

Food Defense: What It Is, Why We Need It, and Where It's Going?

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Introduction

As CEO of ISI Security, one of my jobs is keeping up with current security trends surrounding different industries and there is almost no other industry in which security impacts more people than the nation's food supply. For the purposes of this discussion, food includes all commercially produced consumables (i.e. food, water, beverages, pharmaceuticals).

Food Safety / Food Defense

Food safety laws began to take shape in the early 1900s after the publication of the novel, The Jungle by Upton Sinclair. In that novel, the author exposed the appalling unsanitary conditions in America's meat packing industry, and by extension the nation's food industry as a whole. Following that publication, the public outcry demanding changes to address the conditions forced government at all levels to establish laws to protect the public from accidental or careless practices that could result in premature spoilage or dangerous adulteration of food products. These laws, while extremely important, are not broad enough in scope to protect the public from the modern terrorist age.

Food safety differs from food defense in that it is only concerned with unintentional acts. Food defense is defined as activities associated with protecting the nation's food supply from deliberate or intentional acts of contamination or tampering (<http://www.fda.gov/food/fooddefense/training/ucm111382.htm>). The concept of food defense as a unique and separate study from food safety came in the wake of the terrorist incidents of September 11, 2001. While there was no food based bioterrorism related to those incidents, Al-Qaeda and related groups have made food bioterrorism a stated goal (<http://www.cnn.com/2010/US/12/21/al.kaeda.poison.plot/>).

Food That Kills

Intentional adulteration or poisoning of food is not a new concept. In antiquity, intentional poisoning of food was usually associated with targeted assassination attempts and not generalized terrorism. Mass contamination of people or armies usually took the form of poisoning an enclosed area through the introduction of rotting bodies of dead soldiers or animals. The resulting disease left fear and death in its wake.

To terrorists, causing fear in the targeted population, even without mass casualties, is a stated goal. This is one reason why food bioterrorism is considered effective. Even a failed attack will have the effect of creating fear in the targeted population, as well as possibly

have a devastating impact on the economy. Some examples of modern food based bioterrorism:

In February 1978 disgruntled Palestinian citrus workers intentionally injected Jaffa oranges with liquid mercury in an attempt to cause damage to the Israeli economy. Five Dutch children were sickened, but later recovered (Jewish Telegraphic Agency, February 1, 1978).

In October 1984, members of the Rajneeshee cult put liquid salmonella on local salad bars around Dalles, Oregon, in a test run for a larger scheme to sway a local election. Ultimately 750 people were sickened, and became the largest example of food bioterrorism. Thankfully, none of the victims died (New York Daily News, June 15, 2013).

In the space of three days beginning on September 29, 1982, seven people died in and around Chicago, Illinois, from cyanide laced capsules of Tylenol. The murders triggered a nationwide panic that resulted in the product being pulled from the shelves of all stores. While the person or people responsible for this crime are still at large, the investigation is still active and on-going to this day (<http://www.foxnews.com/us/2013/09/28/chicago-tylenol-murders-remain-unsolved-after-more-than-30-years/>).

Chain of Vulnerability

At first glance, food safety measures are indistinguishable from food defense as it relates to the steps taken to prevent and mitigate public harm. In essence, food defense is everything that food safety is, plus additional security measures. Part of the extreme difficulty in defending the nation's food supply is the multitude of steps in harvesting and/or bringing products to market. Each of these steps is a potential avenue for the introduction of poisons or pathogens that could cause mass panic and death. Food defense is broadly broken down into two major areas of vulnerability. The first area of vulnerability is pre-harvest.

Pre-harvest applies to both plant production and livestock, and includes the time the raw products are in their growing or cultivation period. Commercial animal and plant production in the pre-harvest phase require large areas of production (i.e. fields and pastures) making effective security a difficult and expensive proposition. Current security of plants and animals in the pre-harvest phase is basically non-existent. Agricultural fields generally have, at most, barbed wire fencing, while most having no security. Livestock security is usually centered on anti-rustling efforts through the use of GPS and/or RFID tracking hardware and is thus ineffective in regard to food defense. Introduction of an adulteration or poison in the pre-harvest phase may be difficult as it relates to effectiveness, but is low-risk for the terrorists to undertake without discovery. The second major area of vulnerability is post-harvest.

Post-harvest also applies to both plants and animals, and includes the time the raw products are removed from their field or pasture to the ultimate delivery to the consumer. The steps in the post-harvest/production phase are numerous and diverse, and include:

- Harvest / Slaughter
- Storage
- Processing
- Packaging
- Storage



- Wholesale
- Retail Distribution or Food Service
- Delivery to the Consumer

Between most or all of these steps is also the added step of transportation.
(Food Defense Incidents 1950-2008 by G. R. Dalziel)

It almost goes without saying that the above process is ripe for the intentional introduction of poisons or pathogens. Security, at all the links in above chain may vary slightly, but generally the security will be some form of controlled access along with low use of camera surveillance.

Homeland Security Act

The first major piece of legislation relating to food defense was the National Infrastructure Protection Plan (NIPP) portion of the Homeland Security Act of 2002. The NIPP is divided into Sector-Specific Plans (SSPs) that cover all aspects of protecting the nation's critical infrastructure. The SSPs related to food defense are:

- Commercial Facilities SSP
- Critical Manufacturing SSP
- Food and Agriculture SSP

While extremely valuable as the nation's first foray into the area of food defense, the SSPs are written in a very broad manner and don't provide many details that anyone outside of that SSP would understand. Also, each SSP can be anywhere between 100 to 200 pages in length, making condensing them down to a brief of this type virtually impossible. For purposes of this brief, we will look at the follow-up actions by the executive branch agencies who take broad mandates and turn them into policies.

Guidance For Industry

Released in March 2003, and then revised in October 2007, the Food and Drug Administration's (FDA) Guidance for Industry: Food Producers, Processors, and Transporters: Food Security Preventive Measures Guidance provided nonbinding recommendations to industry in furtherance of food defense. It covered the following topics:

- A. Management
 1. Preparing for the possibility of tampering or other malicious, criminal, or terrorist actions.
 2. Supervision
 3. Recall Strategy
 4. Investigation of Suspicious Activity
 5. Evaluation Program
- B. Human Element - Staff
 1. Screening (pre-hiring, at hiring, post-hiring)
 2. Daily Work Assignments
 3. Identification

4. Restricted Access
 5. Personal Items
 6. Training in Food Security Procedures
 7. Unusual Behavior
 8. Staff Health
- C. Human Element - Public
1. Visitors (for example, contractors, supplier representatives, delivery drivers, customers, couriers, pest control representatives, third party auditors, regulators, reporters, tours)
- D. Facility
1. Physical Security
 2. Laboratory Safety
 3. Storage and Use of Poisonous and Toxic Chemicals (for example cleaning and sanitizing agents, pesticides)
- E. Operations
1. Incoming Materials and Contract Operations
 2. Storage
 3. Security of Water and Utilities
 4. Finished Products
 5. Mail Packages
 6. Access to Computer Systems

(<http://www.fda.gov/Food/GuidanceRegulation/GuidanceDocumentsRegulatoryInformation/FoodDefense/default.htm>)

While being the most comprehensive set of food defense related policies to date, because it was nonbinding, there were no incentives for industry to adopt them.

Holes In The Armor

As of 2011, even with the NIPP SSPs in place, there was a lot of evidence the food industry was taking a “business as usual” stance when it comes to food defense with the tacit approval of the federal government. This was allowed to happen through a complete lack of coordination in effectively utilizing the money allocated to all the federal agencies with a stake in food defense. Things were so bad that renowned bioterrorism expert, John Hoffman, was quoted as saying, “We may be blindsided by an intentional food-based attack on this nation sometime soon,” and “The unfortunate truth is that we, as a nation, lack effective surveillance ... At present, our primary detection capability is the emergency room.” (<http://www.foodsafetynews.com/2011/09/gao-lack-of-coordination-for-us-food-defense>)

Food Safety Modernization Act

Food defense was also a substantial part of the Food Safety Modernization Act (FSMA) of 2011. The crux of FSMA was transitioning the federal government from a mainly reactive stance, when it comes to the safety and security of the nation’s food supply, to a preventative or risk mitigation based model. As part of the FSMA, there is a proposed rule called, “Focused Mitigation Strategies to Protect Food Against Intentional Adulteration”. This rule, whose details are still under consideration, will become the cornerstone of the nation’s food defense strategy once the rules are finalized. Once the rules are complete, they



will apply to any owner, operator, or agent of all domestic or foreign facilities required to register with the FDA.

FMSA Proposed Rule

The FDA has identified four key activities within food systems that are the most vulnerable to adulteration:

- Bulk Liquid Receiving and Loading
- Liquid Storage and Handling
- Secondary Ingredient Handling
- Mixing and Similar Activities

Facilities would be required to review their production system to determine if they have any of these activity types or complete their own vulnerability assessment. Once that is completed, they would need to identify actionable process steps, which are points, steps, or procedures in a food process that will require focused mitigation strategies to reduce the risk of intentional adulteration. Facilities are also required to complete a written food defense plan. Once in place, this proposed rule would establish measures that a food facility would be required to implement to protect against the intentional adulteration of food.

Food Defense Plan

Each facility covered by the rule would be required to prepare and implement a written food defense plan, which would include the following:

- Actionable Process Steps
- Focused Mitigation Strategies
- Monitoring
- Corrective Actions
- Verification
- Training
- Recordkeeping

(<http://www.fda.gov/Food/GuidanceRegulation/FSMA/ucm378628.htm>)

Emerging Trends

Recently the FDA has introduced two new programs related to food defense:

- Food Defense 101
- Food Defense Plan Builder

Food Defense 101 provides training in preparedness against an intentional attack against the food supply. The courses provide an understanding of and guidance for developing a Food Defense Plan based on a common sense approach.

Food Defense 101 is comprised of four courses:



1. Food Defense Awareness for the Food Professional
2. Food Defense Awareness for the Front-line Employee
3. Food Defense Regulations
4. ALERT, for owners and operators of food facilities

(<http://www.fda.gov/Food/FoodDefense/ToolsEducationalMaterials/ucm353774.htm>)

The Food Defense Plan Builder is a software program designed to assist owners and operators of food facilities with developing personalized food defense plans for their facilities.

The Food Defense Plan Builder guides the user through the following sections:

- Company Information
- Broad Mitigation Strategies
- Vulnerability Assessment
- Focused Mitigation Strategies
- Emergency Contacts
- Action Plan
- Supporting Documents

(<http://www.fda.gov/Food/FoodDefense/ToolsEducationalMaterials/ucm349888.htm>)

Conclusion

The trend in the area of food defense is an increase of mandated regulation, with little or no government funding of the costs required to comply with the new regulations. While the government has and will likely create tools and programs to minimize the impact of compliance, the majority of the financial burden will fall on the industry itself. This also means the private sector must prepare now to take on these added responsibilities. Even though there hasn't been a successful attack or even a credible, identified plan to target the nation's food supply, the implications of a successful terrorist incident are potentially beyond measure. In addition to possibly large numbers of people who become sick or killed, there could also be huge economic impacts resulting from an attack on the nation's food supply and resulting panic. Like other areas of critical infrastructure, the food industry is on the front line of America's new war.

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