

Response to Nuclear Disasters Involving Farms

Public perception develops in the early phases of disaster response, when interest and attention are highest. However, the impact lasts well into the recovery period. A perception that could have a long-term effect on the livestock industry is a lack of consumer confidence in the wholesomeness of food of animal origin. The spread of misperceptions about food must be immediately addressed in disasters, especially nuclear accidents, through reputation management programs. These should be developed before disasters strike.

In an accident involving a nuclear power plant, three Emergency Planning Zones (EPZs) are defined: the basic Emergency Planning Zone (EPZ), the Public Education Zone (PEZ), and the Ingestion Pathway Zone (IPZ). The shape of these zones is a circle around a nuclear facility, even though nuclear plumes do not spread according to geometry, nor do the zones take local geography into account (Fig. 30-1).

The basic EPZ is a 10-mile-radius area from which complete evacuation is planned. The plans and procedures for evacuation are mandated by the Department of Energy (DOE). The DOE oversees standards for evacuation planning and implementation. The PEZ is a 35-mile-radius area in which the public should receive extensive information on the plans and procedures developed for public safety in the event of nuclear accident. The IPZ is a 50-mile-radius area for which plans are developed that address exposure from ingestion of contaminated food (for humans) and feed (for livestock). The IPZ plans, including those for livestock and producers, are made and implemented by the Department of Health and Human Services.

The plans for each of the zones are progressively activated based on the scale of the event (Table 30-1), the amount of radionuclide leakage, weather data, and statistical methods that are used to predict the direction and extent of spread of radionuclide materials. Progressive activation of plans to increasingly larger zones is likely to be the most cost-effective method to deal with a nuclear fallout. However, it is also likely to result in the public perception that the spread of nuclear material is out of control.

Table 30-1 Classification system used for emergencies at nuclear power plants

Emergency classification	Definition	Example	Zones affected
Unusual event and alert	No threat to the public	Operator error, minor equipment failure	None
Site area emergency	Full mobilization of emergency personnel to areas likely to be affected	Release below levels considered safe	EPZ
General emergency	Most severe classification	Potential core melt and threat to public safety	EPZ, PEZ, IPZ

EPZ, Emergency Planning Zone; PEZ, Public Education Zone; IPZ, Ingestion Pathway Zone.

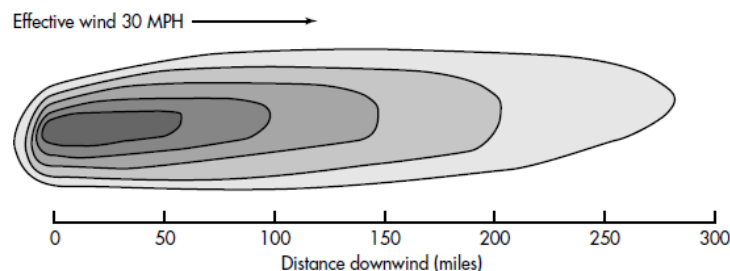


FIG. 30-1 Effects of wind on deposition from nuclear fallout. The shapes of the plume and the distance traveled depend on the wind speed. (Modified from Byrne WF, Bell MC: *Livestock, fallout and a plan for survival*, Oak Ridge, 1973, University of Tennessee Agricultural Extension Services.)

Compliance

As mentioned, the factors that determine the effectiveness of a response to a nuclear accident are compliance and public perception. In no other type of disaster is as much control exerted over the response phase. Virtually every aspect of response has been addressed by regulatory agencies, and unauthorized persons are not allowed to enter potential or known contaminated sites. However, one major aspect of response that authorities appear to have overlooked is the behavior of animal owners, especially farmers.

The evacuation of dairy cows is not as big a problem as people may envisage. One study at the University of Tennessee indicated that 5000 cows can be safely evacuated within 20 hours. The same study, however, indicated that dairy farmers who were flooded would not leave their animals. Similar information is available on beef ranchers. Farmers have consistently shown low confidence in officials who recommend that they evacuate their farms. Even after farmers have been flooded, they have indicated that they would prefer to rely on their own judgment in deciding whether to evacuate. A problem that occurs in a forced evacuation without animals is that farmers attempt to rescue or at least provide food and water for their animals.

The arguments against large-area notification of radiation release are the same as for any large-scale evacuation. These are discussed in Chapter 6. Nonetheless, if emergency management planning has been a community effort involving all stakeholders in the industry, if evacuation routes have been agreed on and are regularly used in drills, and if family disaster preparedness and business resumption plans have been developed, evacuations are not likely to be as great a concern. However, the present “from the top down” authoritative approach is likely to result in low compliance, a low level of public confidence in authorities, and a long-term detrimental impact on the public’s perception of the wholesomeness of meat, milk, and eggs.