

# Development of an On-line Food Safety Training Course for Food Distributors.

REPORT PROJECT – MALS

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## Why Food Distribution?

Food Distribution is integral to the food supply system in the United States. Our food comes from many sources and must be shipped to many more before the consumer is able to take control. Product handling and storage conditions during this phase are critical to the overall quality and safety of the food. Having worked for a major foodservice distribution organization in the area of quality assurance, for 25 years, it became apparent that food quality and food safety was becoming more and more important to the consumer. Distributors needed to provide documentation as evidence of proper food safety practices because not only was it becoming critical to regulators but to customers as well.

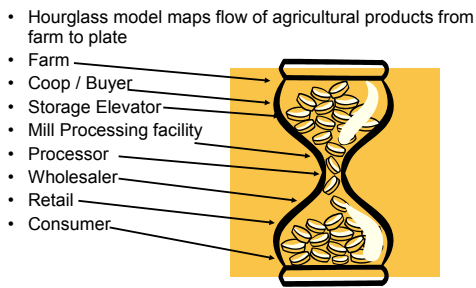
With the introduction of regulatory HACCP in Seafood, Meat & Poultry, and Juices starting in the late 1990's, warehouses came under greater food safety regulations. Distributors were covered simplistically and without much enforcement. The Bioterrorism Act of 2002, introduced another level of regulation and expectations that fall squarely on the shoulders of distributors in the terms of traceback and food defense. Training of the distributors who were members of our group became imperative. No GMP or SSOP training was available to our industry, and HACCP training programs were targeted at processors. Recall and Food Defense training for a warehouse was also limited. Therefore, working with Virginia Tech's food science department and others, I developed and delivered distributor appropriate training for over 250 managers. The positive result was that customer complaints caused by product mishandling were significantly reduced. Unfortunately over that same period, it became apparent that these managers needed assistance in training their teams after they went home and began building their programs. The request for a simplified, job appropriate training program for staff became a consistent theme.

### ***Importance:***

The Food Distribution System in this country is a critical node in the farm-to-table continuum. (Scheule, 2001) Most of the food produced in this country is grown and processed in key regional areas and is shipped many thousands of miles before consumption. (Chite, 2005; Monke, 2005) This means that after production or harvest the distributor is the second or third stop on a food's path to the consumer. (See Hourglass Models -- Chart 1 )

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## Crops: Hourglass Model:



## Animals: Hourglass Model:

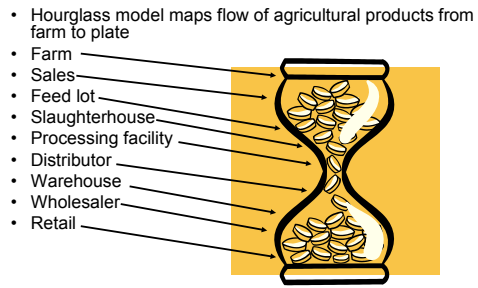


Chart 1: Source: (Boyer, 2007)

The Food Distribution Industry is divided into types by the customer base that it services. Food Distributors can have a retail customer base – grocery stores, convenience stores, or a foodservice focused customer base – restaurants, hotels and other away from home eating establishments. The type of customer is relevant only to the distributors marketing plan. It does not affect their regulatory status, training needs, or process flow.

The Distributor might be further divided by product mix. The distributor's focus might be specialized in a product commodity type, i.e., meat, produce, seafood, chemical, paper. These niche distributors are usually small and have a very narrow band of products. Retail Food Distributors while they have a wide array of products they deliver their products in large lot sizes, pallets of products at a time versus one case at time. These distributors all have the same process flow and training issues as a larger distributor but the product mix or cross contamination issues are limited so their food safety programs might be slightly less complex or less regulated.

The most complex type of food distribution operations is a "broadline" foodservice distributor. This company is one who purchases products intended for sale in the foodservice industry and the products are sold to restaurants, hotels, nursing homes, hospitals, schools, daycare centers, prisons, and military installations. These facilities are of special interest because they have a wide range of products, general 4,000 to 15,000 SKU's in inventory. The products may be refrigerated, frozen or shelf stable. They may be fresh unprocessed or may be processed to various degrees, i.e., raw, prepared, pre-cut, partially cooked, fully cooked or ready-to-eat (RTE). A broadline distributor inventories and sells non-food items: cleaning supplies, fuels (sterno and candle types), paper goods, foils-films, cutlery, and both small and large kitchen equipment. These facilities carry products that fall under the jurisdictions of the FDA, USDA, EPA, and U.S. Customs. They have the most complex needs for food safety programs and training. They tend to have higher numbers of individuals on staff and can experience high turnover, which increases the need for an effect training program. These firms also employ computer based logistical programs to help aid in order picking proficiency, but which do not have food safety logic built into the systems. They build orders, based on route through the warehouse, truck routes, with cube maximization to ensure that the greatest number of cases is loaded into the truck with the lightest weight products on top.

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In all cases a distributor purchases product from a “vendor”, the products are transported from the manufacturing facility or from a manufacturer’s “forward warehouse.” The logistics and transportation systems needed to manage this inbound system are huge and offers access, and opportunity for a motivated individual to cause harm, or for an untrained or inexperienced truck driver to be reckless in maintaining the cold chain or product integrity. Internally, the opportunities for a food safety failure in warehouse process flow are also numerous, for both unintentional acts as well as intentional acts of sabotage or terrorism. With this commingling of products, even though most are in closed containers, and the rapid pace of the distribution business, it should be evident that individuals in this area of the food chain have a strong impact on food safety and food defense; thus reinforcing the need for procedural training and food safety education for workers in this segment.

Upon doing a literature search, as well as reviews of industry trade group resources, web based advertisements; only one source of training was found that directly related to food safety training for a warehouse associate. It was offered by a United Kingdom company, Food First Health and Safety . They offer “food hygiene” training. According to the company’s advertisement the one hour course “is designed to provide increased understanding about food hygiene,” and “includes information and advice to employees on the health issues concerning food hygiene.” The program is for purchase and has not been reviewed. (<http://www.firsthealthandsafety.co.uk/foodhygiene.php> )

There are numerous sites that offer generalized GMP, HACCP and other related Food Safety Training. Most training is directed at production based activities. Warehouse safety training is available. However, training is directed towards workers personal safety, meeting OSHA requirements, understanding material data safety sheets, equipment operational training, safe handling of wooden pallets, etc.

Food safety training is readily available for food handlers in the foodservice industry. The National Restaurant Association ServSafe™ Program is an excellent example. By design, it starts its food safety control and training at the delivery step. This program, properly suggests, that the restaurant operation should insist that its purveyor have food safety systems in place and that cross contamination and cold chain management are controlled up until the point of delivery by the purveyor.

FDA and USDA also focus on the processor and more recently on the producer, but merely cover distribution by introducing the word “food holding”, “storage” or “storage facility” into the regulations. Often distribution facilities are ignored by regulators, or are only visited when an Agency is investigating a recall. The FDA’s Food Warehouse Inspection Report Form FDA 2679 (8/01) is a three (3) page document that contains twenty-six (26) points of inspection. This form asks basic GMP questions but does not address regulatory HACCP or Food Defense issues; thus, demonstrating the need for a simplistic or customized training. It also demonstrates the government’s view that warehouses are generally not implicated in outbreaks.

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It is true that thus far, Distributors have not been central to product failures. However, they are central to Cold Chain Management and Recall or Traceback Investigations programs. In the event of a “product failure” the Distributor needs to have programs and documentation in place to prove that they were not the cause. Since they are a key dispersement site they need to be prepared to readily identify where and when select product has been shipped. This then is the goal of a food safety program at the distribution level. Distributors must have programs, management systems, documentation, and training to ensure that the products are properly maintained while under their control, and have proper rotation and traceback systems.

In some cases distributors “break cases” or operate in-plant retail sales operations. These behaviors, created a greater opportunity for introduction of biological, chemical, or physical hazards as the warehouse associate might be “repacking” or dealing with damaged containers. When this occurs, all of the food safety programs that a processor or grower is required to comply with comes into play, and full compliance is necessary. Training of the associates becomes even more important.

It is evident that specific or specialized training is needed and availability is limited. Therefore, the development of such a program for the industry was determined to be a valid objective. The goal or developmental objective should be that all associates in a food distribution system could operate with greater knowledge and understanding of the current Food Safety Regulations: GMP’s, SSOP’s, HACCP, and Food Defense as it relates to issues they control.

Since warehouse safety training is directed at the same personnel that this course’s food safety training is directed. A review of style, delivery mechanisms, and evaluation techniques is valuable. Worker safety training is offered using: traditional classroom style training, self taught (independent study), or on-line self directed courses, each type may or may not have an assessment or evaluation of learning. These are all available and based on the facilities needs or budgets may be chosen to meet the firm’s needs or regulatory requirements.

By conducting a literature search no articles were found to be directly related to the education of warehouse associates. However, in the journals “Food Protection Trends” and “Journal of Food Science Education”, several articles were located that addressed industry needs, evaluation of various types of educational media, and developed food safety knowledge instruments that identified motivational appeal to improve food safety learning, all of which could be applied to the warehouse workforce.

In a 2007, “Needs assessment survey of sanitation, good manufacturing and hygienic training practices for food processors, wholesalers and warehouse operators” published in Food Protection Trends (vol. 27(6), 2007, 400-408 – Pivarnik, L.F.,; Hicks, D. Jahncke, M; Gall K) Their abstract states:

*“The need for sanitation training for US food industry personnel was assessed. A survey was designed and distributed to food processors, wholesalers and distributors to determine current training practices and to ascertain their opinions on whether an*

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*Internet-based, interactive training course on sanitation, Good Manufacturing Practices and Good Hygienic Practices could be utilized. Of 182 survey respondents, 75% categorized themselves as food processors of a variety of processed commodities: poultry (47%), meat (40%), dairy (34%), sea food (31%), fruits and/or vegetables (21%) and cereals, breads and/or baked goods (13%). Although respondents (95%) indicated that there was some food safety, sanitation and/or hygiene employee training in their facilities, 54% responded that they could use an Internet-based course, and 43% indicated that they would like to judge it prior to implementation. It was encouraging that 82% of those surveyed indicated that the Internet-based training could be integrated into the workday. The top 4 barriers to employee training were identified as time, cost, language and literacy. However, 61% still indicated that they would be willing to pay for an Internet course that would first target management level employees and would then provide supplementary educational materials that would be used for on-site training of production employees.”*

### **The Audience:**

When evaluating the educational needs of warehouse associates, it is important to understand their general demographics. These individuals tend to be young (19-30 years of age), physically strong, like to work with their hands; they are not required to be nor are they usually highly educated. They do have to be able to read and do arithmetic. Managers tend to be older and may have business, logistics, industrial engineering type training, or degrees. In most facilities the VP of Operations is responsible for both through put and food safety, and generally has a much stronger logistics background.

The night shift is usually made up of individuals who are working a second job, or who are comfortable working less traditional business hours. The job demands are less complex as the associate's only responsibility is to locate the proper product, count the correct quantity and apply the appropriate customer shipping sticker to the units. The computer sets the route, the order, and quantity. The individual needs to be fast and accurate.

In the warehouse setting the day shift is the preferred shift, and high performing night shift associates are rewarded by moving them to the day shift in the warehouse or on the routes as a delivery driver. The individuals on the day shift are usually slightly older (22-45 years of age); educationally they are no more diverse than the night shift. The day shift is principally responsible for receiving and putting new inventory away, as well as restocking and maintenance of the warehouse stocking system. These individuals have a greater overall impact on sanitation and food safety.

The Driver is as integral to the food safety chain, as are all of the warehouse associates who receives, stores, picks, pulls, and restocks. Drivers can be the weak link in the food safety chain simply by improperly stacking products during the delivery process to an individual restaurant or store. In order to be a “distributor truck driver” the individual is generally selected because they have a Class 1 Drivers License, are drug free, and have reasonably good people skills. A Distributor's driver is the distribution company direct link to the customer; the sales representative may visit periodically and the inside sales person may call frequently, but the truck driver is in the facility at least once every week.

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In two separate papers presented in the Journal of Food Science Education in 2007, by Carol Bryd-Bredbenner, et. al., the researchers determined that there was not much known about the Food Safety knowledge of young adults, particularly young males. The research team set out to develop an instrument to measure psychosocial information with regards to the perceptions of food safety, prevalence, and preventative measures. This research was conducted on college campuses, using the appropriate age, and sex of most warehouse employees. The group was principally freshman or sophomores of various backgrounds and course loads. The development process of the questionnaires determined that three factors: food safety beliefs, food safety locus of control, and food safety self-efficacy, help to determine an individual's motivation to receive and implement food safety education.

The report defined these three areas as:

1. Food safety beliefs "indicated that the importance of cleanliness/sanitation to the participant and personal interest in learning about food safety constructs were indeed individual, unique constructs."
2. "The food Safety locus of control, was defined by the researchers as the degree to which an individual believes food safety (avoidance of food poisoning ) is controlled by internal (that is, largely under a person's control) or external factors (that is, largely under the control of powerful others or determined by luck or chance factors.)"
3. Self-efficacy is a "psychosocial construct", which indicates the willingness of a subject to change behaviors.

The study demonstrates the need to make the course as personal and job oriented as possible, and to make the significance of failure high enough to be of concern to cause a person to check his own behaviors as well as that of his co-workers. The materials should be presented to match the education level and background of the associates, yet not be so simple that the individual feels like they are being talked down to, or thought of as unintelligent. If we again use the *Bryd-Bredbenner* articles we find that the researchers used the Flesch-Kincaid Grade Level Score to evaluate the readability of their questions. They used eighth to tenth (8-10) grade levels with success. In general, warehouse operations associates job requirements are that the associated be able to read, count, do simple math and be physically able to do heavy lifting and be coordinated enough to drive. They meet the same educational demographic as most of the customers they serve.

The materials in this course are presented at about an 8th grade to high school education level, and is intended to mimic the language and depth of subject coverage as the ServSafe™ Program, but to target the educational materials to "real world" distribution issues, and is targeted to help the warehouse associate or delivery driver relate to behaviors or requirements of their employers. ServSafe™ while it is targeted to restaurant managers, can be understood by individuals with less responsibility, or individuals with less than a full high school education. While the information presented in this course is not intended for leadership level or program development level training, it can be used by the Food Safety Coordinator to train team members and review regulatory expectations, as that is how the program is written.

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Unfortunately since September 11, 2001 we have had to deal with the threat of a terrorist attack on the food supply, which means firms need to be aware of intentional acts of sabotage in addition to random acts of ignorance, or laziness. So for the purposes of this course any breakdown in the food safety system is referred to as a “failure” and is used to refer to both intentional and unintentional issues unless otherwise noted. Since the course’s overall goal is prevention, it should be noted, that the discussion of Food Defense must be handled delicately. It is generally discussed in terms of prevention of theft or guarding against the actions of outsiders, as a fully open discussion about intentional product contamination could be fuel for a disgruntled employee. However failure to mention Food Defense at all would be reckless, as the training is intended to explain to employees the firm’s expectations and reasons for requesting behaviors, and limiting access and all attempts have been made to present the materials using a positive preventative approach. The stronger food defense discussions should be held privately within the facilities management team.

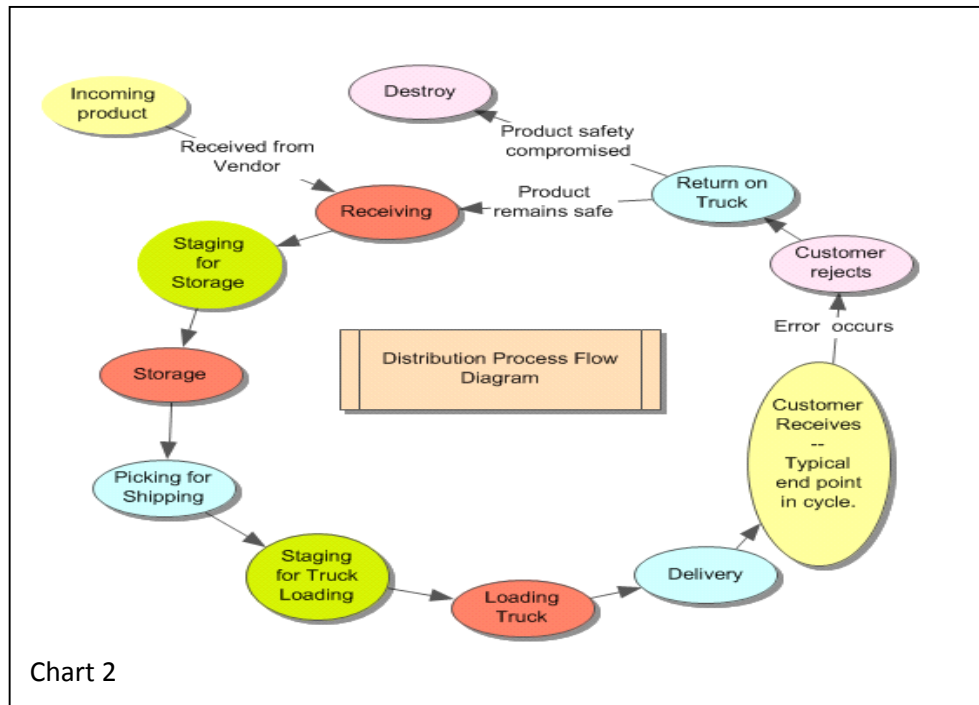
The ServSafe™ program demonstrates that food safety training can be simplified, yet provide meaningful information, in a positive “preventative” manner. Just as ServSafe™ makes assumptions that the person taking the course has some restaurant exposure, this program does not explain or detail terms or job functions that are common in the distribution industry.

By design the program is presented in segments or Modules to allow for “break” style educational opportunities and to allow for “refreshers” when an associate needs to be retrained or has advanced in responsibilities and now has new functions to consider or practice. It is impossible to create a version that is specific for each function as they overlap and depending on the size of the firm, the functions may be highly segmented (one person does one job); or as is more frequent in a small firm “one” person does it all. Each segment has a quiz developed to ensure learning has occurred on the key elements. Successful completion demonstrates the associate’s fundamental knowledge of food safety and typical understanding of compliance with regulatory programs. Test results can be used to demonstrate the firm’s compliance with the “provides training” element of the regulations.

### ***The process:***

In order to create and later to evaluate a Food Safety Course for Distribution one must first outline the warehouse process, issues, concerns that a Distributor has so that we can ensure that the distributor’s educational needs are fully met. A key to understanding is the work flow path that a product must follow (See Chart 2)

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Each process area has internal process paths and each has inherent risks and opportunities for failure and each can be viewed as opportunity for improvement nodes. As the chart demonstrates a distributor's process flow is relatively simple and straightforward; however, the opportunities for a food safety failure in warehouse process flow are numerous, for both unintentional acts as well as intentional acts of sabotage or terrorism. The areas of similar risk or procedures are coded using matching colors.

The product arrives at the distribution facility usually in its final state, and is off-loaded and mixed with inventory and products that come from multiple sources or countries of origin. Many food distribution facilities function close to 24 hours a day, 7 days a week. Most firms receive and store products during the day. Receiving usually begins at 8 am after all of the firms delivery trucks have departed for their routes, and will continue throughout the day until about 3 or 4 o'clock in the afternoon. This will leave sufficient time for the sales representatives and on-line customers to have placed their orders and for the warehouse to restock lower level aisle slots to aid in efficient order picking. It also permits the return and cleaning of delivery vehicles to start the cycle over again. The night shift is responsible for proper order selection, and truck loading. This process generally occurs between the hours of 7 pm and 4 am and is commonly referred to as the night shift. The end of this shift usually occurs when all of the orders are picked, checked, and loaded onto the firm's delivery trucks. The trucks have specific delivery routes and must leave at a prescribed time each day in order to meet the delivery schedule set for them. The distributor using logistics modeling attempts to maximize the number of cases of product on a truck, while minimizing the length of time and distance traveled to unload the truck. Each truck can be thought of as a mini-warehouse, and each driver acts as an order picker, with the added responsibility



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for payment collections, driving, and ensuring nothing happens to the products on his truck while under his control.

### ***Course Requirements:***

Since all regulatory food safety programs have a training component. This course has been designed to help food distribution facilities (both retail and foodservice) provide training so that their workers understand and are able to apply food safety principals as they proceed with their normal activities during their shift.

The content and emphasis should create buy-in to the belief that food safety issues can be caused by improper handling in the warehouse and not just by the supplier or the customer. The content must reinforce that control over personal behavior is key. However, the material should be authoritative enough that it empowers the associate to do the right thing even when it is hard, or the associate believes or “knows” others won’t. The content should give enough scientific and regulatory based content instruction to make the participant in the course understand that there are rules for a reason, and that understanding leads to easier compliance. Unfortunately this course may not be able to prevent complacency which is why it has been put together in standalone modules so retraining can occur as needed.

### ***Course Purpose:***

- To help the warehouse associate understand basic food safety concepts.
- It is important that workers understand how their personal behavior can affect their families health, as well as, the health of the industry they serve and the future of their company.

### ***Course Structure and Presentation method.***

- Ten (10) modules that build on each other.
- Two (2) of which demonstrate actual practices and can be used over again for refresher.
- Sessions are designed to work inside of a 30 minute training window. Sessions last between 8 and 26 minutes with the majority around fifteen (15) minutes. HACCP is the longest session and Food Defense is the shortest. The total program is 3.5 hours of lecture. (2 hours 47 minutes without session 9)
- To ensure learning each will have a short quiz (10 questions) that must be successfully completed (70%) before the participant may go on to the next module. The questions are randomly generated to prevent cheating.
- An exam covering all modules will be given a goal of 75% correct must be obtained in order for the participant to receive a certificate of competition.

It is recommended that the participating company to try to get the associates to score higher by establishing an internal reward system. It is the author’s goal that students of the course pass with a rate higher than 75%. However, due to known’s such as reading comprehension, and test taking skills or test anxiety, setting a level higher than 75% correct might actually cause the associate to not try. Only

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the employer can truly judge the individuals true comprehension. Relying once again on the ServSafe™ model, 75% correct is considered a passing grade; however, an individual must obtain a 90% or higher to be eligible for train-the-trainer programs. A firm might set its own internal goals for scoring and require certain percentages for each job function or pay grade.

### ***Summary of Course Modules:***

As we have already established each associate must use care when handling products. Job functions affect the areas of GMP, SSOP, HACCP, RECALL or Food Defense that a worker has direct control over. The course outline was put together to walk an associate through program definitions, expectations, and then application using “real-life” examples or scenarios.

- **Course Introduction: Food Safety Hazards (Number of Slides: 17 Length of time: 11:55 minutes)**  
This Module explains to the participant how the course will work and gives them an over view of each module, time requirements, testing requirements and overall expectations for successful completion of the course. The second half of this module explains why food safety is important, key terms that are the foundation for the rest of the course and a fundamental introduction to hazards (biological, chemical and physical) that can affect food safety.
- **Module 1 – Understanding Microorganisms (Number of Slides: 19 Length of time: 16 minutes)**  
This module helps the student develop a deeper understanding of Biological Hazards. The associate need to understand what is necessary for microorganisms to grow, reproduce, cause illness, or spoilage. This module covers in greater detail the concepts of cross-contamination, oral-fecal route, and environmental paths of pathogen introduction into foods. It is not intended to do much more that make the associate realize that they must manage the cold chain and cross contamination.
- **Module 2: Introduction to Food Safety Programs. (Number of Slides: 12 Length of time: 12:32 minutes)**  
This module has been developed to introduce the concept that the facility falls under governmental jurisdiction. This module touches on the origination of food laws and regulatory management. It is designed to introduce the associate to the types of programs that must put into place to be compliant. The intent is to help the associate know that there is a legitimate reason for the companies policies and procedures. Failure to meet expectations has greater consequences than annoying your boss.
- **Module 3: GMP's (Number of Slides: 15 Length of time: 16:44 minutes)**  
This module discusses the regulatory aspect of GMP's. The fundamental program requirements that apply to the facility. It is designed to help the associate understand what is expected from a regulatory perspective.
- **Module 4: SSOP's (Number of Slides: 22 Length of time: 18:05 minutes)**

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This module discussed the regulatory aspects of Sanitation Standard Operating Procedures. It introduces fundamental sanitation issues and requirements, again from a regulatory perspective.

- **Module 5: HACCP – Key Elements (Number of Slides: 24 Length of time: 26:31 minutes)**  
This module is the longest and most complex. It is intended to not only get the employee to be able to say HACCP correctly but for them to understand the difference between what is acceptable from a quality perspective but from a food safety perspective and why it is critical to perform properly and document certain functions.
- **Module 6: The Rules Applied – Part 1 (Number of Slides: 33 Length of time: 23:23 minutes)**  
This the first Module where the content information from the previous models is put into play. It specifically covers the GMP job performance protocols and expectations which are industry best practices are discussed and encouraged.
- **Module 7: Working the Rules – Part 2 (Number of Slides: 30 Length of time: 22:21 minutes)**  
This the first Module where the content information from the previous models is put into play. It specifically covers the SSOP job performance protocols and expectations which are industry best practices are discussed and encouraged.
- **Module 8: Recordkeeping (Number of Slides: 15 Length of time: 11:19 minutes)**  
Food Safety Programs are not effective unless records are kept. Warehouses are used to keeping records for accounting purposes. The documentation of behaviors – times, temperatures, cleaning etc. have not traditionally been part of the normal operations, and not every associate is the position to take or keep records. This model helps to explain the need, and train backup personnel.
- **Module 9: Temperatures & Thermometers (Number of Slides: Length of time: minutes)**  
Food Safety Programs are not effective unless the cold chain has been properly maintained. Not all warehouse associates are required to take temperatures for GMP's or HACCP purposes. The associate should understand the proper method for temperature taking, and the importance of using a verified thermometer. The session covers proper verification and validation techniques for a limited number of types of thermometers and briefly discusses proper temperature taking techniques using each. This model helps to explain the need for accuracy, and provide training for backup personnel.
- **Module 10: Food Defense (Number of Slides: 12 Length of time: 8:30 minutes)**  
Food Defense is new to the industry since September 11, 2001. However guarding against theft is a more traditional consideration. Warehouses need to be restrictive in access and this module helps to explain that to the associate. However it also addresses the issue of the truck driver and reminding that individual the importance of control over products in the truck while it is in the delivery cycle. The goal is not to give a disgruntled associate the tools to cause harm but more to make them aware of where blame would be placed if an attack would be carried out. No one is

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going to come into a warehouse with guns blazing, an attack would be simple and relatively ambiguous, and so employees need to be taught to be watch for people in odd places.

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Chart 1: Source: Dr. R Boyer – Virginia Tech FST 5614 -Agroterrorism Course Module –March 12, 2007

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