

## Chapter 4

# Creating a Food Defense and Response Plan in Complex Food Production Systems

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### 4.1 INTRODUCTION

Food safety is a recurring technical and management challenge, which is further complicated by constantly evolving public perceptions. Currently, the food supply in the United States remains one of the safest in the world. The Centers for Disease Control and Prevention (CDC), however, estimates that 76 million people get sick, more than 300,000 are hospitalized, and 5,000 Americans die each year from foodborne illness (Mead et al., 2000). More than 200 known diseases are transmitted through food. The food supply is susceptible to both unintentional and intentional contamination by a wide range of other agents. Fortunately, there are only a handful of documented instances where the food supply has been intentionally adulterated, although the threat of such contamination is very real. The continued industrialization of food systems, including the development of long, complex supply chains and distribution channels, has complicated efforts to guarantee a safe food supply.

Efforts to understand crises in industrial systems draw heavily on the principles of complex systems theory or chaos theory (Perrow, 1984; Seeger et al., 2003). These approaches emphasize the dynamic and nonlinear nature of highly complex systems. As systems become centralized, increasingly complex and tightly coupled, the probability of unforeseen interactions increases. These interactions carry the potential to create a crisis, or what system theorists call bifurcation. In bifurcation, a system is fundamentally altered in some dramatic way. Thus, a system designed to distribute safe food may function to spread contamination.

Although the modern food production system is very safe, it is increasingly efficient, dynamic, integrated, tightly coupled, and complex. Interestingly, the US food supply is exceedingly centralized, as food companies become larger, more vertically integrated, and fueled by added producers who provide escalating inputs to existing organizations. Today, food travels through agricultural production supply chains on both domestic and international farms, to orchards and ranches, through transportation, to processing in industrial settings, to distribution, into wholesale and retail outlets, and on to the consumer and storage. Modern food production is very susceptible to systemic breakdowns during any number of these steps. This extended chain of production, often expressed with the phrases “from farm to fork,” or “from seed to shelf,” inherently creates vulnerabilities. Industrial, mass production of food products and width of distribution has added to the complexity and increased the chances that an adverse event will be quite widespread.

Greater emphasis on efficiency and smaller profit margins may also serve to reduce slack resources and buffers that may have served to contain crises. The use of technology, such as automated production, while reducing some threats, has introduced others and further enhanced overall complexity. Finally, globalization of food production and distribution has added additional levels of intricacy and reduced levels of predictability. In the global food market, food is produced under a very wide range of regulatory, cultural and economic contexts. These features of the food production and distribution system are all illustrated in the cases presented here.

Insuring the safety and reliability of food production systems is a multi-stage process involving appropriate risk awareness, communication, mitigation resources, and appropriate response strategies. This chapter describes the difficulty of providing food defense within complex, globalized, and highly dynamic food production systems. The high reliability organization and mindfulness framework is proposed as a useful approach for managing and mitigating risks (Weick and Sutcliffe, 2007). The CDC’s Crisis and Emergency Risk Communication (CERC) crisis planning template is presented as a resource to help prepare for and respond to an event (Reynolds and Seeger, 2012).

## 4.2 FRAMING RISKS AND RESPONSES

Many efforts to address issues of risks and their manifestation in the form of a crisis focus on the stages of development. These approaches seek to identify the structure of a crisis both to enhance understanding and to facilitate effective management of risk. Phase or stage models describe how a crisis will develop and evolve over time in a relatively predictable pattern. The result is the description of a series of relatively general and discrete stages or phases that describe the unfolding of crises generally regardless of the

industry, organization, or cause. These approaches also allow for anticipating communication and informational needs over the life cycle of a crisis. As such, they are particularly useful frameworks for risk and crisis management.

Next, we introduce food defense and response plans by discussing a simple three-phase model of precrisis, crisis, and postcrisis. This model is used widely by organizational crisis theorists and is probably the most widely used framework in part due to its simplicity. During precrisis, an emerging threat or risk develops and interacts with some other aspects of a system. This process is typically described as an incubation or gestation period where the magnitude of a threat grows and interacts in unanticipated ways. Often, this incubation involves a risk judged by managers as relatively minor interacting in a nonlinear and disproportional way with other factors. Sometimes, organizations have failed to conduct adequate risk assessment. In other cases, threats converge or connect and interact with new deficiencies or fallacious assumptions about risk. Another common interaction concerns the level of threat preparation interacting with other system needs. In the case of Peanut Corporation of America, for example, what was perceived as relatively minor issues of sanitation interacted with poor inspection procedures resulting in a massive salmonella outbreak in 2008 and 2009. The recall of Peanut Corporation of America was complex and extensive because the company's product, peanut paste, was an ingredient in dozens of other food products. The outbreak was eventually associated with almost 700 reported illnesses and 9 deaths.

The second stage, or the crisis stage, begins with the trigger event and a general recognition that a crisis has occurred. Most often the trigger event is some dramatic, sudden occurrence that signals a severe disruption of the system and onset of harm or the potential for harm. In other cases, the realization that a crisis is occurring is a slow realization. The crisis stage continues until the harm is contained and the organization has returned to some relatively normal operation. One of the challenges in the case of contaminated food, however, is that an outbreak of foodborne illness is usually not immediately identified. Tracking the outbreak back to the source usually takes even longer. Disease surveillance systems have become much more sophisticated in the last decades and advances in epidemiology allow for rapid strain typing of bacteria (CDC, 2012). In the case of the 1993 Jack in the Box outbreak of *Escherichia coli* O157:H7 bacteria, even with good local surveillance, it took 39 days to determine that a serious outbreak was happening. By the time the outbreak was identified, traced to the source, and contained, the deaths of 9 children and 600 illnesses were associated with eating undercooked hamburgers from Jack in the Box (Bottemiller, 2013).

The final stage, postcrisis, begins when the harm, drama, confusion, and uncertainty of the crisis dissipate and some sense of order is reestablished. Postcrisis is generally accompanied both by a sense of relief and recognition

of the loss that has occurred. This stage typically involves an intense investigation and analysis that includes efforts to create plausible explanations of what went wrong to answer: why, how, who is to blame, and what should be done to prevent future crises. Apologies may be warranted to those who were harmed and further reflection could provide lessons learned from the incident.

In August 2008, the Canadian food company Maple Leaf Foods announced a recall for several products linked to a listeria outbreak. The outbreak would eventually be associated with five deaths. Maple Leaf Foods acted very quickly to close the plant where the products were produced and recalled products. By taking this aggressive, proactive stance, the company demonstrated sincerity and commitment to consumers. On August 23, 2008, Maple Leaf CEO, Michael McCain, issued a public apology accepting responsibility for the outcome. In the video posted on YouTube, he acknowledged that the company was at fault and described what he was doing. He expressed his deep personal expressed sympathy for those affected: "... our best efforts (to keep customers safe) failed and we are deeply sorry." McCain noted that his company exists in a "culture of food safety" and that "We have a unwavering commitment to keep our food safe." Finally, McCain acknowledged that, "We know this has shaken your confidence in us. I commit to you that our actions are guided by putting your interest first" ([http://www.youtube.com/watch?v = zIsN5AkJIAI](http://www.youtube.com/watch?v=zIsN5AkJIAI)).

The postcrisis stage can provide direction for both food defense systems and crisis response plans. Defense of the food system is a precrisis process and activity that involves risk analysis, assessment, developing appropriate process structures, norms, capacities, and values to insure the ongoing production of a safe product (Novak and Sellnow, 2009). Crisis planning is also a preevent activity that is manifest in the crisis and postcrisis stages. Crisis planning establishes procedures for operating in response to the unique conditions created by a crisis and is necessary but not always sufficient for an effective response.

In the following sections we describe processes and procedures for food defense as an ongoing process of risk assessment and analysis. We describe general methods and procedures for crisis planning that will aid a food organization to respond more effectively to a crisis.

### **4.3 PROCESSES AND PROCEDURES FOR FOOD DEFENSE: HIGH RELIABILITY ORGANIZATIONS**

In every aspect of the food industry, organizations rely on well-planned routines to collect, transport, clean, process, package, and distribute their products. These routines provide both efficiency and safety for consumers. Yet, at every step of the process the routines of food production are susceptible to pathogens that can enter the production process and contaminate consumer products. To further complicate the issue, food production procedures are

vulnerable to intentional attacks ranging from sabotage to full-blown terrorism (Doeg, 2005; Mohtadi and Murshid, 2009). The routines of production warrant constant review and updating.

The routines that operate in the food industry should be reviewed mindfully. A mindless approach occurs when routines are applied with such calloused regularity that workers and managers forsake the conscious observation and reporting of failures that is necessary to preserve high standards of food safety. By contrast, mindfulness is characterized by workers and managers whose “attention naturally goes to what is different and out of balance” (Langer, 2009, p. 13). In other words, food industry workers are mindful when they notice minor failures throughout the production process that could result in the contamination of products. Ideally, every member of the organization exhibits a “high level of sensitivity to errors, unexpected events, and—more generally—to subtle cues suggested by the organization’s environment or its own processes” (Levinthal and Rerup, 2006, p. 503).

Mindfulness is an essential characteristic in maintaining high reliability in organizations and requires effective communication about risks. Weick (1993) suggested that organizations begin the high reliability process by making sense of the minor failures they observe. This sensemaking process includes creatively solving problems, clearly defining roles among employees, continually questioning assumptions—even those with a long history. A willingness to encourage employees to voice their concerns and to follow up on issues is also important. More recently, Weick and Sutcliffe (2007) advocated a series of specific steps or commitments based on effective communication.

High reliability organizations (HROs) typically encounter risk on a regular basis. They respond to those risks through the mindful use of techniques for observing failures, gathering the best information available, and engaging in corrective action. Novak and Sellnow (2009) found that the mindful participation of employees at every stage of food production can reduce the risk of both unintentional and intentional contamination. They observed that food production workers do notice production problems and, if a supportive environment exists, are willing to report problems to supervisors. The HRO model offers a series of specific suggestions for anticipating and containing problems (Weick and Sutcliffe, 2007).

#### **4.4 ANTICIPATING PROBLEMS**

HROs anticipate problems by displaying a preoccupation with failure, reluctance to simplify, and sensitivity to their operations. When organizations use these strategies and open communication to accompany them, they increase their potential to identify and address a risk before it becomes a crisis. Anticipation is based on scrutinizing all potential vulnerabilities. This scrutiny helps workers and supervisors to avoid oversimplifying tasks to a point of encouraging a mindless application of routines. Food processing

organizations should anticipate problems at every stage ranging from harvest to delivery of a packaged product to retail outlets.

#### 4.4.1 Preoccupation With Failure

The observation, reporting, and analysis of even minor failures is critical to the HRO approach. Without a willingness to reconsider routines based on minor failures, organizations often develop a false sense of confidence. In fact, many organizations interpret near misses as a sign of resilience when in fact a crisis was averted by luck or chance rather than by procedural effectiveness (Tinsley et al., 2012). To counter this preoccupation with failure, the HRO model suggests embracing failure more than success (Weick and Sutcliffe, 2007). In short, a preoccupation with failure assumes that risk mistaken for safety is far more threatening than safety mistaken for risk.

#### 4.4.2 Reluctance to Simplify

Efficiency and simplicity are not always synonymous. A simple system may be efficient. If, however, that simplistic system allows harmful bacteria to contaminate a food product, the ensuing harm may be quite complex. The HRO management philosophy resists the temptation to simplify. Organizations should constantly create new categories for interpreting the risks and procedural challenges (Weick and Sutcliffe, 2007). Operations or procedures will function best when differentiating categories or labels are accepted by employees. Rather than categorizing all risks into one category, HRO uses subcategories and scrutinizes “examples that fit the category imperfectly to see what *new* category they suggest” (p. 58). This reluctance to simplify enables HROs to create a language for risk communication that is more sensitive to the dynamic nature of risk. It also allows the HRO to see differences in kinds of risks that might otherwise be overlooked.

#### 4.4.3 Sensitivity to Operations

Simply put, organizations display sensitivity to operations when they attend to “the messy reality inside most organizations” (Weick and Sutcliffe, 2007, p. 59). Routine procedures can lead employees to mindlessly assume that their intentions and expectations reflect reality. In truth, these assumptions can create a false sense of confidence that inhibits the recognition of failures. Sensitivity is the antithesis of these mindless assumptions. Sensitivity to operations is accomplished when organizations “focus on actual work rather than intentions, define actual work by its relationships rather than its parts, and treat routine work as anything but automatic” (p. 62).

## 4.5 CONTAINMENT

Anticipation strategies are designed to help organizations see new and emerging risks and to respond to these emerging problems before they result in crises. The HRO model accepts that not all risks can or will be observed before they manifest into threatening conditions. Thus, the model introduces containment as a means for responding to events “mindfully and swiftly” after they have occurred (Weick and Sutcliffe, 2007, p. 65). Strategies for doing so include a commitment to resilience and deference to expertise.

### 4.5.1 Commitment to Resilience

From an HRO perspective, organizations are resilient when they are “mindful of events *that have already occurred* and . . . correct them before they worsen and cause more serious harm” (p. 68). Doing so requires organizations to engage in precrisis planning (Seeger, 2006). The National Center for Food Protection and Defense explains that such precrisis planning involves establishing communication networks, assigning communication roles, and having the resources needed before a crisis event occurs (Sellnow and Vidoloff, 2009). Organizations committed to resilience prepare themselves for crises so that, despite the uncertainty, they have the strategies and resources in place to continue to function, recover quickly, and adapt their operations after such events.

### 4.5.2 Deference to Expertise

The HRO model does not prioritize organizational hierarchies in the management of risk. In fact, such hierarchies can preclude an organization’s decision makers from receiving the most accurate and informative input regarding failure. Deference to expertise occurs when organizations allow information to flow in all directions throughout the organization so that expertise is shared both upward and downward. For example, regular feedback from line workers can help supervisors regularly revise routine procedures to adjust to evolving risks. Organizations that diminish the role of worker input at any level increase the potential for minor failures to grow into serious crises.

## 4.6 PLANNING A RESPONSE TO A FOOD-RELATED CRISIS

While the HRO approach can significantly reduce the occurrence of crises in the food industry, some will occur. Eventually, food products contaminated with serious pathogens will be consumed by the public resulting in illness. Some of these illnesses will be serious and several will result in deaths. In these cases crisis preparation, including a crisis plan, is essential. What is crisis preparation and how can a food company be prepared? Preparing for a

crisis is a multifaceted and ongoing process which involves a variety of steps. Preparation includes understanding how a crisis is likely to evolve, training personnel, cultivating crisis response capacity, and developing an operations plan alongside a communication plan.

While the HRO approach can significantly reduce the occurrence of adverse events in the food industry, crises do occur. Contaminated products may be distributed and consumed by the public resulting in illness. Some reported cases will be very serious and invariably consumer death is always a possibility. In these cases, crisis preparation is essential. Food companies can contribute to their preparation by assembling a crisis communication plan. While a crisis plan does not insure an effective response, it significantly increases the chances that the response will be carefully thought out and timely, and that critical skills and resources are available.

Crisis preparation is a complex and ongoing process. To be successful, communicators will need to understand how crises evolve, the role of training, how to establish response capacities, and how to develop an operations plan and a communication plan.

#### 4.6.1 Crisis Phases

The CDC developed a five-stage model to help identify specific communication activities associated with a public health emergency. These include: (1) precrisis, (2) initial event, (3) maintenance, (4) resolution, and (5) evaluation ([Reynolds and Seeger, 2012](#)). Crisis preparation and planning can take advantage of these stages to indicate what will need to happen during each stage.

##### 4.6.1.1 *Precrisis*

Planning and preparation can help an organization be ready once a crisis emerges. There are certain challenges that are unique to the food industry that should be anticipated. For example, there should be a process in place to determine the source of a contamination. Organizations should anticipate predictable crises and form appropriate responses in advance. The precrisis phase affords organizations time to plan for common crisis events, develop chains of command, assign tasks, select spokespersons, train staff, form alliances with partner organizations, draft messages, and collect resources.

##### 4.6.1.2 *Initial Event*

When a crisis emerges, the time to plan has passed. Responders will need to activate existing plans as quickly as possible while still verifying facts about the event. Once a basic understanding of the event is available, the communication plan can be activated and amended to fit the current situation. During the initial stage the public needs to know how current risks will impact them personally, what they should do to protect themselves, where to



get more information, which agencies are tasked with responding to the event, and ultimately who will be responsible for fixing the problem. Food events often result in recalls which need to be communicated in a timely manner and designed to reach the target audience. The public will also want to know the basics of who is at fault, what happened, where and when the crisis occurred, and why current procedures or policy failed to protect them.

#### *4.6.1.3 Maintenance*

Crises generally enter the maintenance stage once the immediate danger from the event is contained. Once the shock of the initial event subsides, responders will need to answer questions about fault, the likelihood that the crisis could have been prevented, what will be done to ensure the crisis never happens again, and finally what the organization will do differently in the future. Instead of simply reporting facts, the organization may need to respond to questions and criticism from the media. In some cases, organizations have apologized for the harm caused by a contaminated product. Moreover, although the crisis may seem to be contained, communication surrounding the event could escalate as new details emerge.

#### *4.6.1.4 Resolution*

There is no clear-cut moment that defines a shift to the resolution phase. The exact amount of time depends on how quickly responsibility is defined (i.e., if an investigation is necessary) and how quickly those affected recover. Be prepared to truly examine what went wrong, improve organizational capabilities to control future risks, engage in communication to bolster public support, and potentially draw attention to systemic failures outside of organizational control that need to be addressed (e.g., a food safety policy that needs to be changed).

#### *4.6.1.5 Evaluation*

It is important to allocate time to revisit the communication plan and make note of what worked well and what failed. Ignoring lessons learned will increase the chances that an organization will repeat a mistake again in the future. Consider archiving communication documents along with a final report which reflects collective understanding of the event for future use.

### **4.6.2 The Unique Nature of Food Crises**

Food safety professionals can anticipate some of the challenges unique to their industry. The first is determining the source of contamination. For example, in 2007 ConAgra responded to a *Salmonella* outbreak in Banquet brand frozen poultry pot pies. At first, ConAgra concluded that consumers were in fact undercooking the pot pies (Sellnow and Petrun, 2009).

Later, the company learned that in fact prescribed cooking instructions for the pot pies were incorrect. Unfortunately, this misunderstanding implied that ConAgra was simply trying to shift the blame for the contamination to consumers instead of assuming responsibility. If possible, it is helpful to anticipate who will be in charge of an initial investigation, who would need to be notified about a contamination (e.g., other industry partners, distributors, consumers), and how each of those groups could be reached.

Food illness can be difficult to identify at first and different types of information may need to be communicated at different times. Organizations will also need to work with the US Food and Drug Administration and/or the US Department of Agriculture. Recalls are usually voluntary and conducted by the manufacturing organizations, although in some instances if a company has failed to identify a contamination, recalls may be mandated. During the precrisis phase organizations should anticipate the process of both communicating with the public, reporting to regulatory agencies, and releasing internal updates and calls to action for employees.

### 4.6.3 Training and Developing Crisis Response Capacity

Crisis preparation should begin by assessing current crisis response capabilities. [Weick and Sutcliffe \(2007\)](#) suggest performing “conscious audits” to help anticipate current capabilities (p. 83). Knowing what response capacity is available, for example, means that organizations should know what needs to go right and how things can go wrong. Companies can also assess mindfulness to see where employees, departments, and leadership fall short. Identifying organizational strengths and weaknesses will help in developing effective crisis plans.

Several training options are available to bolster capabilities during the precrisis phase. For example, managers can help employees learn crisis procedures by holding drills. Drills typically test a part of the crisis plan. Another option is to facilitate an exercise that simulates a larger-scale organizational response within a realistic scenario. Exercises allow responders to test policies and procedures under pressure and become familiar with operations. Exercises and drills should be conducted when crisis response operations are created or changed, and typically at least once a year.

Additionally, planning should anticipate surge capacity. For example, during a national or international contamination, additional communication staff, public health professionals, spokespersons, administrative support, among other skills, may be needed. Anticipating surge capacity should assess what internal staff can manage, when contracted or additional staff would be called, and how other organizational partners could contribute to the response. While it is usually impossible to know initially how widespread a recall will be, organizations need to be ready to assume the greatest level of damage has happened so they can be ready to respond should a worst-case scenario occur.

Finally, organizations will need to cultivate relationships with external audiences prior to including them in a crisis plan. Strategic partners could include industry groups, employees, investors, media, or nongovernment organizations, or others. Alerting these key groups to crisis plans in advance, and sharing finalized crisis-planning documents with them, will allow them to be prepared to work with a responding organization. Ideally, organizations will work together to disseminate consistent messages and avoid communication breakdowns (Seeger, 2006).

#### **4.6.4 The Emergency Operations Plan and Communication Plan**

An emergency operations plan outlines procedures for mitigating the harm surrounding a crisis. In the case of food systems, this may include halting production and shipment, inspecting, cleaning, and repairing equipment and operations, securing information and records, and notifying appropriate agencies, among other activities. An emergency operations plan will specify who is responsible for these activities and specify procedures and steps. Typically the plan specifies the team members who will manage the crisis response. Alongside outlining technical procedures, the communication plan will detail policy and procedures to communicate with implicated stakeholder groups.

Ideally, a communication plan will be developed alongside the emergency operations plan. While information may overlap in some areas, the communication plan will delineate roles, responsibilities, and resources to reach the public, media, government, and nongovernment organizations during a crisis. While communication plans will vary organization to organization, several foundational elements are essential including (Reynolds and Seeger, 2012):

*A note from leadership.* An introductory note from leadership endorsing a crisis plan signifies support for a plan and inspires confidence in those who will follow the plan.

*Public information team responsibilities.* Each team should be listed in the document, along with an outline of which team will be held accountable for assigned tasks.

*Information verification and clearance policy.* Clearance procedures for information should be established in the precrisis stage. Names of who approves what and when should provide a detailed overview of the clearance process. This information is imperative to ensure information is not released without verification and approval.

*Media contact lists.* Compile any contact that could be needed from local, state, and national media.

*Coordination information.* Discuss how multiple organizations would work together during a response. Include a point of contact for emergency response partners.

*Spokespersons.* Identify approved and media-trained spokespersons.

*Emergency response team member's contact information.* Include each team member's full contact information so they can be reached day or night.

*Procedures to acquire resources.* Overview how additional resources, including space, equipment, and personnel, should be acquired.

*How information will be disseminated.* Crisis response can use many methods to release information, spanning from traditional newspapers and television to new media and other digital tools. Plan what channels will work best to reach anticipated stakeholder groups.

*Identified list of key stakeholder groups.* Finally, define stakeholder groups and list known points of contact. Stakeholder could include anyone that might contact the organization (Coombs, 2012).

Communication planning will yield a document unique to each organization. There is no prescribed length or design format; rather, plans can be composed in a style and format consistent with other organizational documents. It is likely that no two organizations will have the exact same plan. Plans should be revisited, updated, and revised as organizations adapt to current events and new threats.

## 4.7 CONCLUSION

Creating a food defense and response plan in complex food production systems is an ongoing process that should be matched to the evolving risks an organization faces. Risks in the food industry are continuously changing as products, production systems, consumers, and regulations change. The high reliability approach is useful in maintaining strategic risk awareness. Regardless of vigilance, food companies still face some likelihood that crises will occur. In these cases, the crisis planning process and a crisis plan can be critical to mounting an effective response.

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