#4. STEP TWO IN IMPLEMENTING YOUR HACCP-BASED QUALITY PROGRAM

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The previous article explained how to begin implementing a HACCP-based quality program, which involved getting management commitment and having top management personnel sign a policy committing themselves and the company to strive for zero defects in food safety and customer satisfaction.

Next, the article pointed out that since the line employees are the ones who are actually responsible for achieving zero defects, there must be an organization with sufficient employees to accomplish all of the tasks necessary to carry out the owner's operating goals and objectives. The larger the facility is, the more employees and tasks there are, and the operation is more complex.

For each identified position, there should be back-up personnel to fill in during leave, vacations, sickness, etc. For each position, there must be identification of the responsibilities, the authority, and accountability. Management staff is responsible for making it possible for employees to perform with zero defects. This is done by providing training, coaching, and the necessary tools and equipment. Employees, in turn, must perform their tasks in the ways prescribed in the quality assurance policies, procedures, and standards manual.

System Description

The next step in implementing a HACCP program is to completely specify the system's components. If safe food and service are to be provided, employees will be assigned tasks that will make this happen, and these employees must be given instructions on how to do each task correctly.

The instructions in the quality assurance manual not only control the risk of foodborne illness, but they also assure control of the physical and occupational hazards in the facility. There is no need to write separate manuals for every government agency that oversees the business. Of course, the purpose of the QA manual is also to assure that every customer is "WOW'd" by the products and service and will become a repeat customer. Therefore, each component of the system must be specified. The following are the various sections of the system description so that the operating practices in the manual will cover everything that the operation does.

1. **Location**. Describe the location of the facility in full detail. This is necessary, because a facility could be subjected to storms, flooding, and other natural disasters. The QA plan must have emergency procedures in place in case these disasters occur.
2. **Clientele to be served**. This description is in the form of age and immune status. If a facility caters to a nursing home or children and babies, there must be full consideration of control systems--ultra-pasteurization, for example--to assure that the sensitive population is not subjected to unsafe levels of hazards. On the other hand, a restaurant that serves ethnic food to a population that desires raw meat is a different situation that needs to be considered in the operating manual. There are really no "forbidden" food processes. The retail food system exists only to serve its customers. Each clientele group has its own needs, wants, and resistance levels to food infection and intoxication.

3. **Business hours / styles of service**. How many hours a day is the facility open? How many days a week? This dramatically effects the ability to keep the facility clean as well as staffing and training of employees. When a foodservice operation is open for business from 8:00 AM to 4:30 PM five days a week, as in industrial feeding, this constitutes a very different situation than the hamburger restaurant that never closes.

   At this point, one should describe the styles of service available at the facility. Is it a cafeteria operation part of the time, fast food, buffet, table service, deli, bulk food sales, distributed service (banquet, room service, home delivery, delivery to other buildings and wards)? Is there off-site service or catering; temporary foodservice operations; service from trucks, cars, or carts; vending? For each of these, it must be specified when the meals are prepared and served, how people are to be fed, how many entrees and food items are available, and the weight of the food served (which will be used to specify equipment). One also needs to identify the amount of soiled dishes, glassware, utensils, and the quantities of expected leftovers. With this basic information, the QA process designer can validate that the food preparation and delivery / service systems will be capable of handling the volume and types of food to be sold.

4. **Menu description**. This HACCP program requires that every menu item have a recipe in which the ingredients, procedures, and food times and temperatures are specified to assure that the pathogenic substances in the menu items are controlled or made safe. Each item on the menu, beginning with appetizers and drinks from the bar and ending with desserts and pastries, must be listed. The items listed in the system description are grouped according to production style to provide generic preparation guidelines. The actual recipes are written later in the manual development stage.

   In some cases, menus are fixed, and others are cyclical; the chef buys the freshest food in the market and cooks that food, and the menu changes daily. However, from the standpoint of a HACCP'd process, one does not worry about the flavors of the food, but is concerned about the quantity of a certain style of food being prepared. For example, all roasts are processed in ovens and have the same cooking hazard control points. Was the food cooked enough to inactivate the vegetative pathogens? After the roasts are cooked, is the food consumed before the spores have a chance to outgrow and cause illness or death? With thin menu items (e.g., hamburgers, chicken, pork chops, Swiss steak, eggs), the critical questions, again, are, "Did the center of the food reach a temperature to inactivate the vegetative pathogens in the middle of the food?" and "Was the food consumed before the spores outgrew and increased in numbers to a hazardous level?"

   The following are the basic menu item groups.

   a. Thick foods. Roasts.
   b. Thin foods. Grilled, griddled, and sautéed food items.
   c. Sauces, soups, and broths. Acidified and non-acidified items; salad dressings, complete range of soups, stocks, and hot sauces (i.e., meat sauces, dessert sauces). For each acidified sauce, when the recipe is written, the percentages of acid, sugar, and salt are calculated in order to control the water activity and the acid content for food safety purposes.
   d. Fruits, vegetables, and carbohydrates. Cold or cooked fruits, vegetables, including starchy vegetables (e.g., potatoes), and other carbohydrate items. Some of these items, such as fruits, have sufficient acid to make them safe, but one must consider

the containers in which they are placed. Acidified foods cannot come in contact with hazardous metal containers.

Raw, cold fruits and vegetables are made safe by washing or surface blanching for pasteurization. Hot vegetables are made safe by various styles of cooking (boiling, steaming, microwaving, etc.). The questions at this point are, "Were the vegetative cells (e.g., *Salmonella*, *E. coli*) controlled, and were the spores of *Clostridium botulinum* and *Bacillus cereus* controlled in the hot vegetables that were prepared?"

e. Bakery / pastry. Breads, doughs, pies, cakes, etc. The vast majority of bakery items are baked, and the baking temperature is sufficient to inactivate the vegetative pathogens. In some cases, such as pies, acid becomes the hazard control component. In other bakery and dessert items, water activity is the controlling factor, because the water activity of the bread, for instance, is less than 0.92. At this level, surviving spores cannot multiply. It is important to review all bakery items to be sure that fresh, raw eggs are not added to a finished food.

f. Cold combinations. All mixed salads (e.g., potato salad, chicken and meat salads, pasta salads, vegetable salads). The cold salads are made from food items from the first five groups. Therefore, the ingredients should be safe already. A major aspect of safety is that these salads could be handled and mixed with bare hands. This means that the salad ingredients must remain below 50ºF during salad preparation to assure that *Staphylococcus aureus* from the skin does not have the opportunity to produce a toxin.

g. Hot combinations. Casseroles, combinations that are 2 inches or less in thickness. As an example, a sauce, vegetable, meat, carbohydrate, and perhaps a bakery item such as bread crumbs are combined, put into a pan, and heated. The FDA food code says that these items should be heated (reheated) to 165ºF in less than 2 hours to assure safety. Actually, once food is cooked, it becomes very sensitive to pathogen outgrowth. Since *B. cereus*, *C. botulinum*, and *S. aureus* toxins will not be inactivated at the specified "reheating" temperatures, one cannot use reheating as a hazard control procedure. Once the ingredients are prepared, they must be handled in a way to assure that there is no significant multiplication of pathogens before they are mixed in the casserole or hot dish.

Cooling the food to be used in hot combinations from 130 to 45ºF in less than 15 hours is one fundamental control strategy and then, using these cold ingredients within 14 days is also effective hazard control.

5. **Environment**. The environment in which the facility is situated is a critical control point in terms of the products produced. It the facility (e.g., food processing plant) is located in a farm area, it is likely that the dust in the air will be contaminated with animal fecal material. If there are a lot of birds, bird fecal material that gets into the air must be controlled. Additional mold problems in the ductwork and other parts of the facility can be caused by excess moisture in the air. Pest control becomes a major factor in facility design when there are insects and pests surrounding a facility site. Finally, the water and sewer systems must be compatible with the restaurant or processing plant. If the facility has its own wells and septic systems, management becomes responsible for testing and certifying the capabilities of the systems on a semi-annual basis.

6. **Facilities**. There are two components to the facility information requirements. There needs to be a description of the floors, walls, and ceilings of the food facility to show that there is good structural resistance to cleaning chemicals, so that the kitchen can be thoroughly cleaned every night without becoming worn. Typically, walls are glazed tile, epoxy coated, or glass board. The floor can be either epoxy coated or tiled. Solid epoxy-coated floors resist wear better than tiles where the water leaks around grout. The floor drains are critical in terms of *Listeria* control and must be cleanable on a weekly basis. The lighting must be 50 foot-candles or brighter in order to assure that the work area is safe for employees. There must be pest and insect control programs in place. In addition, the contamination of the various departments should be color-coded on the floor plan. Areas that handle raw food should be color-coded red; areas in which food is converted from raw, contaminated food to safe food are yellow. The clean, pasteurized, ready-to-eat food areas are identified by a green color code. In training new employees, it is essential in a HACCP system that they understand where the contaminated vs. ready-to-eat food areas are, so that there is a minimum of cross-contamination.
7. **Equipment**. The major items of equipment in the kitchen and their capacities must also be identified. This includes the water heater, air conditioning system, air flow system over the hood area, refrigeration sizes and compressor capacities, and oven and kettle cooking capacities. The kitchen will have an upper limit of capacity to produce and sell hot or cold food. These capacities are identified in doing the equipment analysis, and the kitchen is rated for maximum customer handling capability.

Summary

This article has discussed the first two steps of system quality assurance design. The first step is to specify the organization and the jobs, and for each job, the responsibilities, accountabilities, and authority. There must be enough people to staff whatever type of food operation an owner decides to operate.

The second step is describing the system. It is not possible to assure the safety of the system until every component of the system, all styles of food service, and all menus and recipes have been identified. This way, one can be sure that controls are specified. For any organization that produces and sells food, the QA program must describe how to do that safely.

The next article will explain GMPs and supplier HACCP.