



ALL FLORIDA PAPER

FOOD SAFETY PROGRAM

COMPANY OVERVIEW

All Florida Paper is a leading privately-held distributor of Foodservice Packaging and Janitorial/Sanitation Products headquartered in Medley Florida, serving business in 35 industries and throughout 25 countries. With over 8000 items in stock, AFP is a key partner with businesses throughout eight market sectors, ranging from Education to Healthcare, and Foodservice to Janitorial and Sanitation. Also, the company has developed redistribution services through Central and South America, as well as the Caribbean. We are committed to delivering and providing exceptional service to our customers as well as investing in the development of all our associates. To accomplish these objectives, we have created detailed work procedures and practices for each of our associates and their respective duties.

COMPANY POLICY AND OBJECTIVES

There are two main components to what we do daily at AFP — providing best in class service to all our customers while emphasizing safety first at every touchpoint.

World-Class Customer Service

Our organization is committed to offering world-class service to all our customers. To accomplish this, every Associate at every level must understand and embrace this portion of our culture. No matter what your position is at AFP, serving our customer is our top priority. The reason why we continuously grow as an organization is because we bring value, integrity, and transparency to our customers. We are also fully committed to supporting the continued success of their businesses. We offer this same level of service, with the same standards and commitments to all new and future customers of AFP as well.

Safety

Safety, health, and security are key business objectives. We believe that every collision, injury, and security incident is preventable. Working safely and responsibly is a condition of employment.

Employees at all levels are responsible and accountable for safely performing all work duties and protecting their employees, customers, assets, and the public in general.

Building and maintaining a culture that is committed to safety, health, security, and environmental protection will help us:

- Minimize or prevent personal injury, occupational disease, property damage, and damage to the environment.
- Meet applicable federal, state, and local regulations and exceed those requirements whenever the business warrants it.
- Reduce costs associated with injuries, collision, theft, and future environmental cleanup.
- Improve work productivity and morale.

DISCLAIMER

All Florida Paper has developed this Food Safety Program for the NSA and its members to use the best practices and processes for Food Handling, Food Preparation and Cleaning, and Sanitizing guidelines. We have attempted to highlight the most critical areas of concern in these matters. We have used key points from the Association of Food and Drug Officials, Food Marketing Institute, Food Safety, and Inspection Service and a critical segment from the USDA Rules and Regulations. By no means does this manual consider every single area of concern regarding Food Safety, so therefore we will not accept any responsibility for any fine or any form a liability regarding these matters. We recommend that you download all pertinent information regarding proteins and all perishables items from the USDA Rules and Regulations and constantly update to make certain that you are always in compliance and make certain that your insurance policies cover such events.

All Florida Paper has developed this Food Safety Program for the use and benefit of the NSA and its members. The information presented to you contains material from the US Department of Agriculture (USDA), USDA Rules and Regulation Vol 80, No 244 2016 Edition, Food Safety and Inspection Service, Food Marketing Institute and copyrighted material from the Association of Food and Drug Officials, which is an organization established in 1896 to provide retailers with guidelines on best practices, processes and guidelines set by the USDA as well as from our own experience gathered throughout over a quarter-century of assisting the retail industry with the implementation of the rules, regulations and standards set by the USDA. We strongly urge that your group engages an organization specializing in the design of a HACCP (Hazard Analysis and Critical Control Points) program and designates a trainer that will review these processes with department managers as well as train new employees adequately in the Food Safety areas.



FOOD SAFETY PROGRAM

Safety

Food safety is the number one priority of the protein, produce, and prepared foods industry. Proteins, produce, and prepared foods have brought significant challenges to the retail grocery industry in recent years. The Food Marketing Institute (FMI) is committed to working hard to identify the issues that present these challenges to our industry and find the appropriate solutions for them.

This guidance program is divided into two parts:

1. Best Practices and Processes for Food Handling throughout the supply chain for Retail Grocers/Foodservice
2. Best Practices and Processes for Cleaning and Sanitizing for Retail Grocers/Foodservice

1. BEST PRACTICES AND PROCESSES FOR FOOD HANDLING THROUGHOUT THE SUPPLY CHAIN FOR RETAIL GROCERS/FOODSERVICE

Meat Cutting and Processing for Grocery Retail/Food Service:

Proper handling and storage are two of the most vital processes undertaken by staff once meat orders arrive at the point of sale. Because foodborne illnesses have not been fully eradicated yet, and food storage is often subject to human error, rigid processes need to be followed to ensure that all products arriving for sale are checked, refrigerated immediately, and stored correctly. Poor food-handling and storage procedures can prove to be disastrous to a food service company and customers alike.

In the United States, there are 48 million episodes of foodborne illnesses causing 128,000 hospitalizations and 3000 deaths caused by 31 major sources of pathogens in 2018. This means that nearly 1 in 6 Americans acquired a foodborne illness in 2018. Most (58%) were caused by Norovirus, followed by nontypical Salmonella (11%), Clostridium perfringens, (10%) and Campylobacter (9%). Leading causes of hospitalizations were nontypical Salmonella (35%), Norovirus (26%), Campylobacter (15%) and Toxoplasma gondii (8%). Leading causes of deaths were nontypical Salmonella ((28%) T. gondii (24%), Listeria monocytogenes (19%), and Norovirus 11%).

Here are some examples of what can happen if a food poisoning outbreak occurs due to mishandling or poor storage procedures:

- ✓ Loss of customers and sales
- ✓ Illnesses and even deaths of clients
- ✓ Loss of prestige and reputation
- ✓ Costly legal and court costs
- ✓ Increased insurance premiums
- ✓ Lower employee morale
- ✓ Professional embarrassment
- ✓ USDA investigation and possible consequences if charged

Receiving Procedures:

Here are several steps to ensure that protein products are handled in a timely and safe manner once they arrive:

- ✓ Check to see that the order matches the invoice (number of boxes, etc., and list of product names; have a driver and receiver sign off).
- ✓ Ensure that all packages are still sealed and not damaged.
- ✓ Check the temperature of the delivery truck storage area (was it cold on arrival?).
- ✓ Sort and move all the meat products immediately to their correct storage coolers.
- ✓ Ensure fish, meats, and poultry are kept as far apart as possible, and fish containers are kept sealed until ready to use.
- ✓ Ensure cooler and freezer doors are always kept closed.
- ✓ Immediately report any unusual temperature fluctuations to your employer.

HACCP is an operation system that ensures that as many precautions as possible are undertaken to eliminate, minimize, or prevent any form of contamination. HACCP identifies critical control points that relate to all transportation, handling, preparation, service and storage of food products.

Receiving, storage and preparation are all important sections of a food safety flow chart and receiving of products is your first step when developing a flow chart. The following are important elements to consider when receive products in general.

- ✓ Never assume that all the food and proteins that you receive are good to eat.
- ✓ The receiving dock and related areas should be well lit and kept very tidy.
- ✓ Do not keep trash bins and receptacles near the receiving areas because of flies, bacteria and other contaminants that may affect your newly arrived proteins.
- ✓ Incorporate this area into a daily cleaning schedule to ensure proper cleanliness.
- ✓ Schedule your deliveries to allow adequate time for the proper inspection and receiving of all products.
- ✓ Have all appropriate equipment and containers on hand. Scales, plastic gloves, containers and thermometers are important pieces to have in easy reach.
- ✓ Make certain that you have created storage space in both your coolers and freezers prior to the arrival of your proteins to put away quickly after receipt and checking of products.
- ✓ Do not leave you newly arrive proteins exposed to the elements (rain, sun, very elevated temperatures).
- ✓ Record the temperatures of the delivery trucks refrigerated and freezer storage. If the temperature is not within an acceptable range, do not accept the shipment (because you are unable to ascertain the length of time that the temperature has been unacceptable).

Each food group, whether dry foods, dairy products, fresh produce, or meats requires a slightly different procedure. No matter what the product type, the principal component in a receiving procedure is accuracy. Any carelessness or half-hearted attempts at checking the delivery will render the whole process useless.

Fresh meat, poultry and seafood are shipped in pieces and/or by weight. Count and weight the fresh items. Check for leaking vacuum-packed packages and check the grade of the meat against the grade on the invoice. In addition, if specification were given on the order form, confirm the cuts of meat do meet those specifications.

Frozen products are often delivered in cases and carton. Open the cases to count the items to check for signs of freezer burn, torn wrapping, partial thawing or other problems.

In summary, when receiving products, especially proteins remember:

- ✓ The quantity of the goods received should match the quantity of the invoice and the quantity of the purchase order.
- ✓ The quality of the goods received should be to the specifications given on the invoice or to specifications previously worked out with the supplier. This includes supplying the specific brand name when it is requested.
- ✓ The prices of the goods should be listed on the invoice and should match the prices on the purchase order.
- ✓ Do not purchase your perishables and proteins from suppliers that have poor refrigeration in their trucks, regardless of attractive prices. Poorly refrigerated proteins have reduced shelf life and have dangerous bacteria content.

Storage Procedures:

Proteins should be packaged appropriately to prevent drying out, spoilage, or freezer burn. Whole sub-primals are vacuum packed as soon as they are removed from the carcass and will have a long shelf life when kept in original vacuum packaging. Cut meat products for retail use should be wrapped in permeable film on trays or vacuum packaged after proportioning. Cut meat products for foodservice may be vacuum packed after cutting or stored in food-grade containers, wrapped appropriately and stored accordingly to food safety standards.

Coolers should be maintained at 0 C to 2 C (32 to 35.6 Fahrenheit). This is considered the safest temperature to hold meats and maintain flavor and moisture. Water freezes at 0 but meat freezes at -2. Once the package has reached its expiration date and has not been sold, it must be discarded.

Today most common cooling units are the blower coil type, in which cool air is circulated via coils and fans from a ceiling-mounted unit that draws air from the floor up through the coils and then back into the cooler area. Floor areas of the cooler must be free of containers that may impede airflow. This means that all food containers and boxes must be elevated above the floor level.

This also means that modern coolers humidity levels are built into the system and are maintained automatically. For example, lean beef is made up of approximately 70% moisture to optimize flavor. Moisture content in the air is expressed as relative humidity and is measured as a percentage. To maintain the moisture in meats a relative humidity must be kept between 75% and 80%. This means that all food containers and boxes must be elevated. If the moisture drops below 70%, shrinkage will occur. However, if the humidity level is too high, moisture will condense onto the meat and appear on the walls of the cooler, creating an excellent medium for bacteria growth and sooner than normal meat spoilage.

Modern meat coolers and freezers also have a built-in defrost cycle, which is usually timed to activate in the early morning hours when there is less traffic in and out of the units. This important cycle is designed to melt away ice buildup on the blower coils (as they operate at below-freezing temperatures) into a drain system. This part of the cycle takes 20 to 60 minutes. Meat freezer temperatures should be maintained at approximately -23C to -29C (-10F to -20F).

Handling Procedures:

Once processing begins, the following steps must be taken to reduce any additional contamination of the product:

- ✓ Do not allow product in any kind of box or container to come in contact with any cutting or work surface or the floors.
- ✓ Ensure that all processing tables and cutting boards are already cleaned and sanitized
- ✓ Ensure surfaces are dry with no residue of any sanitizer on them (remember that sanitizers are toxic while wet)
- ✓ Maintain separate cutting and processing boards for different species, especially fish, chicken, and pork.
- ✓ Clean and sanitize boards immediately after use and elevate to air dry as quickly as possible.
- ✓ Have separate cutting boards for cooked meat slicing,
- ✓ Thoroughly clean and sanitize meat slicers and tenderizers between uses for different cooked and raw products. These slicing tools and machines pose a real risk for cross-contamination and are always subject to scrutiny by health inspectors.
- ✓ If possible, process different species of cooked and raw products on different days. This help minimize the risk of cross-contamination in processing areas, tools, and machines that are used for a variety of products
- ✓ Do not use the same band saw for all your proteins.
- ✓ Maintain your protein cases at 32 F – 35.6 F
- ✓ Maintain your general floor space at 68-72 degrees depending on the time of year



GUIDELINES FOR SEAFOOD RETAILERS

- 1. Introduction**
- 2. Seafood Spoilage – Cause and Control**
- 3. Personal Hygiene**
- 4. Premises Hygiene**
- 5. Seafood Handling and Storage**
- 6. Food safety programs and HACCP**
- 7. Maximizing Seafood Quality**
- 8. Presentation, Promotion and Marketing**
- 9. Product Knowledge and customer service**

1. INTRODUCTION

This handbook offers assistance and guidance in the management of seafood safety and quality, with each module providing practical information and advice on how to ensure seafood safety and quality during all stages of retail distribution and sale.

It can be inserted into your Food Safety Program for future reference and utilized for staff training.

Fresh seafood is one of the safest foods available, but if people suspect that they have contracted an illness from food it is the seafood that frequently gets the blame. In reality many food poisoning instances are caused by a variety of foods other than seafoods. There is a public perception that seafood is high risk, in fact in the cases attributable to seafood it is invariably the activities of the seafood handlers that have caused the problem

Surveys suggest that food safety is of the utmost importance in the mind of the consumer. Therefore, it makes sense for the seafood industry and retail operators to be perceived as providing safe, quality food. The following information will help retailers manage potential hazards and assist in staff training. This should result in a higher degree of professionalism and greater customer confidence. Research suggests that, over a period of time, this will result in an increase in sales and a more vibrant seafood industry.

Posters and a handbook on seafood retailing are available and complement these guidelines.

2. SEAFOOD SPOILAGE - CAUSES AND CONTROL

What is seafood spoilage?

As every seafood retailer knows, seafood is a very delicate food and if it is to reach the consumer in good condition it must be handled with care and speed.

Seafood spoilage is the physical and biochemical deterioration or breakdown of tissue in seafood. As seafood spoils, the external appearance undergoes great change, particularly to the skin, eyes, gills, flesh and organs. At the same time, the odour changes from an initial fresh sea odour to a sour fishy smell.

What is the result of seafood spoilage?

If seafood is not stored and handled correctly, it can very quickly spoil and 'go off'. The following table outlines the undesirable consequences of seafood spoilage.

Spoilage Consequences	Cause
Reduced shelf life	Due to the action of bacteria, enzymes and oxidation.
Off flavours and smells	From the breakdown of tissue through the action of bacteria and enzymes.
Taints	Off flavours that arise from contamination during handling and preparation.
Reduced quality	Deterioration of the visual, physical and chemical characteristics of seafood from the action of bacteria and enzymes.
Food poisoning	Predominantly from the contamination and growth of bacteria.

Seafood spoilage will dramatically reduce the shelf life of seafood. The term 'shelf life' refers to the time period that seafood can be stored and consumed before spoilage makes it unpalatable. The shorter the shelf life the shorter the time you have to sell produce at the best possible price.

TABLE 1 What causes Seafood Spoilage?

Cause	Effect	Controlling Factor	Mode of control
Bacteria	Live healthy fish can be covered in bacteria, while the flesh remains sterile. After death, incorrect handling can introduce bacteria to the flesh resulting in spoilage. Seafood handlers and the environment are other sources that may result in bacterial spoilage and the resulting 'off' odours and flavours.	Temperature of seafood: below 5°C, or greater than 60°C	Prevents bacteria from growing or producing toxins. Kills bacteria.
		Rapid processing	Minimises the time when bacteria can grow.
		Good storage practices: separation (raw & ready-to-eat)	Prevents cross contamination.
		Covering food	Protects seafood from contamination.
		Good handling methods	Prevents contamination & cross contamination.
		Healthy & hygienic staff	Prevents contamination & cross contamination by disease
		Clean & hygienic premises	Prevents contamination & cross contamination.
		Using correct packaging	Prevents bacteria from getting onto the seafood.
Enzymes	Enzymes are present in the flesh and various organs (e.g. gut) of all seafood. They function to break down food into energy. After death, enzymes will continue to function resulting in the break down of flesh to a soft texture, with unpleasant odours and flavours	Temperature of seafood: between 2°C and -1°C Temperature greater than 75°C	Slows the activity of enzymes. note: Between -1.5°C and -5°C enzyme activity is increased. Thorough cooking will halt enzyme activity.
		Thorough wrapping	Reduced exposure to air slows enzyme activity
Oxidation	Oils in seafoods will react with oxygen in the air over a period of time causing rancidity (strong fishy odour and flavour). Oily fish will become rancid faster than lean fish. The bright red colour of muscle	Correct packaging reduces contact with oxygen, such as vacuum packing or thorough wrapping.) Rapid processing	Physical barrier prevents contact with oxygen. Minimises length of time product is exposed to air.

	will become dull and eventually turn brown. Oxidation is a major cause of spoilage during prolonged freezer storage. Dehydration will accelerate oxidation	Glazing, where a thin coating of ice is applied to frozen product Holding frozen product at or below -30°C MAP - modified atmosphere packaging.	Physical barrier prevents contact with oxygen. Colder temperatures reduce level of oxidation. Evacuates oxygen from the atmosphere surrounding the product, replacing with another gas.
Dehydration	The drying out of seafood causes a reduction of flavour, juices and loss of weight, Severe dehydration of frozen seafood is referred to as freezer burn. It may result in a dry 'woody' appearance or the build up of icicles within pre-packaged goods	Using correct packaging Glazing, where a thin coating of ice is applied to frozen product Constant temperature of frozen product below -30°C.	Physical barrier prevents dehydration Physical barrier prevents dehydration Temperature fluctuations result in the partial thawing and refreezing of product. This process results in the rupture of cell walls and the loss of fluids from within the cell.
Physical damage	Torn, bruised, cracked or crushed products are all results of rough handling.	Training staff in appropriate handling and storage techniques. Using appropriate containers for storage and handling.	Staff realising the importance of correct handling procedures and following these instructions. Containers that are suitable for protection of product.
Rigor Mortis	Rigor mortis has three stages; pre-rigor, rigor and post rigor. Fish have very delicate connective tissue between muscle blocks, if a fish is handled roughly while in rigor mortis, it will damage this tissue resulting in a texture change and loss of moisture and flavour. Fish going slowly and gently through the process of rigor mortis will extend the shelf life of product.	Filleting should never occur before the commencement of rigor, While a fish is in rigor it should not be straightened out or bent. Chilling slows and extends the process of rigor.	The muscle contraction without a supporting skeleton will result in a tough texture. While in rigor the straightening or bending of a fish will result in the tearing of muscle blocks away from the connective tissues resulting in a 'gaping' or torn fillet. While in rigor spoilage is minimal.

What is contamination?

Contamination is the introduction of a contaminant on to or into a food. There are three types of contamination:

Bacterial

Bacteria can get on to seafood from the environment, food handlers, or the premises and equipment.

Chemical

Chemicals can get on to seafood from cleaning chemicals not being properly rinsed off equipment or excessive food additives. Chemicals can get into seafood from a polluted harvest environment.

Physical

Physical objects can get into seafood from food handlers and the processing environment (e.g. jewellery, hair, dust)

- food poisoning resulting from bacteria,
- chemicals that may cause sickness, or
- physical objects that may result in injury

Contaminated seafood may cause consumer illness, such as:

Contamination of seafood may result from exposure in the environment (for example, polluted waters) or through direct contact during processing. It is often during processing activities that bacterial contamination of seafood occurs. Even hygienically produced seafood will have some bacteria on it after processing.

What is bacterial spoilage?

The most important cause of seafood spoilage is bacterial growth. Bacteria live almost everywhere as they are present in water, air, mud from the sea floor, external surfaces (for example, in slime) and in the gut of all seafood.

Controlling bacteria can save money by reducing wastage and maintaining seafood quality. Like most other living creatures, bacteria need food, moisture, warmth, and time to survive and multiply.

In a seafood premises the most likely sources of bacteria are:

Raw seafood

Seafood contains bacteria in the gut and on the skin, which can get on the flesh during processing.

The staff

Carry all sorts of bacteria on and in them. The most dangerous bacteria carried by food handlers are *Staphylococcus aureus* (Golden Staph) and gut bacteria like *Salmonella* and *E. coli*.

The premises

Walls, equipment and floors if not regularly and properly cleaned carry bacteria.

Pests & vermin

Rodents, birds and insects can all bring bacteria into a food premises.

Waste materials

Will actively grow bacteria.

What is cross contamination?

Cross contamination occurs when we accidentally move contaminants from one place to another (such as from dropped seafood on to the preparation bench, then from the dirty bench on to a clean piece of seafood).

Cross contamination is particularly important between raw and cooked or 'ready-to-eat' seafood. Cross contamination can occur when raw seafood comes into direct or indirect contact with cooked or 'ready-to-eat' seafood during preparation, storage, or display. Consumption of cooked ready to eat seafood that has become contaminated with bacteria from raw seafood, may result in food poisoning.

What is food poisoning?

Food poisoning is any illness caused from eating contaminated food. Allergies, heavy metals, viruses and chemicals can all cause food poisoning. However, the main cause of food poisoning is bacteria.

The symptoms of food poisoning and the time between eating contaminated food and the start of symptoms (that is, the onset time) will vary depending on the bacteria causing the illness.

Food poisoning symptoms may include:

- nausea,
- diarrhoea and vomiting,
- stomach pains,
- sweating and fever, and
- headache.

People can get food poisoning from eating the bacteria or from the toxins produced by the bacteria. After consuming contaminated food, the onset time of food poisoning may vary from hours to days. Fast-acting food poisoning is caused by bacterial toxins, while food poisoning that takes days to develop is caused by the bacteria growing in the gut of the consumer.

It is important to remember that food poisoning is a potentially life-threatening condition. Those more susceptible to food poisoning are infants, the elderly, and the sick.

Who is responsible for the increase in food poisoning?

There are three main groups that could be responsible for causing a food poisoning incident;

- the food manufacturer,
- the food service sector (retail and catering), or,
- the consumer.

How do you control seafood spoilage and prevent food poisoning?

Seafood spoilage cannot be stopped, but it can be slowed to a minimum. Reducing the temperature of seafood is the single most effective way of slowing spoilage, obtaining maximum shelf life, and preventing food poisoning.

Temperature control is critical for controlling the rate of seafood spoilage and preventing bacterial growth.

- One day of shelf life is lost for every hour fish remains at room temperature (25°C).
- Seafood at -10°C looks and feels as hard as seafood at -30°C, yet it will deteriorate more rapidly.

Many factors influence seafood spoilage. Table 1 displays factors that should be used together to minimize the rate of seafood spoilage.

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3. PERSONAL HYGIENE

Why is personal hygiene important?

People carry bacteria in their gut, nose, mouth, ears, hair and on their skin. These bacteria are quite normal and do not affect us, however, if they are transferred to food they can grow to numbers that can cause food poisoning. *Staphylococcus aureus* (Golden Staph) lives in the hair, ears, nose, armpits, groin, cuts, pimples, and boils as well as under jewellery. The intestines of humans can also contain salmonella and E. Coli.

Bacteria can be transferred to our hands when we use the toilet, scratch our face or sneeze into our hands. Cross contamination of seafood with these bacteria can occur during any handling and preparation activity. Good personal hygiene is therefore essential for the safe handling and preparation of seafood.

What is good personal hygiene?

Good personal hygiene is essential for preventing bacterial contamination of seafood, and can be as simple as:

- washing your hands frequently.
- wearing clean protective clothing, and
- keeping yourself healthy and clean.

Seafood premises are required to provide a dedicated hand wash-basin equipped with soap (preferably liquid soap), a supply of warm water, nail brush and disposable paper towels or hot air dryer. This basin is not to be used for any other activities (e.g. washing seafood). It is preferable to have foot, knee or solenoid operated taps.

Staff should wash their hands with soap and warm water:

- before handling seafood,
- after handling raw seafood and before handling cooked seafood,
- immediately after using toilet,
- after eating or smoking,
- after performing cleaning duties,
- after handling any waste materials, and
- immediately after coughing or sneezing into hands, wiping nose, scratching head, face or body under protective outer clothing.

Washing hands must be done thoroughly, or a lot of bacteria are left on the skin. The correct method of hand washing involves the following steps:

1. Wet your hands with hot water.
2. Use soap to lather your hands and then rub lather up to your elbows.
3. Scrub under your fingernails with a brush.
4. Rub the lather between your fingers and hands for at least 30 seconds.
5. Rinse off all soap with warm water.
6. Dry your hands with a paper towel (avoid cloth towels as they spread bacteria)

7. Do not touch your face, clothes or other parts of your body after you have washed and dried your hands.

Protective clothing is used to protect the food from contamination and may include:

- hair covering (caps or hair nets),
- apron,
- gloves, and
- enclosed footwear or boots.

Food handlers are required to maintain clean protective clothing that prevents food from coming into contact with any portion of their ordinary clothing. The upper and lower torso is to be covered when handling or preparing un-packaged seafood.

Hair is a common cause of physical and bacterial contamination of foods. To prevent hair from coming into contact with food or food contact surfaces, food handlers are required to wear clean hair covering when in food preparation, packing and services areas.

Quite a number of outbreaks of food poisoning have been caused by people who are ill. Colds or 'flu can result in coughing and sneezing which may directly contaminate seafood or may result in poor hygiene (such as not washing hands). Diarrhoea and infectious illnesses (like hepatitis) pose a significant risk to food safety as they can be transmitted through food.

Staff are required to tell management if they are suffering from:

1. Severe cold or 'flu symptoms.
2. Stomach cramps, vomiting and/or diarrhoea.
3. Contagious or infectious diseases.
4. Infected wounds, sores or boils.
5. Dermatitis, rashes, or skin irritations.

They are not permitted to perform any activity where there is direct contact with seafood, and should only work in areas where there is no risk of contamination.

Following is a list of some other recommended personal hygiene requirements.

- Cover cuts, burns, rashes or other injuries. Use brightly coloured, waterproof bandages & wear a disposable glove over the top.
- Remove all jewellery as it prevents effective hand washing and poses a risk of physical contamination.
- Remove nail polish, heavily scented hand creams or other cosmetics that could contaminate the seafood.
- Do not eat or drink in food preparation or storage areas.
- Do not smoke in food preparation or storage areas.

It is a good idea for seafood businesses to document their requirements for personal hygiene and have them accessible to all staff. A sign or poster of the requirements may be useful. It is important to note that visitors and contractors must also abide by the personal hygiene requirements.

4. PREMISES HYGIENE

Good premises hygiene is essential for producing safe seafood and a good shelf life.

Good premises hygiene includes:

- cleaning and sanitation of seafood preparation surfaces and equipment,
- controlling pests and vermin (such as rodents, cockroaches, flies),
- effective waste disposal, and
- maintenance of premises and equipment.

Why do we clean and sanitize?

Cleaning and sanitation is often seen as a chore. It is done at the end of the day, staff are tired, and it has a financial cost. Failure to perform effective cleaning however, can result in substantial product losses, and possible food poisoning.

All surfaces, equipment and utensils that come into contact with seafood should be cleaned and sanitized at least on a daily basis. This means it should be odourless, free of soil, and be almost entirely free of bacteria.

The main reasons we clean and sanitize regularly are;

- to minimize the risk of contamination (e.g. bacteria, insects, foreign objects),
- to maintain safe seafood and prevent food poisoning,
- to maximize product shelf life,
- to reduce premature product spoilage and waste,
- to prevent the attraction of pests and vermin,
- to prevent objectionable odours,
- to meet regulatory requirements,
- to satisfy customers, and • to provide a safe environment to work in.

What is cleaning?

Cleaning is the removal of all waste materials from surfaces. Waste material may be anything that is harmful to the food, unsightly, or a potential food supply for the bacteria. Seafood waste materials would include fish scraps, protein residues, fat, blood, guts, scales and slime.

Because of fatty residues and sticky slimes, a detergent is necessary to effectively remove waste materials from seafood preparation surfaces.

A detergent is a cleaning chemical that:

- is able to 'wet' the surface,
- softens and penetrates waste materials,
- breaks up fats and holds them in suspension,
- lifts waste materials so they can be rinsed away with water,
- does NOT kill bacteria.

What is sanitizing?

Because detergents do not kill bacteria, surfaces, equipment and utensils that have been thoroughly cleaned also need to be sanitized.

Sanitizing is the killing of bacteria on a clean surface through the use of;

- steam,
- hot water ($>75^{\circ}\text{C}$), or
- chemicals, applied as foams or sprays.

There are many types of chemical sanitizers available, but it is important that they;

- are of food grade,
- must be applied at the right concentration, and
- require time to work (contact time).

Chlorine-based sanitizers are often used due to their low residual properties. Phenol-based sanitizers are not recommended as they leave a residue that can taint seafood.

What is good housekeeping?

Good housekeeping is the practice of 'cleaning as you go'. Continually cleaning up is necessary to:

- control contamination, and
- maintain a safe working area.

Good housekeeping would include the following practices:

- Regular removal of food residues, food scraps, and waste materials from work areas and amenities.
- Adequately store packaging materials to prevent contamination (for example dust, insects, chemicals).
- Maintain work areas in a neat manner, where equipment (for example tools and hoses) is returned and adequately stored.
- Provide good supply of suitable cleaning equipment such as mops, brushes, protective clothing, and gloves.

Avoid the use of cleaning cloths as damp cloths breed bacteria.

- Store and maintain cleaning equipment hygienically and replace when worn.
- Store cleaning chemicals away from foods and packaging materials.

What is a cleaning procedure?

To ensure effective cleaning and sanitation, and to make sure all staff are aware of their duties, it is recommended that seafood businesses document their cleaning procedure. This procedure should cover walls, floors, benches, sinks, equipment and other seafood contact surfaces, as well as the method of chemical dilution and application. The method of cleaning may vary depending on the item being cleaned, the equipment available, and the chemicals used. Cleaning procedures can be written in conjunction with cleaning chemical suppliers.

There are many different cleaning and sanitizing chemicals available, including combined detergent and sanitizers, foams, no-rinse sanitizers, and sanitizer sprays. Because of this, a generic cleaning procedure may not apply to all seafood premises.

An example cleaning procedure may include the following steps;

Step 1	Dry clean	<ul style="list-style-type: none"> • surfaces are wiped and floors swept • solid wastes (i.e. seafood scraps) are put into waste bins
Step 2	Cold water wash (removes soluble waste & softens remaining materials)	<ul style="list-style-type: none"> • use cold water under pressure to wash walls, floors and equipment. Hot water is not recommended as it causes food residues to set and become difficult to remove • start from the corners and work towards the drain (top to bottom) to reduce the spread of contamination
Step 3	Apply detergent & scrub (loosens and lifts soil and dirt)	<ul style="list-style-type: none"> • apply an approved food grade detergent to all surfaces, moving upwards from the bottom to the top and observing manufacturers instructions (i.e. concentration, contact time, temperature) • scrub equipment and surfaces using cleaning pads or sponges • remove any build up of materials (e.g. around hand basins and equipment)
Step 4	Warm water rinse (removes dissolved waste materials and cleaning chemicals)	<ul style="list-style-type: none"> • rinse all detergent from the surfaces using warm potable water under pressure from the top down
Step 5	Apply sanitiser (kills any bacteria present)	<ul style="list-style-type: none"> • very hot water (greater than 75°C) or an approved food grade chemical sanitiser may be used • apply the sanitiser to all surfaces by moving upwards from the bottom to the top and observing manufacturers instructions (i.e. concentration, contact time, temperature)
Step 6	Hot water rinse (removes sanitiser)	<ul style="list-style-type: none"> • rinse all sanitiser from the surfaces using hot potable water (greater than 75°C) under pressure from the top down
Step 7	Flush drainage system	<ul style="list-style-type: none"> • flush the drainage system with high pressure water for several minutes to prevent a build up of food residues and the possible production of odours
Step 8	Allow to air dry (removal of water prevents any remaining bacteria from growing)	<ul style="list-style-type: none"> • ensure surfaces and equipment dry rapidly. • do not dry surfaces with tea towels as they may re-contaminate the surface (if a towel is needed, use a disposable paper towel)
Step 9	Inspect	<ul style="list-style-type: none"> • inspect surfaces and equipment for cleaning effectiveness • determine if they look, feel and smell clean? (i.e. look for streaks, feel for grease residues, wipe with a tissue to detect discolouration, run your finger under bench tops, move equipment, if you can smell fishy odours then there is a cleaning problem) • may be performed as part of the 'Pre-Operational Hygiene Inspection' or during hygiene audits

What is a cleaning schedule?

How often you clean something will depend on the item being cleaned. Some items are required to be cleaned and sanitized daily, while others may be weekly or even monthly. Seafood contact surfaces should be cleaned and sanitized daily, while an exhaust canopy should be cleaned at least weekly.

One of the best tools to ensure cleaning duties are completed when required is through the use of a cleaning schedule or roster. A cleaning schedule lists all the items that require cleaning, the frequency of cleaning, who is responsible for performing the cleaning, and possibly the cleaning method to be used.

The cleaning schedule should be placed on a wall in a visible location. At the completion of cleaning, the responsible person is required to sign or initial the cleaning schedule.

The benefits of using a cleaning schedule ensure that;

- items are not forgotten to be cleaned,
- staff understand their duties and responsibilities,
- there is a permanent record of performing cleaning and sanitizing, and
- staff are accountable. Following is an example of a cleaning schedule.

Sample Cleaning Schedule

Daily Cleaning & Sanitation

Items to be Cleaned	Method	Person Responsible	Mon	Tues	Wed	Thur	Fri	Sat
Preparation benches	DS							
Hand wash basin & sinks	DS							
Buckets / Tubs / Boards	DS							
Equipment e.g. knives, tongs	DS							
Display cabinets	DS							
Bain Marie	DS							
Scales	DS							
Price labels	DS							
Utensils / Pots / Crockery	DS							
Display cabinet	DS							
Internal waste bins	DS							
Cookers / Stoves / Fryers	D							
Washing-up area	D							
Floors & walls	D							

Weekly Cleaning & Sanitation

Items to be Cleaned	Method	Responsible	Mon	Tues	Wed	Thur	Fri	Sat
Delivery vehicle	DS							
Coolroom / refrigerator	DS							
Toilets & Basins	DS							
Dry goods store	P							
Plastic curtains	D							
Exhaust canopy	D							

Monthly Cleaning & Sanitation

Items to be Cleaned	Method	Responsible	Mon	Tues	Wed	Thur	Fri	Sat
Freezers	D							
Cupboards / Shelving	D							
Lighting & ceiling	D							
Walls	D							
Windows & screens	D							
Exhaust fans / Ventilation	D							
Drains / Grease Traps	P							
Yard & surrounds	P							
External Waste disposal area	P							

Cleaning Method: P = Physical D = Detergent S = Sanitiser

How is pest control important to premises hygiene?

Pests are a potential source of contamination. Flies, cockroaches, mice, birds, and animals all carry bacteria and, if not controlled, they can bring food poisoning bacteria into a premises.

The best cleaning and sanitizing procedure can be destroyed if cockroaches or mice are active during the night. Good personal hygiene and food handling practices can also be in vain if flies have access to food processing areas or seafood is not protected from flies.

To control pests, two possible approaches that can be used:

- preventive measures, and
- elimination measures.

Preventive measures are the most effective approach and often the cheapest. They aim to:

- prevent pest entry to the premises, and
- remove the food supply (e.g. starve them out).

Elimination methods are used to control pests that gain access to premises. These types of pest control methods are usually more expensive but may be required under certain circumstances.

The location of baits and the application of chemical sprays are particularly important because baits and sprays could contaminate seafood. Baits must be located away from foods. Foods and packaging materials must be protected from chemical sprays. You may need to seek professional advice when deciding what pest control measures to use.

Preventive Measures	Elimination Measures
Fly screens, plastic strips, air blowers	Internal fly traps & zappers
Sealing access points (e.g. cracks)	Rodent or cockroach traps & baits
Eliminating harbourage sites	The application of chemical sprays
Controlling waste materials	
Effective cleaning	
Cover all foods or store in lidded containers	

Effective pest control also requires routine premises inspections to look for signs of pest activity (such as smears, droppings, gnaw marks). This could be done weekly as part of the cleaning program. Look in the places where activity may be expected, such as inside cupboards, underneath refrigerators, and in drains.

Why is waste disposal important to premises hygiene?

Seafood waste is highly perishable and may generate offensive odours. Seafood scraps and waste materials are a potential food supply for bacteria.

All pests require food and moisture to survive. Waste materials are an important food supply for pests, so controlling your waste will help control pests. If you remove the food supply, you can effectively 'starve them out' and prevent them from breeding.

Effective handling and disposal of waste would include:

- avoiding contact with protective clothing,
- washing hands after handling waste materials, and
- identifying waste bins and using lids.

As a general rule, if something is easy to clean, it will get cleaned. Consequently, it makes good sense to keep your premises in good repair. Internal walls, floors and ceilings must be smooth, durable, resistant to corrosion, non-toxic, impervious to water and non-absorbent. They must be maintained free from cracks, crevices and other defects. If they do not fit this description they will be harder to clean and often will not be cleaned thoroughly.

5. SEAFOOD HANDLING AND STORAGE

Seafood purchased by a retail store for on-selling to the consumer, must be safe and of sufficient quality to ensure it will not spoil during expected storage times. Good handling and storage practices are needed by the retail store to ensure that the customer receives safe seafood that will keep for a reasonable time, is fresh in appearance and colour, and is palatable when consumed.

How do I purchase safe, quality seafood?

The three most effective ways of ensuring you purchase safe, quality seafood are to:

- know your supplier,
- perform a receipt inspection, and
- ask your suppliers to show you their Food Safety Program.

Careful selection and evaluation of your suppliers will ensure seafood has been harvested from uncontaminated waters by commercial fishermen, and that it has been handled and stored safely.

Checking the following at receipt will confirm seafood safety and freshness:

- product temperature (chilled seafood should be below 5°C but ideally between -1.5° and 2°C; frozen seafood should be below -18°C),
- package condition and use-by-date of pre-packaged seafood,
- hygiene and cleanliness of the transport vehicle,
- a record of the species, harvest date and location, and supplier's name, and
- visual quality criteria, as listed in this handbook.

To minimize the potential risk to consumers, seafood retail outlets should be able to trace seafood back to the supplier. This information is necessary to allow for rapid notification and effective recall if seafood contamination is suspected.

The results of any inspection should be recorded to provide permanent evidence of good supply. This can be achieved by recording the information on the receipt or delivery docket, or by using a 'Goods Received Inspection Record'.

Date	Product	Supplier	Quantity	Inspection Result <ul style="list-style-type: none"> • use-by-date • package condition • product temperature • quality assessment 	Comments & Action Taken	Checked By (signature)

If you are not happy with what you have received, do not be afraid to reject the delivery and inform the supplier. It may be a good idea not to purchase from them until they can demonstrate better control.

Requiring your suppliers (especially suppliers of processed ready-to-eat seafood) to have a Food Safety Program and HACCP Plan will give you further assurance that the purchased seafood has been handled and stored safely.

How do I store seafood safely?

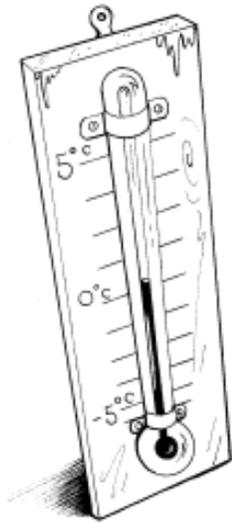
During storage, the pleasant flavours of seafood are progressively lost as spoilage occurs, and stale unpleasant flavours develop. As these spoilage flavours increase, the seafood becomes less acceptable to the consumer.

To prevent seafood spoilage, three important factors must be controlled during storage:

- Product temperature,
- Storage time (stock rotation), and
- Protection from contamination.

Fresh seafood must be stored between -1.5° and 5°C . Frozen seafood must be stored at -18°C or lower. Seafood should never be at room temperature.

Storage temperatures closer to 0°C (between -1.5°C and 2°C) or lower than -18°C , will give a longer shelf life as they minimise the activity of enzymes and the growth of bacteria.



Avoid the partial freezing of seafood because

- seafood cannot be sold as 'fresh' if its temperature has gone below -1.5°C , and
- storage temperatures between -2°C and -5°C will cause the disruption of cell membranes and speed up enzyme activity.

Stock rotation during storage is important to maintain seafood safety and freshness. Never mix two deliveries and identify them by using different shelves and date codes. Rotate stock and prevent left over seafood coming in contact with fresh seafood. A stock rotation system should operate on the 'first in - first out' principle.

To prevent contamination during storage and display, seafood should be covered, separated, and well drained. The following seafood should be separated to prevent cross contamination:

- Cooked or 'ready-to-eat' from raw seafood,
- Different seafood species (especially shellfish from finfish),
- Processed seafood (e.g. smoked fish) from fresh seafood (e.g. fish fillets),
- Seafood from other foods.

Seafood must not rest in liquids during storage as this will cause the flesh to go mushy and will leach out flavour and colour.

Seafood can be stored safely:

- in ice,
- in a chiller, cool room, refrigerator or freezer, or
- in a refrigerated display cabinet.

How do I store fresh seafood using ice?

For maximum shelf life, the best technique for storing fresh chilled seafood is to pack it in ice. This retains freshness, quality characteristics and prevents dehydration and spoilage.

Ice operates most efficiently when it melts and when in direct contact with the seafood. The melting ice allows a heat transfer while also washing bacteria from the outside of the fish.

Effective ice storage of seafood includes the following steps:

1. Wash whole fish (both outside and inside), remove foreign matter, such as seaweed, and allow to drain. Seafood should be washed in salted chilled water to prevent flavour loss.
2. Plastic wrap any exposed flesh not covered by skin or shell to prevent contact with ice and melt waters.
3. Layer seafood in a shallow container and surround (bottom, sides and between layers) with an equal weight of crushed or shaved ice. Fillets should be protected by sheets of plastic and lie flat with the skin side up to prevent gaping. If the fillets are skinned, the sides with the bloodline should be stored facing each other to prevent leaching of blood and discolouration of fillet. Whole fish should be stored belly down and head to tail (soldier stacking). Whole crabs should be stored upside down. Green prawns should be stored in an ice slurry.
4. Cover the container during storage using lids or plastic wrap to prevent contamination.
5. Melted water should be drained through a perforated base and collected in a tray underneath. Melting can be slowed by placing the container in a chiller, but care should be taken that the thermostat is not set below 0C.
6. Replace ice as it melts or becomes contaminated.

How do I store seafood in a chiller, coolroom or refrigerator?

Chiller, cool room or refrigerator storage is often used as an effective method of controlling seafood temperature. These environments however can dry out seafood, and ice may also be needed to prevent dehydration.

If a chiller, cool room or refrigerator is used for seafood storage, it is important to;

- check the storage temperature regularly and record it at least daily. Storage temperatures can be recorded on a suitable form such as an 'Appliance Temperature Record'.
- Rotate stock.
- Ensure there is sufficient air circulation and that the unit is not over stocked.
- Open the chiller door as little as possible, as temperature fluctuations will speed up biochemical and bacterial spoilage.

Ensure seafood juices are contained, and if stored in the same refrigerator, that cooked or 'ready-to-eat' seafood is above raw seafood.

How do I store live seafood?

Live seafood should be purchased from a reputable supplier and particular care taken during handling and storage. If the live product dies, it is frequently due to little cooling and it is very hard to determine the quality and safety of this product. If this occurs it is advisable to remove the product from sale and dispose of it in a landfill waste to prevent the possible transmission of aquatic diseases. (DO NOT dispose of it through the stormwater drain).

Different species have different needs, however they all should be:

- kept cool,
- kept moist,
- kept dark, and
- handled carefully.

To achieve the best survival and longest shelf life when live seafood is stored, ensure that it is kept in the optimum temperature range to reduce mortality.

- Live lobster should be held in a tank with clean well-aerated water, between 10°C and 15°C.
- Live yabbies and marron should be held in clean well-aerated water between 10°C and 20°C.
- Live blue swimmer crabs should be held in clean well-aerated water between 10°C and 20°C. Claws should be fastened to prevent injury to one another.
- Live fish should be kept in clean well-aerated water at a temperature in keeping with their natural habitat.
- Discard any bivalves that are not capable of closing when tapped. Gaping shells where the soft tissue inside is exposed may indicate spoilage and thus should be treated with caution.

It is not always practical to keep seafood live in aquariums. Indeed in particular cases, such as oysters, the eating quality may suffer if placed in an aquarium.

How do I handle & prepare seafood safely?

There are three main ways that seafood can be prepared for retail display or sale.

1. Fresh preparation (scaling, filleting, slicing and shucking).
2. Cold processing (marinating, pickling, smoking,).
3. Cooking.

During the handling and preparation of seafood, the following points are important for maintaining food safety:

- Maintain good staff and premises hygiene.
- Never leave seafood at room temperature awaiting preparation.
- Return prepared seafood to a temperature controlled environment.
- Prepare small amounts at a time.
- Prevent unnecessary contact with seafood.

Particular care should be taken when handling 'ready-to-eat' seafood, such as:

- raw seafood (oysters, sashimi tuna, surimi products),
- cooked seafood (whole or peeled prawns), • smoked seafood (smoked salmon), or
- marinated seafood (pickled mussels).

Preventing contamination of 'ready-to-eat' seafood is critical as there is no cooking step, prior to consumption, which would normally kill any food poisoning bacteria. 'Ready-to-eat' seafood should be separated from raw seafood during preparation. This can be achieved by preparing at different times, different locations, or by using different equipment and utensils (e.g. colour-coded).

The vast majority of seafood is cooked prior to consumption, either by manufacturers, by retail outlets (e.g. restaurants or fish & chip shops) or in the customer's home. It is important to understand that raw seafood may contain bacteria, and if it is not cooked sufficiently it could result in food poisoning. Therefore it is essential that the cooking process will fully cook the seafood. An internal temperature of greater than 60°C is required to kill bacteria. It is not practical to check every piece of seafood that is cooked, however you can verify that a particular cooking temperature and time will achieve an internal temperature of greater than 60°C. Staff training and written instructions on the cooking of seafood will also help ensure effective cooking. Take care not to overcook seafood as it can become tough and dry.

When cooking seafood in retail outlets, minimize the time seafood is at room temperature. Avoid coating or batter mixes becoming contaminated with bacteria by using small batches and replacing often.

How do I freeze and thaw seafood safely?

The causes of seafood spoilage are retarded or eliminated when seafood is frozen. After thawing however, seafood again becomes subject to bacterial and other types of spoilage.

The faster you freeze seafood the longer its shelf life. Slow freezing may speed up enzyme activity or will produce larger ice crystals which may damage the flesh and result in a loss of quality.

Ice crystal damage is obvious when seafood is thawed, as a large amount of fluid can be lost resulting in dry tough flesh and a loss of flavour.

It is better to buy commercially frozen seafood than to poorly freeze it yourself. If you have to freeze seafood, the seafood must be of good quality (fresh), and it must be frozen as quickly as possible.

The following steps are recommended for the safe freezing of fish:

1. Whole fish should be gilled and gutted.
2. Wash whole fish (both outside and inside) and allow to drain.
3. Pre-chill the seafood (e.g. in a refrigerator or an ice slurry preventing water contact with exposed flesh).
4. Wrap the seafood in a clean plastic film or pack into a freezer bag.
5. Remove all the air as this will slow bacterial growth and prevent oxidation.
6. Label the seafood (species, weight, date frozen).
7. Place the seafood into the freezer in single layers (fillets flat, whole fish and crustaceans belly down with head lower than the tail).
8. Freeze small quantities at one time.
9. To extend the frozen life of seafood, whole fish may be removed from the freezer after they are fully frozen, unwrapped and dipped or sprayed with water. This will produce a protective ice layer and reduce dehydration. Rewrap, re-label and return to the freezer.
10. Fish can be kept frozen for 4-6 months (three months for oily fish).

Even if quickly frozen after catching, frozen seafood will not keep indefinitely. Bacterial activity ceases below about -10°C , but chemical and biochemical changes (enzymes, oil oxidation, dehydration) will still occur. These changes may bring about slow irreversible changes in odour, flavour and appearance. For long-term freezer storage, it is recommended that a temperature of -30°C is maintained (this may only be achieved by commercial freezers). Seafood stored at -15°C (domestic freezers) will have a much-reduced shelf life.

Other important points to remember when freezing seafood include the following.

- Never freeze unsold seafood (bacterial spoilage may have already occurred).
- Do not refreeze seafood, as it will increase the chance of bacterial spoilage.
- Handle frozen seafood gently as it can be easily damaged.
- Regularly defrost freezer as ice build up will slow the process of freezing.
- When defrosting the freezer, move seafood to an alternative freezer or totally run stocks down.

Frozen seafood should be thawed in the refrigerator, which may take some time so plan ahead, and remember to:

- cover the seafood to protect it from contamination and dehydration,
- drain liquid from the thawing seafood,
- check regularly, and
- cook as soon as possible.

Do not thaw seafood at room temperature as the outer layers of the flesh may rapidly deteriorate while the inner layers remain frozen, resulting in the development of 'off' smells and flavours. Seafood thawed in running water may become waterlogged and there may be some flavour loss. The skin of whole fish that have been thawed in water may lose its gloss and sometimes become bleached.

How safe is my ice and water?

Ice and water has the potential to contaminate seafood and cause food poisoning if it is not manufactured or handled under hygienic conditions. Retail seafood premises can minimize the risk of bacterial contamination of seafood from ice or water by:

- using only potable (drinkable) water to wash seafood and the premises,
- using only potable (drinkable) water to make ice,
- monitoring samples of the water supply,

- regular cleaning and sanitizing of ice storage facilities and ice machines,
- regularly replacing or sanitizing filters,
- storing ice scoops hygienically so they do not become contaminated,
- practicing good staff hygiene, and • never re-using ice, as it will contain bacteria.

How do I display seafood safely?

It is just as important to display and serve seafood to the customer in a safe manner as it is to control safety during receipt, storage and preparation. Seafood contamination and spoilage can be prevented during display and customer service by:

- maintaining display cabinets between -1.5°C and 5°C ,
- maintaining good staff and premises hygiene,
- using clean trays for displaying seafood,
- preventing unnecessary contact with seafood (use tongs, disposable gloves, or plastic bags where possible),
- changing or washing gloves as often as you would wash your hands,
- using separate tongs for 'ready-to-eat' seafood,
- weighing seafood onto a piece of plastic wrap or into a plastic bag (never directly onto the scales),
- separating 'ready-to-eat' seafood, preferably in different compartment or by a physical barrier,
- not overstocking the display cabinet as this will reduce effectiveness,
- loading display cabinets with pre-chilled seafood (display cabinets are designed to temporarily hold temperatures but not to reduce a product's temperature), and
- not using display signs that puncture the flesh (they are a potential source of contamination and allow easy access for bacteria),

Ideally, display cabinets should be fully enclosed to maintain a constant air temperature and prevent contamination. If open display is used, protect the seafood with sneeze guards, have a 10 to 20 cm deep bed of ice, and add an 8 cm-high ice ridge along the back edge of the case.

Display cabinets should be sloped between 12° and 22° to assist cold air convection, and have a wide straight drain to allow melt water and other fluids to drain away as quickly as possible.

Spraying seafood with an ice water mist approximately every hour, or as needed, will prevent dehydration and keeps the seafood looking moist.

The importance of temperature control!

Temperature control throughout the entire process of seafood receipt, transport, processing, storage and display is critical to ensuring the retail sale of safe, high quality seafood that has a maximum shelf life. This sequence of temperature control is often referred to as the cold chain. Because temperature control is critical to seafood safety and quality, as well as having thermometers on or in all appliances (e.g. refrigerators, freezers, display cabinets, transport vehicles), it is recommended that retailers have a portable thermometer that can accurately measure product temperatures to within 1°C.

Transportation of seafood requires all the same controls to maintain safety and quality. Transport vehicles should be maintained in a clean and hygienic state, and transport methods (refrigerated or use of ice) should be capable of maintaining seafood at between 0 and 5°C.

6. FOOD SAFETY PROGRAMS AND HACCP

How do you reduce the risk of food poisoning outbreaks?

Traditionally, food safety has been determined through premises inspection and end product testing. This form of reactive control has proved costly and ineffective. To reverse the increasing incidences of food poisoning, the new proactive approach to managing food safety is the adoption of Food Safety Programs.

Developing a Food Safety Program will help a seafood business understand its product and process, and will ensure controls are in place for identified food safety hazards. The proactive approach of Hazard Analysis Critical Control Point (HACCP) has been adopted internationally by regulators and industry.

The food safety program will detail how a food business is going to maintain staff and premises hygiene, and manage the safety of seafood from ingredient receipt - during food preparation and storage - through to customer delivery. A Food Safety Program for a seafood retailer, may comprise of:

- staff food hygiene training,
- documents describing staff and premises hygiene requirements (GMP),
- a method for hazard identification and control (HACCP),
- a food recall procedure, and
- a system for maintaining records, reviewing the program, and amending documents.

During the development and implementation of a Food Safety Program, a retail seafood business will be expected to:

- systematically identify the potential hazards that may be reasonably expected to occur,
- identify where each identified hazard can be controlled and the means of control,
- provide for systematic monitoring of those controls,
- provide for appropriate corrective action when a hazard is found not to be under control,
- provide for regular review of the program by the food business to ensure its adequacy, and
- provide appropriate records to be made and kept by the food business.

The identification of potential food safety hazards and their methods of control may be achieved by utilizing HACCP principles, or by documenting them into procedures.

Once developed, the Food Safety Program is required to be:

- maintained on site,
- reviewed at least annually to ensure its adequacy, and
- audited by a Food Safety Auditor.

A Food Safety Program requires review and audit activities to:

- ensure it has been effectively implemented,
- determine if it needs updating, due to process changes or the identification of new hazards, and
- verify that food safety is being achieved.

How do I train my staff?

Food hygiene training is essential to ensure staff understand their duties and responsibilities in relation to maintaining food safety and minimizing the risk of food poisoning.

It is the responsibility of the proprietor to ensure that staff undertaking or supervising food handling operations have skills in food safety and food hygiene matters commensurate with their work activities.

What is good manufacturing practice?

Good manufacturing practices (GMP) are all the activities and work practices undertaken to prevent damage, deterioration, or contamination of food or ingredients. These include setting requirements for staff and premises hygiene, the maintenance of premises and equipment, and providing appropriate equipment.

Before considering the safe preparation and storage of seafood, the premises must be properly constructed inside and out, equipment must be suitable for the purpose, surfaces must be clean, and staff must practice good hygiene.

Implementing good manufacturing practices will ensure that the foundations are in place to be able to implement a Food Safety Program. These GMPs will include subjects previously mentioned under earlier headings, including premises, staff, storage and conditions.

Documented procedures or work instructions are the most effective way to prevent contamination from food handlers, the premises and equipment. These procedures ensure staff know their responsibilities, perform their duties in a consistent manner, and provide the basic operational requirements necessary for the production of safe seafood.

Procedures need to be simple and easily interpreted by staff, and may include:

- flow diagrams,
- pictures or graphical representations, or
- written text.

Procedures may be developed and implemented for the following activities.

- personal hygiene,
- cleaning and sanitation,
- pest and vermin control,
- waste disposal,
- facility and equipment maintenance,
- product handling, storage, identification and traceability,
- food temperature measurement and thermometer calibration, and
- staff training.

Written procedures should be accessible to staff and become a useful tool for staff training.

What are food safety hazards and how are they controlled?

Before you can identify possible food safety hazards associated with your business, you must first list all the steps used to obtain, prepare and serve seafood to your customers. These may include ordering or purchasing seafood; transport from market to store; receipt of seafood; storage; preparation steps (such as scaling, gutting, filleting, slicing, or shucking); processing steps (freezing, thawing, marinating, pickling, smoking or cooking); display for sale; and sale to customer.

Once you have listed all the process steps, you then need to identify all the potential hazards at each step, then determine how you are going to control them.

There are three possible types of hazard that may make seafood unsafe.

- Biological contamination - including bacteria, viruses and parasites.
- Chemical contamination - including pest control chemicals, detergents, and sanitizers
- Physical contamination - including metal, plastic, glass implements or containers, jewellery, and hair.

Examples of some potential hazards that could be identified by a retail seafood business and possible methods of control are included in the following table:

Process Step	Potential Hazard	Control Measure
Purchase or receipt of seafood.	<p>The seafood is contaminated with:</p> <ul style="list-style-type: none"> Seafood toxins (e.g. Paralytic Shellfish Poison, Ciguatoxin) Heavy metal (e.g. mercury) contamination particularly shark and large predatory fish. Bacteria (e.g. <i>Vibrio</i>, <i>clostridia</i>, <i>Staphylococcus aureus</i>, listeria, salmonella.) Scrombrotoxin (histamine) Viruses (e.g. Hepatitis) Parasites (e.g. anisakis) Foreign objects (e.g. wood, glass, plastic) 	<ul style="list-style-type: none"> Approved supplier program. Harvested from uncontaminated waters (from an approved area). Effective chilling from harvest to the retail store. Good hygiene during handling and transport. Purchase of fish of a limited size. Cooking prior to consumption.
Transport to store	<ul style="list-style-type: none"> Contamination during transport (from vehicle or food handlers). Growth of bacteria due to poor temperature control. 	<ul style="list-style-type: none"> Good personal hygiene, cleaning and sanitation (Procedures & GMP) Monitoring storage temperature. Chiller / freezer unit maintenance. Effective use of ice
Storage	<ul style="list-style-type: none"> Growth of bacteria due to poor temperature control or excessive storage time. Cross contamination between cooked or 'ready-to-eat' and raw seafood. Contamination from staff or equipment (e.g. trays). Use of contaminated ice or water. 	<ul style="list-style-type: none"> Monitoring storage temperature. Chiller / freezer maintenance. Effective method of storage (e.g. air circulation, not overstocking, use of ice). Stock rotation system. Separation during storage. Good personal hygiene, cleaning and sanitation (Procedures & GMP). Only use potable water and ice made from potable water. Regular cleaning and sanitising of ice storage facilities and ice machines.
Preparation steps	<p>Contamination from:</p> <ul style="list-style-type: none"> Staff Equipment (e.g. knives) Pests (e.g. flies) 	<p>Procedures & GMP:</p> <ul style="list-style-type: none"> Personal hygiene procedure Cleaning and sanitation procedure Pest & vermin control procedure

Listing all the steps and their potential hazards clearly demonstrates that the safety of retail seafood relies on many factors. These include the effective operation of equipment, as well as staff understanding and adhering to documented requirements. Every step is important to ensuring safe retail seafood and protecting the customer from food poisoning.

What is a HACCP Plan?

HACCP stands for 'Hazard Analysis Critical Control Points'. It is a proactive and preventive system for managing food safety. The concept of HACCP was developed in 1959 to produce safe food for the NASA space program. Since then its application during food manufacture, transport and retail service has gained international acceptance.

HACCP requires a food business to look at all the steps in the process of manufacturing or supplying food (e.g. ingredient receipt, storage, handling and preparation, display and customer service), identifying possible food safety hazards at each step, and then putting controls in place to prevent the hazards from occurring.

HACCP uses a systematic approach for the identification, evaluation and control of food safety hazards. The development of a HACCP Plan utilises five preliminary steps and seven principles prescribed by Codex Alimentarius. Codex Alimentarius (meaning 'food law') is a collection of internationally-adopted food standards.

The five preliminary steps are:

1. Assemble a HACCP team
2. Describe the product
3. Identify the intended use and consumers of the product
4. Construct a process flow diagram
5. On site verification of the flow diagram.

After the HACCP team completes the five preliminary steps, the following seven principles are applied.

1. Conduct a hazard analysis for each step in the process.
2. Determine the Critical Control Points.
3. Establish critical limits.
4. Establish a system to monitor control of each CCP.
5. Establish the corrective action to be taken when monitoring indicates that a particular CCP is not under control.
6. Establish a procedure for verification to confirm that the HACCP system is working effectively.
7. Establish documentation concerning all procedures and records appropriate to these principles and their application.

A HACCP plan consists of documents and records that are developed when a HACCP team follows the five preliminary steps and seven principles prescribed by Codex Alimentarius.

It is important to remember that HACCP manages food safety hazards associated with food and the process of production. Documented procedures covering GMP manages food safety hazards associated with staff and the processing environment.

Before the development of a HACCP plan, retail seafood businesses should gain an understanding of how to apply HACCP principles. It is recommended that at least one member of the HACCP team receives some HACCP training, and technical information can be obtained from food technologists, microbiological laboratories, and contained within industry guides and publications.

There is a lot of information available that can help you develop a HACCP Plan for your business, including guides, generic HACCP plans, and the Internet. It is important to remember that your business is unique, so adopting another business's HACCP Plan will not work. Developing your HACCP Plan utilising these guides and examples, will build understanding and commitment.

What is a food recall procedure?

A food recall is the action taken to remove from sale, distribution and consumption, foods which may pose a safety hazard to consumers. Foods that would pose a safety hazard to consumers would either contain:

- the growth of a bacterial pathogen (e.g. *Salmonella* spp.),
- toxic chemicals (e.g. excessive addition of food additives, chemical contamination), or
- harmful foreign bodies (e.g. glass fragments).

A Food Recall Procedure documents the steps to be taken by a food business when it identifies it has produced or sold potentially unsafe food. The procedure is used to trace the location of potentially unsafe food, and documents the action to be taken to ensure that potentially unsafe food is effectively controlled to minimize consumer illness.

Keeping good records of supplier deliveries (supplier names, type and quantity of seafood, date received, date of harvest) will help perform an effective recall.

Why are records important?

Your Food Safety Program and HACCP plan will generate monitoring records. Records should be completed accurately, be legible, and be stored in an efficient manner.

Records are important to a retail seafood business because they are:

- evidence of safe food handling and demonstrate a history of control,
- your defense if implicated in a food poisoning outbreak, and
- an evaluation that can help to identify trends or recurring problems.

What are the benefits of a Food Safety Program?

As well as fulfilling proposed regulatory requirements and growing consumer demands, the development of a Food Safety Program and HACCP Plan will also provide a retail business with many benefits. Following are some of the potential benefits which may improve operational efficiency, reduce costs and increase profits.

- Marketing tool for domestic and overseas markets.
- Safe preparation and service of food, and the prevention of food poisoning.
- Maximum product shelf life.

- Improved consumer satisfaction and increased market share.
- Better trained staff, who understand their duties.
- Ability to display 'due diligence' and protection from litigation.
- Compliance with the National Food Safety Standards for Food Safety Program development and implementation.
- Compliance with customer requirements (e.g. supermarkets or Sydney Fish Market).
- Provides evidence that a business is handling food safely.
- Potential reduced inspection/audit frequencies and associated costs.
- Precise clarification of management objectives regarding food safety.
- Reduced risk of litigation and reduced costs of any such litigation.
- Reduced cost associated with potential product recalls.

What is a Quality Assurance System?

A Quality Assurance System is a documented system that aims to ensure the supply of a quality product or service. It consists of business policies, procedures, work instructions, records, processes, resources and structure for effective quality management.

A Food Safety Program is the beginnings of a Quality Assurance System and can be expanded to fulfil the requirements of any QA Standard or Code.

There are many QA Standards and Codes to which a seafood business can become accredited. Before embarking on quality assurance, it is important to understand the differences between the various standards and codes and to know your reason for accreditation. Do not be afraid to ask for advice.

See the WA Seafood Quality Management Initiative (SQMI) publication [Quality Assurance Guidebook](#) for more information on QA Systems.

7. MAXIMIZING SEAFOOD QUALITY

Before attempting to control the quality of retail seafood, you must first define what constitutes quality. The decision about quality rests ultimately with the consumer. Quality seafood can be defined as seafood that meets the customer's requirements.

Quality is a combination of various properties that influence acceptability. Attributes that determine the quality of retail seafood may include:

- Freshness - degree of spoilage
- Food safety - will not cause illness or injury
- Aesthetic considerations - size and appearance
- Satisfaction on eating -texture and taste
- Degree of contamination with undesirable materials
- Nutritional value
- Cost
- Damage
- Packaging
- Service

Some quality attributes are more important than others, and will vary depending on the type of seafood and the consumer. However, freshness and safety are the single most important requirements for all seafood. Quality attributes that affect the health and safety of the consumer are not negotiable.

Factors that affect the quality of retail seafood at the point of sale include:

- the initial quality of the seafood (from markets or wholesaler),
- time between catching and retail distribution,
- rough handling,
- temperature control,
- staff and premises hygiene,
- method of storage and display (chilled and frozen), and
- staff product knowledge.

How do I assess seafood quality?

'Sensory analysis', or using your senses, is still the most effective way of assessing the freshness and quality of seafood. It is cheap, no equipment is needed, and it is quick.

As we are already aware, when seafood spoils it goes through a sequence of changes that are readily detectable. When assessing seafood quality, the aim is to detect these changes using all your senses.

- Sight - appearance and damage
- Touch - texture of flesh
- Smell - odour of gills and flesh
- Taste - flavour and texture of flesh

Quality characteristics vary between the type of seafood and between species. No single rule applies to all seafood, however the following general quality characteristics can be used as a guide when selecting seafood.

Seafood	Quality Characteristics
Whole fish - good quality	<ul style="list-style-type: none"> Flesh is firm, moist & elastic to touch (springs back). Smooth round eyes (not sunken), transparent cornea, & black, shiny pupils. Skin is intact with bright, glossy, metallic sheen. Scales lying flat and attached firmly to skin, undamaged fins. Bright red gills with thin translucent mucus. Glossy thin transparent and odourless body slime. Fresh seaweed smell from gut and gill area (no ammonia or 'fishy' smell). If gutted, no protruding bones, intact lining, no discoloration.
Whole fish - spoiled	<ul style="list-style-type: none"> Burst belly. Pupils sunken, cornea milky. Skin has a thick, milky mucus, and scales missing. Flesh is soft with no elasticity. Gills are yellowish, bleached colour, sour odour.
Fresh fish fillets	<ul style="list-style-type: none"> Skin is intact with bright, glossy, metallic colour. Flesh is firm, moist & elastic, not separating, firmly attached to any bones. Odourless slime, pleasant salty, sea smell from gut area (no ammonia or 'fishy' smell).
Crustaceans (prawns, crabs, lobster)	<ul style="list-style-type: none"> Shell is clean, intact, bright & glossy. Prawns should not have any blackspots (an enzymic spoilage) on the shell or a "gritty" feel about them. Firmly attached head and limbs. Moist, firm, white flesh. Odourless to mild pleasant odour.
Squid and octopus	<ul style="list-style-type: none"> Bright skin, no staining and intact. Pure white very firm flesh, not slimy. No "gritty" feel about them. Almost no smell.
Live shellfish (mussels & oysters)	<ul style="list-style-type: none"> Clean (no sand, mud, barnacles). Intact closed shell, or closes when tapped. No unpleasant odours.
Shellfish (scallops, mussels, oysters)	<ul style="list-style-type: none"> Scallop flesh white to cream. Mussel flesh white or orange. Oyster flesh often grey. Firm, plump, moist & elastic flesh. Orange roe, firmly attached. No excess liquid in package. No unpleasant odours.
Frozen seafood	<ul style="list-style-type: none"> Hard frozen. Package intact. No ice build up (indicates thawing and refreezing). Individually plastic wrapped or layer packed with plastic sheets. Bright and glossy colour, no gaping of tissues. Clean fresh frozen smell.

Characteristics of fresh fish

GENERAL APPEARANCE

Fish lie individually in the box. They may still be in rigor. All colours are clear, bright and shiny with glistening appearance. Scales bright and not easily rubbed off.

SKIN

Iridescent opalescent and shining with no excess mucus, and no signs of bleaching. Outer skin - clear or water white.

CAUDAL VEIN

Blood red and solidified

EYE

Bulging, full and convex. Translucent cornea. Pupil clear, black and bright.

GILLS

Engorged with bright red clear blood, free from mucus, clean and translucent. Smell: pleasant fresh seaweed odour (not offensive).

ABDOMINAL CAVITY

Firm and elastic (resilient to pressure) translucent white or pale pink (no traces of viscera) adheres firmly to the backbone. Peritoneal membrane, shining smooth and glossy, not easily removed from the flesh.

Characteristics of stale fish

GENERAL APPEARANCE

Fish fall together as a composite mass within the box losing their individual identity. The flesh appears limp, soft and pitted. Colours become pale, dull and indistinct, possibly with a thick covering of yellow/grey slime. Scales are easily detached.

SKIN

Dull, pitted and bleached with a covering of dotted yellowish grey mucus slime.

CAUDAL VEIN

Blood watery dark red, brown or purple permeating into the flesh of the fish.

EYE

Sunken and concave. Pupil grey or milky white with cloudy cornea. Lacks any sign of lustre.

GILLS

Deep brown grey or bleached with a thick covering of dotted yellow mucus. Smell musty, mousey, peppery, putrid or sour (unpleasant).

ABDOMINAL CAVITY

Flesh: dark pink to red, yellow or even brown. Easily pitted with pressure, soft and flabby, possibly with traces of viscera still attached due to poor gutting. Flesh easily removed from the backbone. Peritoneal membrane easily torn, gritty or sandy to the touch.

How do I maintain seafood quality to the customer?

To maximize seafood quality during receipt, storage, preparation and customer service, retail seafood outlets must:

- Handle seafood carefully
- Separate and grade
- Maintain hygiene
- Keep seafood cold
- Keep seafood covered
- Keep seafood moist
- Keep seafood moving

Fresh Vs Frozen Seafood?

The benefits of freezing seafood are a longer shelf life, and supply is not subject to seasonal variations or weather conditions. The disadvantages of freezing seafood may include deterioration of quality , drip loss during thawing, and the consumer's perception of freshness.

Incorrect freezing and freezer storage of seafood may result in:

- protein denaturing by enzyme action where proteins may lose their structure and thus their ability to hold moisture - on thawing, the flesh loses excessive moisture and looks dull, white and spongy;
- ice crystal formation and cell damage due to slow freezing;
- oxidation of the oils resulting in rancid flavors;
- freezer burn.

The quality of frozen seafood depends on the speed of freezing. Quick freezing of fresh seafood locks in flavor and quality. In some cases commercially frozen or 'sea processed' seafood is of better quality than chilled seafood that may have been incorrectly handled and stored.

8. PRESENTATION, PROMOTION AND MARKETING

Presentation, promotion and marketing play a large part in drawing customers to your shop and making the sale.

How do I display and present seafood effectively?

The importance of seafood display and presentation cannot be over-emphasised. The display will lure the customer to the shop and an interesting presentation will get the sale, particularly the impulse sale.

Seafood presentation, and the image of the premises and staff all have an impact on customers. Things to bear in mind during the presentation and display of seafood are:

- staff product knowledge (know about today's product),
- the presentation should promote product freshness,
- the premises should be seen as clean and hygienic,
- staff should be neat (e.g. uniforms) and hygienic,
- display cabinets should be kept full,
- good housekeeping,
- effective lighting,
- use plenty of ice,
- use garnishes (e.g. whole or fruit slices, well washed parsley), and
- location of product information.

Be careful with garnishes as they may contaminate seafood or result in staining. Parsley may carry bacteria or citrus fruit slices may leave marks on exposed flesh. This can be avoided by washing garnishes and by minimising product contact.

How do I create interest?

Seafood comes in a wide variety of colours, shapes and sizes, so use these characteristics to create stimulating displays. Some points to remember when trying to create interest are:

- variation,
- large variety of colours to catch the eye,
- the use of value-added products,
- bright lights to promote a clean premises,
- music and entertainment (e.g. filleting demonstrations),
- posters to keep the customers thinking about seafood,
- decor that includes an aquarium, illustrated instructions, or photos, and
- seafood arranged according to commodity (fillets, whole fish, shellfish, valueadded products)

Entice your customers by providing other meal ingredients and accompaniments (e.g. bottled chilli sauce next to a display of mussels, bottles of lemon juice, bread crumbs). A good location for accompaniments is next to the cash register.

What is the best lighting for seafood?

The best lighting for displayed seafood is blue tint fluorescent lighting. Fluorescent lighting radiates little heat and the blue tint will bring out the seafood's colour and markings.

How can I use quality and price?

Arrange displays according to product quality and price. The oldest and less attractive products should be located at the back, and, if possible, sold first. To help turn over older stock a price-reduction system can be implemented. Use weekly specials to encourage return business. Take note of the best-selling places in your display and utilize these to move older stock.

What is successful promotion & marketing?

Most foods require promotion and marketing to entice customers. Seafood is probably one of the least marketed flesh foods and the least understood by customers. This gives the retail seafood businesses an opportunity to educate the customer and use new marketing ideas.

Promotional options for retail seafood businesses may include:

- face-to-face selling,
- displays and demonstrations,
- discounts, giveaways or competitions,
- media advertising (e.g. local newspaper),
- joining an association to create more profile with your promotions, and
- value-added convenience products.

To successfully promote and market seafood you must first know your customer and their needs. Customers' needs might vary depending on location and season, but may include:

- good service,
- interesting displays and presentations,
- promotional information,
- quality seafood, and
- price.

To obtain more information about your customer you may utilize:

- short questionnaires,
- a suggestion box,
- opinions from tasting, and
- talking to your customers.

Encourage the completion of a questionnaire or the use of a suggestion box by offering a prize (e.g. a voucher) for the best suggestion of the month.

Utilize preparation and cooking displays that offer complimentary bite-size samples. Once a customer has tasted something they are more likely to buy it.

Promote seafood that is in-season as it will be at its best quality and cheapest price, and utilise the 'up-market' image of seafood.

How can I use promotional information?

Seafood is not only perceived as being healthy, it is healthy! Seafood is the complete nutrition package, high in protein, low in fat and containing essential vitamins and minerals. This opens a opportunity to promote seafood as the 'healthy choice' ideal food for health conscious consumers.

Nutritional characteristics of seafood that can be promoted to the customer include:

- high protein (100g serving of fish provides approximately one third of the recommended daily requirement of protein),
- contains all of the essential amino acids (threonine, valine, methionine, isoleucine, leucine, phenylalanine, lysine, arginine and histidine) and many non-essential amino acids (taurine thought to help control blood pressure),
- low cholesterol, • low in saturated fats,
- high in unsaturated fats,
- monounsaturated fats reduce the risk of coronary heart disease and cancer,
- polyunsaturated fatty acids (Omega-3 fatty acids are found principally in seafood) have a role to play in preventing coronary heart disease, types of arthritis, and possibly even cancer by:
 - lowering the level of triglycerides in the blood,
 - reducing blood clotting,
 - prevents hardening of the arteries,
 - reducing inflammation in conditions such as rheumatoid arthritis,
 - improving the immune system,

- high in trace elements and essential minerals (Iodine, Selenium, Iron, Copper, Calcium, Magnesium, Zinc),
- high in vitamins (B group vitamins, Vitamin E, A & D),
- low in salt (associated with high blood pressure),
- easily digestible.

As well as information on the nutritional benefits of seafood, customer information cards could be supplied on:

- How to purchase quality seafood
- Handling instructions
- How to prepare seafood in the home
- Recipes to promote healthy eating
- Methods of cooking seafood (steaming, baking, grilling, barbecuing, microwave, marinating, sousing, smoking).

9. PRODUCT KNOWLEDGE AND CUSTOMER SERVICE

How important is product knowledge?

Since many customers are not familiar with the large variety of seafood, face-to-face selling and product knowledge is very important.

Customers may know only a few species of fish, one or two ways of preparing or cooking seafood, and may also lack knowledge on the storage and shelf life of seafood. Therefore seafood retailers who talk to their customers about handling, quality, and meal suggestions are more likely to enhance their sales.

How important is customer service?

Staff appearance and manner have a marked effect on customer perceptions. Positive memories are what motivate customers to return.

The objective of good service is to excite, incite and delight the customer. Good customer service may include such things as:

- smart appearance,
- speed of service,
- knowledgeable and experienced staff,
- polite and personal attitude, and
- building a relationship with your customer (building loyalty).

Avoid over-promising and under-delivering as customers seek service not apologies.

Training staff in retail skills and product knowledge will enhance the customer's shopping experience and increase the sales of seafood.

Rules and Regulations

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Executive Summary

This rule requires official establishments and retail stores that grind raw beef for sale in commerce to maintain specific information about their grinding activities. This rule is necessary to improve FSIS's ability to accurately trace the source of foodborne illness outbreaks involving ground beef and to identify the source materials that need to be recalled. The recordkeeping

requirements in this final rule will greatly assist FSIS in doing so. FSIS has often been impeded in its efforts to trace ground beef products back to a supplier because of the lack of documentation identifying all source materials used in their preparation. On July 22, 2014, FSIS published a proposed rule (79 FR 42464) to require official establishments and retail stores to maintain records concerning their suppliers and source materials received. Having reviewed and considered all comments received in response to the proposed rule, FSIS is finalizing the rule and making several changes in response to comments. Most of the proposed requirements are retained in this final rule. This final rule requires establishments and retail facilities that grind raw beef to keep the following records: The establishment numbers of the establishments supplying the materials used to prepare each lot of raw ground beef; all supplier lot numbers and production dates; the names of the supplied materials, including beef components and any materials carried over from one production lot to the next; the date and time each lot of raw ground beef is produced; and the date and time when grinding equipment and other related food-contact surfaces are cleaned and sanitized. These requirements also apply when official establishments and retail stores grind new source materials at an individual customer's request. In response to comments, FSIS is not adopting two proposed requirements. First, under this final rule, establishments and retail stores that grind raw beef products will not have to maintain records concerning the weight of each source component used in a lot of ground beef. After considering comments, FSIS concluded that weighing each component in a lot of ground beef was time-consuming and

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not dependent on the weight of any contaminated component. FSIS is also not requiring that establishments and stores that grind raw beef products maintain records of the names, points of contact, and phone numbers of each official establishment supplying source material because FSIS already has this information in its Public Health Information System (PHIS). Any

marginal benefit presented by these two

proposed requirements would be outweighed by the time burden associated with recording the information. In response to comments, this rule also differs from the proposed rule in terms of the place where the records must be maintained and the retention period. Under the proposed rule, based on existing recordkeeping requirements (9 CFR 320.1), establishments and retail stores would have been allowed to keep the required records at a business headquarters location if the grinding activity is conducted at multiple locations. In response to comments, however, this rule requires the grinding records to be kept at the location where the beef is ground. This change in the final rule will save investigators valuable time and will reduce the risk that records will be lost or misplaced. Finally, in response to comments, for purposes of this rule, FSIS is including the definition of a lot as set out in the regulatory text at the end of this document (9 CFR 320.1(b)(4)(iii)). Under the proposed rule, based on existing regulations (9 CFR 320.3(a)), the required grinding records would have been required to be maintained for up to three years. However, in response to comments, FSIS concluded that because the records required by this rule are needed primarily to investigate foodborne illness outbreaks, their utility diminishes over time. FSIS consulted with its investigators and public health experts and determined that the records would rarely be needed after one year. Considering this fact and comments concerning the burden of keeping records on-site, particularly at retail stores, FSIS shortened the retention period in the final rule to one year after the date of the recorded grinding activity. The final rule will result in storage and labor costs to official establishments and retail stores that grind raw beef for sale in commerce. Benefits will accrue

in terms of averted foodborne illnesses, less costly outbreaks and recalls, and increased consumer confidence when

purchasing ground beef. These costs and benefits are listed in Table 1.

TABLE 1—EXECUTIVE SUMMARY TABLE

Costs:

- Labor D \$56.6 million annually (\$45.8 million to \$67.4 million).
- Storage D \$2.7 million annually.
- Unquantified Costs D Non-labor costs associated with recordkeeping for customer-requested grinds.
D Potential for slight costs to consumers in the form of ground beef price increases.

Benefits:

- Unquantified Benefits D Benefits to consumers in the form of averted foodborne illnesses as a result of contaminated
-

Background

Under the authority of the Federal Meat Inspection Act (FMIA) and its implementing regulations (9 CFR 329.1 and 329.6), FSIS investigates reports of consumer foodborne illness associated with FSIS-regulated products. FSIS investigators and other public health officials use records kept at all levels of the food distribution chain, including the retail level, to identify the sources of outbreaks.

FSIS has often been impeded in these efforts when an outbreak involves ground beef because of a lack of documentation identifying all source materials used in its preparation (79 FR 42464). In some situations, official establishments and retail stores have not kept adequate records that would allow effective traceback and traceforward activities. Without such records, FSIS cannot conduct timely and effective consumer foodborne illness investigations and other public health activities throughout the stream of commerce.

As FSIS also explained in the proposed rule, official establishments and retail stores that grind raw beef products for sale in commerce must keep records that will fully and correctly disclose all transactions involved in their business that are subject to the FMIA (see 21 U.S.C. 642) (79 FR 42465). Businesses must also provide access to, and permit inspection of, these records by FSIS personnel.

The proposed rule also explained that under 9 CFR 320.1(a), every person, firm, or corporation required by 21 U.S.C. 642 to keep records must keep records that will fully and correctly disclose all transactions involved in the aspects of their business that are subject to the FMIA. Records specifically required to be kept under 9 CFR 320.1(b) include, but are not limited to, bills of sale, invoices, bills of lading,

and receiving and shipping papers. With respect to each transaction, the records must provide the name or description of the livestock or article, the number of outside containers, the name and address of the buyer or seller of the livestock or animal, and the date and method of shipment.

The recordkeeping requirements contained in the FMIA and 9 CFR part 320 are intended to permit FSIS to trace product, including raw ground beef product associated with consumer foodborne illness, from the consumer, or the place where the consumer purchased the product, back through its distribution chain to the establishment that was the source of the product.

Having this information available will make it easier to determine where the contamination occurred. Investigators should also be able to conduct effective traceforward investigations so as to identify other potentially contaminated product that has been shipped from the point of origin of its contamination to other official establishments, retail stores, warehouses, distributors, restaurants, or other firms. FSIS must be able to carry out these investigations using records that should be kept routinely by official establishments and retail stores.

In the proposed rule, FSIS explained past efforts it has made to ensure that official establishments and retail stores that produce raw ground beef maintain necessary records. For example, the proposal explained that in 2002, FSIS published a **Federal Register** notice that listed the data that FSIS intended to collect when any samples of raw ground beef produced at an official establishment tested positive for *E. coli* O157:H7 (67 FR 62325, Oct. 7, 2002).

FSIS also listed the information it intended to gather from retail stores at the time it collected a sample of raw ground beef for *E. coli* O157:H7 testing.

In the proposed rule in the present rulemaking, FSIS explained that shortly after issuing the 2002 **Federal Register** notice, the Agency began collecting the information listed in the **Federal Register** notice from official establishments and retail stores (79 FR 42465).¹ However, as the proposal explained, some retail stores and official establishments still did not maintain records sufficient for traceback, and some retail stores did not document or maintain supplier information at times other than when FSIS collected samples of ground raw beef product from the stores for *E. coli* O157:H7 testing.² As a result, FSIS was, and remains, disadvantaged in its foodborne disease investigations.

In 2009, FSIS provided guidance to a retail industry association, which was made available on the FSIS Web site, stating that retail stores should keep appropriate records to aid in investigations involving FSIS-regulated products associated with foodborne illnesses and other food safety incidents.

To further address the issue, on December 9–10, 2009, the Food and Drug Administration (FDA) and FSIS held a public meeting to discuss the essential elements of product tracing systems, gaps in then-current product tracing systems, and mechanisms to enhance product tracing systems for food.³ This meeting was followed on

¹ FSIS Notice 47–02, November 20, 2002, “FSIS Actions Concerning Suppliers that may be Associated with *Escherichia coli* (*E. coli*) O157:H7 Positive Raw Ground Beef Product.”

² On June 4, 2012, FSIS implemented routine verification testing for six Shiga toxin-producing *E. coli* (STEC), in addition to *E. coli* O157:H7, in raw beef manufacturing trimmings. See *Shiga Toxin-Producing Escherichia coli* in Certain Raw Beef Products (77 FR 31975, May 31, 2012).

³ Comments from this hearing are available at: <http://www.regulations.gov/#?searchResults;rpp=10;po=0;s=FDA-2009-N-0523;dct=PS>. A transcript of this meeting is

March 10, 2010, by an FSIS public meeting that discussed its procedures for identifying suppliers of source material used to produce raw beef product that FSIS found positive for *E. coli* O157:H7. FSIS sought input from meeting participants on ways to improve its procedures for identifying product that may be positive for *E. coli* O157:H7.

Despite these actions, as explained in the proposed rule, some official establishments and retail stores still did not keep and maintain the records necessary for effective investigation by FSIS. With this history in mind, FSIS conducted a retrospective review of 28 foodborne disease investigations from October 2007 through September 2011 in which beef products were ground or re-ground at retail stores.⁴ When records were available and complete, enabling FSIS to identify specific production in an official establishment, the Agency was able to request a recall of product from the supplying establishment in six of eleven investigations. In contrast, when records were not available or incomplete, FSIS was able to request a product recall only two of seventeen times. These results confirmed FSIS's experience in specific cases where the presence of records at the retail level was often instrumental in identifying the source of an outbreak, as well as the implicated products that should be recalled. The proposed rule includes a fuller description of this review,

available at: <http://www.regulations.gov/#/searchResults;hpp=10;po=0;s=FDA-2009-N-0523;dc=O>.

⁴ Ihry, T., White, P., Green, A., and Duryea, P. Review of the Adequacy of Ground Beef Production Records at Retail Markets for Traceback Activities During Foodborne Disease Investigations. Poster presented at: Annual Conference of the Council of State and Territorial Epidemiologists; 2012, June 4–6; Omaha, NE. A copy of this document is available at: <http://www.fsis.usda.gov/wps/wcm/connect/87caa3f9-0c76-45c7-be4e-84d73151ed9e/RD-2009->

including specific examples (79 FR 42464).

Since the review in the proposed rule, FSIS has completed nine ground beef outbreak investigations. Of these nine investigations, grinding records were available and complete in four of them and incomplete or not available in five. When records were available and complete, FSIS was able to request a recall of product from the supplying establishment in one of four investigations. For the remaining three, two led to store level recalls.

For these two, FSIS did not request recalls at supplier establishments because in one investigation, the trim for retail product had over ten suppliers, and in the other, FSIS was not able to narrow down the list of suppliers because the retailer did not clean up in between grinding different products. FSIS did not request a recall for the third case in which records were available and complete because there were multiple products and multiple federal establishments involved, and FSIS was not able to identify the product associated with the illnesses or the supplying establishment. In the five investigations where records were not available or incomplete, FSIS was unable to request a recall from a supplying establishment.

The investigations reviewed in the proposed rule, and those reviewed since the proposed rule, confirm the Agency's findings that the records kept by official establishments and retail stores vary in type and quality and are often incomplete or inaccurate. Overall, FSIS has concluded that voluntary recordkeeping by retail stores that grind raw beef has been insufficient, as evidenced by continuing outbreaks linked to pathogens in raw ground beef that FSIS cannot trace back to the source. The lack of specific information about supplier lot numbers, product codes, production dates, and the cleaning and sanitizing of grinding

equipment has prevented or delayed FSIS in identifying the source of outbreaks, as well as other product that might be adulterated. The cleaning and sanitizing of equipment used to grind raw beef is important because it prevents the transfer of *E. coli* O157:H7 and other bacteria from one lot of product to another.

Proposed Rule

On July 22, 2014 (79 FR 42464), FSIS proposed to amend the Federal meat inspection regulations to require that all official establishments and retail stores that grind raw beef for sale keep records disclosing the following: The names, points of contact, phone numbers, and establishment numbers of suppliers of source materials used in the preparation of each lot of raw ground beef; the names of each source material, including any components carried over from one production lot to the next; the supplier lot numbers and production dates; the weight of each beef component used in each lot (in pounds); the date and time each lot was produced; and the date and time when grinding equipment and other related food-contact surfaces were cleaned and sanitized. FSIS also proposed that official establishments and retail stores would have to comply with these requirements with respect to raw beef products ground at an individual customer's request when new source materials are used.

FSIS posted the sample grinding log record below (Table 2) on its Web site in late 2011 and included it with the 2009 guidance and the proposed rule. FSIS proposed requiring the items in the sample record marked with asterisks. The proposed rule specifically stated that the information under the other column headings would not be required, but that some official establishments and retail stores might choose to keep and maintain this information.

March 10, 2010, by an FSIS public meeting that discussed its procedures for identifying suppliers of source material used to produce raw beef product that FSIS found positive for *E. coli* O157:H7. FSIS sought input from meeting participants on ways to improve its procedures for identifying product that may be positive for *E. coli* O157:H7.

Despite these actions, as explained in the proposed rule, some official establishments and retail stores still did not keep and maintain the records necessary for effective investigation by FSIS. With this history in mind, FSIS conducted a retrospective review of 28 foodborne disease investigations from October 2007 through September 2011 in which beef products were ground or re-ground at retail stores.⁴ When records were available and complete, enabling FSIS to identify specific production in an official establishment, the Agency was able to request a recall of product from the supplying establishment in six of eleven investigations. In contrast, when records were not available or incomplete, FSIS was able to request a product recall only two of seventeen times. These results confirmed FSIS's experience in specific cases where the presence of records at the retail level was often instrumental in identifying the source of an outbreak, as well as the implicated products that should be recalled. The proposed rule includes a fuller description of this review,

available at: <http://www.regulations.gov/#/searchResults;pp=10;po=0;s=FDA-2009-N-0523;dc=O>.

⁴ Ihry, T., White, P., Green, A., and Duryea, P. Review of the Adequacy of Ground Beef Production Records at Retail Markets for Traceback Activities During Foodborne Disease Investigations. Poster presented at: Annual Conference of the Council of State and Territorial Epidemiologists; 2012, June 4–6; Omaha, NE. A copy of this document is available at: <http://www.fsis.usda.gov/wps/wcm/connect/87caa3f9-0c76-45c7-be4e-84d73151ed9e/RD-2009->

including specific examples (79 FR 42464).

Since the review in the proposed rule, FSIS has completed nine ground beef outbreak investigations. Of these nine investigations, grinding records were available and complete in four of them and incomplete or not available in five. When records were available and complete, FSIS was able to request a recall of product from the supplying establishment in one of four investigations. For the remaining three, two led to store level recalls.

For these two, FSIS did not request recalls at supplier establishments because in one investigation, the trim for retail product had over ten suppliers, and in the other, FSIS was not able to narrow down the list of suppliers because the retailer did not clean up in between grinding different products. FSIS did not request a recall for the third case in which records were available and complete because there were multiple products and multiple federal establishments involved, and FSIS was not able to identify the product associated with the illnesses or the supplying establishment. In the five investigations where records were not available or incomplete, FSIS was unable to request a recall from a supplying establishment.

The investigations reviewed in the proposed rule, and those reviewed since the proposed rule, confirm the Agency's findings that the records kept by official establishments and retail stores vary in type and quality and are often incomplete or inaccurate. Overall, FSIS has concluded that voluntary recordkeeping by retail stores that grind raw beef has been insufficient, as evidenced by continuing outbreaks linked to pathogens in raw ground beef that FSIS cannot trace back to the source. The lack of specific information about supplier lot numbers, product codes, production dates, and the cleaning and sanitizing of grinding

equipment has prevented or delayed FSIS in identifying the source of outbreaks, as well as other product that might be adulterated. The cleaning and sanitizing of equipment used to grind raw beef is important because it prevents the transfer of *E. coli* O157:H7 and other bacteria from one lot of product to another.

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Table 2: Grinding log record that FSIS posted (2009)

<p>NEW WAVE STORE</p> <p>123 Main Street</p> <p>Anytown, USA, Zip Code</p> <p>FRESH GROUND BEEF PRODUCTION LOG/TRACKING LIST</p> <p>Employee Name _____ Today's Date _____</p>										
Date and Time of Grind*	Lot/Batch # (lot = same source material)	Exact Name/Type of Product Produced	Package Size of Product Produced	Amount (in lbs) of Source Material Used in Each Lot, including Carryover*	Production Code of Product Produced	Manufacturer Name of Source Material Used for Product Produced*	Supplier Lot #s, Product Code and/or Pack Date of Source Material Used*	Estab. Info. from Label of Source Material Used (Est. #, ph #, contact info)*	Date and Time Grinder and Related FCSs Cleaned and Sanitized*	Comments
<p>_____ Signature of Store Management Reviewer</p> <p>_____ Date</p>										

*Information that would have been required by the proposed rule.

Final Rule As stated above, the final rule is mostly consistent with the proposed rule. It requires official establishments and retail stores that grind raw beef products to maintain the following records: The establishment numbers of the establishments supplying the material used to prepare each lot of raw ground beef; all supplier lot numbers and production dates; the names of the supplied materials, including beef components and any materials carried over from one production to the next; the date and time each lot is produced; and the date and time when grinding equipment and other related food-

contact surfaces are cleaned and sanitized. These requirements also apply to raw ground beef products that are prepared at an individual customer's request when new source materials are used. If new source materials are not used, there is no reason to record the customer-requested grind separately.

The final rule will not require records concerning the names, points of contact, and phone numbers of each official establishment supplying source material or the weight of each source component. In consideration of comments that it received, FSIS has concluded that the records concerning the names, points of contact, and phone numbers of each

official establishment supplying source material were unnecessary given that FSIS already possesses this information through the establishment profiles in PHIS. In addition, FSIS concluded, in response to the comments submitted, that weighing each component in a lot of ground beef was time-consuming and offered little food safety benefit.

Contamination occurs in a lot of ground beef regardless of the weight of the contaminated component.

In conformance with these changes, FSIS has updated its sample grinding log as pictured in Table 3 below to reflect the requirements of this final rule.

Table 3: Sample Grinding log with final rule requirements.

<p>NEW WAVE STORE</p> <p>123 Main Street</p> <p>Anytown, USA, Zip Code</p> <p>FRESH GROUND BEEF PRODUCTION LOG/TRACKING LIST</p> <p>Employee Name _____ Today's Date _____</p>					
Date and Time of Grind	Manufacturer Name of Source Material Used for Product Produced	Supplier Lot #s, Product Code and/or Pack Date of Source Material Used	Est. Number(s) of Est. providing source material	Date and Time Grinder and Related FCSs Cleaned and Sanitized	Comments
<p>_____</p> <p>Signature of Store Management Reviewer Date</p>					

The final rule also differs from the proposed rule with respect to the place of maintenance and the retention period of the required records. Based on 9 CFR 320.2, the proposed rule would have required records to be kept at the place

where the business, in this case the grinding activity, is conducted, unless the business is conducted at multiple locations, in which case the proposal would have allowed the records to be maintained at a business's headquarters office. In response to comments, FSIS has concluded that keeping the required information at the location where the beef is ground will save investigators time and reduce the risk that records are misplaced when they are moved. This rule, therefore, establishes a new 9 CFR 320.2(b), which requires that all the information required by this final rule be kept at the location where the beef is ground.

Based on 9 CFR 320.3(a), the proposed rule would have required that the proposed grinding records be retained for a period of two years after December 31 of the year in which the transaction giving rise to the record (grinding) occurred. In response to comments discussed below, FSIS concluded that because the vast majority of ground beef is consumed within several months of its production, a one-year retention period is adequate to trace the source of any foodborne disease outbreak involving raw ground beef.

Accordingly, this final rule creates a 9 CFR 320.3(c) which requires that official establishments and retail stores covered by this rule retain the required records for one year.

The final rule also makes technical changes to 9 CFR 320.2 and 320.3 to improve readability.

Summary of Comments and Responses

FSIS received 40 comments on the proposed rule from individuals, retailers, beef producers and processors, beef industry and retail trade groups, consumer advocacy groups, an organization representing food and drug officials, a State department of agricultural and rural development, a food technology company, and two members of Congress. Most of the commenters supported the proposed rule. Industry groups supported recording information for effective investigation in the event of a foodborne illness outbreak but stated that the costs of compliance were higher than estimated, and that several pieces of information were unnecessary or overly burdensome. A summary of the relevant issues raised by the commenters and the Agency's responses follows.

1. Covered Entities

Comment: Consumer and retail trade groups stated that the rule should apply to supermarkets, grocery stores, meat markets, warehouse clubs, cooperatives, supercenters, convenience stores, wholesalers, and restaurants.

Response: This final rule applies to all official establishments and retail stores

that grind raw beef products for sale to consumers in normal retail quantities. The rule covers supermarkets and other grocery stores, meat markets, warehouse clubs, cooperatives, supercenters, convenience stores, and wholesalers, if they grind raw beef product.

FSIS is not applying this final rule to restaurants. Only a small percentage of all raw beef grinding occurs at restaurants and only on a very small scale. It is thus likely that any outbreak traced to a restaurant that grinds its own raw beef will be traceable to a specific supplier.

2. Content of Records

Comment: Retail organizations, a food technology company, and a beef brand recommended reducing costs by removing from the proposed rule the requirement to weigh each source component. These commenters stated that the proposed requirement was time-consuming, disruptive to workflow, unfeasible with current equipment, and offered no public health benefit.

Response: FSIS agrees that the requirement to weigh each source component is not necessary. If a foodborne illness outbreak occurs, the weight of a source component in a lot of ground beef is not significant in tracing the material back to the suppliers. Also, any amount of adulterated source material in a lot of ground beef would adulterate the product. Accordingly, FSIS has removed this provision from the final rule and has adjusted the paperwork burden estimates and costs accordingly.

Comment: An independent grocers' trade group suggested removing the requirement to record supplier lot numbers and production dates.

Response: Supplier lot numbers and production dates are necessary to identify product at a supplier's location that may be associated with an outbreak. By including supplier lot numbers and production dates, investigators can more easily and quickly determine the source of a foodborne illness outbreak and limit the amount of product recalled.

Comment: Industry groups generally opposed recordkeeping for customer-requested grinds. They stated that it was impractical to clean grinding equipment between customer requests, meat case items usually lack supplier information, and public health benefits from logging these grinds would be limited. One meat industry trade group suggested only requiring the proposed recordkeeping provisions for customer-requested grinds over thirty pounds. A retail trade group recommended that its members perform customer-requested grinds at the end of the day or during a clear

production cycle break. *Response:* Customer-requested grinds present the same food safety risk as other raw ground beef. Retailers should keep customer-requested grinds separate and must record the information required in this rule when new source materials are used for customer-requested grinds. It is also in the store's interest to perform a clean up before and after customer-requested grinds. If the source is not clear, or if there is no clean up, traceback to the supplier will be impossible. The retailer would have produced the product associated with the outbreak, and in such circumstances, FSIS will have to request that the retailer recall product. Also, if the source is not clear, FSIS will likely have to request that the retailer recall more product than would be necessary if the retailer had recorded the necessary information. FSIS agrees that customer-requested grinds present unique challenges but estimates that the benefits of being able to rapidly identify a customer-grind associated with an outbreak outweigh the recordkeeping and clean-up costs. *Comment:* Two food-safety non-profits, a grocery store chain, and a consumer group stated that the name of the retail product should be recorded to assist in identifying product subject to recall. One individual and a food-safety non-profit stated that retail products should include specific day or production lot codes to assist in tracing products back to specific grinding lots.

Response: FSIS does not believe that including retail product names on records listing source materials used to produce those products is practical. Products from different source materials may have the same name, e.g., 80/20 Ground Chuck. In addition, products from the same source materials may be marketed differently. For example, packages of "Bob's Ground Beef" and "Jan's Ground Beef" may originate from the same lot of source materials, despite bearing different retail names.

FSIS is also not requiring official establishments and retail stores to label retail products with timestamps or production lot codes to identify them with the specific lot or lots of ground beef from which they were produced. Retail ground beef products can usually be traced back to their specific grinding lots through stores' inventory data, the product's date and time of sale, and information stored on customers' shopper cards. Once a retail product is traced back to the grinding lot or lots,

the records required by this final rule will enable FSIS investigators to identify the source materials, suppliers, and production lots from which the product was produced.

Comment: Industry groups opposed recording the names, points of contact, and phone numbers of suppliers because FSIS already has this information through PHIS.

Response: FSIS agrees that the names, points of contact, and phone numbers of official establishments supplying source materials are already located in the establishment profiles within PHIS. Therefore, the establishment numbers of suppliers provide sufficient information to FSIS, and FSIS has removed those pieces of information from the recordkeeping requirements, leaving the requirement that official establishments and retail stores keep the establishment number of their suppliers of source materials. FSIS has updated its paperwork burden and costs estimates to reflect this change.

3. Use of Sample Grinding Log *Comment:* A consumer group recommended that FSIS provide a sample grinding log containing all of the required information. A grocery store chain and retail trade group stated that grinders should be able to create their own logs, so long as all required information is included. A retail trade group questioned whether grinders would be required to use the sample log shown above.

Response: While FSIS has provided a sample grinding log that is depicted above, FSIS is not specifying in the final rule how official establishments and retail stores must record the required information.

Entities may record the required information as they see fit, so long as the records of the required information are maintained in accordance with 9 CFR 320.2 and 320.3.

4. Imports

Comment: One individual stated that the proposed rule should apply to imported beef. *Response:* FSIS' regulations do not apply directly to establishments in foreign countries, and retail stores in foreign countries are not eligible to export product to the United States. To be eligible to export raw beef product to the United States, countries must maintain an equivalent inspection system for beef. Therefore, in the event of *Salmonella* or shiga-toxin producing *E. coli* (STEC) outbreaks, countries that ship beef to the United States will need to have traceback and traceforward systems for beef products that allow the country to identify the source of

contamination. Countries that export beef to the United States may choose to establish recordkeeping requirements consistent with this rule. However, they may also have other means to track the necessary information.

5. Other Species *Comment:* Individual commenters and food safety groups believed that the rule should apply to ground product produced from swine, poultry, lamb, and turkey.

Response: FSIS issued the proposed rule to address deficiencies in recordkeeping that hampered investigations into foodborne illness investigations involving raw ground beef. Between 2007 and 2013, FSIS investigated 130 outbreaks of human illness. Of those, 31 (24 percent) were linked to beef ground at a retail venue.

FSIS did not propose that new records be maintained for ground products other than beef because the Agency is most often impeded in its efforts to trace back and identify sources of human illness when beef ground in retail stores is the vehicle for those illnesses. FSIS considers the comments requesting similar requirements for other ground product to be outside the scope of this rule.

6. Consumer Education

Comment: A meat processor, a meat products company, and two individuals stated that more outreach was needed to educate consumers on how to properly handle and cook meats.

Response: FSIS promotes consumer awareness of food safety issues and encourages proper food preparation practices. For example, FSIS posts consumer food safety information on its

Web page.⁵ The posted information includes the kind of bacteria that can be found in ground beef, specific information as to why the *E. coli* O157:H7 bacterium is of special concern in ground beef, and the best way to handle raw ground beef when shopping and when at home. This Web page also contains the *Food Safe Families Campaign* guidelines to keep food safe, which tells consumers to cook ground beef to a safe minimum internal temperature of 160 °F (71.1 °C) as measured with a food thermometer.

FSIS also provides food safety education in other forms (e.g., FSIS has continued to work with the Ad Council to launch food safety public service announcements, and FSIS staff provide

⁵ FSIS food safety guidance for meat preparation, available at: <http://www.fsis.usda.gov/wps/portal/!fsis/topics/food-safety-education/get-answers/food-safety-fact-sheets/meat-preparation>.

in-person food safety education through the mobile Food Safety Discovery Zone). Nonetheless, recordkeeping by retail establishments will more quickly and efficiently address the concerns (i.e., traceback and identifying sources of human illness when beef ground in retail stores is the vehicle for those illnesses) raised in this final rule.

7. Supplier Process Control Actions *Comment:* One individual urged official establishments to improve contamination control at slaughter. A meat products company that did not support the rule believed that suppliers cannot control *E. coli*, but that the answer is not more recordkeeping because that does not address the core problem, which is the interdependent relationship between animals and *E. coli*.

Response: FSIS is continuing to address process control actions that should be taken by beef suppliers to control *E. coli*. For example, FSIS made available updated guidance on testing and high event periods⁶ in 2013 and implemented new traceback activities in 2014.⁷ However, while better process control may reduce the incidence of *E. coli* O157:H7-adulterated ground beef, it will not address the issue of official establishments and retail stores not keeping adequate records that allow effective traceback and traceforward activities. Without the records required by this final rule, FSIS cannot conduct timely and effective consumer foodborne illness investigations and other public health activities through the stream of commerce.

8. Implementation *Comment:* An independent grocers' trade group recommended a two-year delayed effective date for small businesses to comply with the rule.

Alternatively, the commenter stated that small businesses should be exempt from the rule's requirements altogether. Similarly, a retail trade group believed that small retailers would need more time for outreach and training and that implementation would take longer than anticipated by the proposed rule

⁶ Compliance Guideline for Establishments Sampling Beef Trimmings for Shiga Toxin-Producing *Escherichia coli* (STEC) Organisms or Virulence Markers, available at: http://www.fsis.usda.gov/wps/wcm/connect/e0f06_d97-9026-4e1e-a0c2-1ac60b836fa6/Compliance-Guide-Est-Sampling-STEC.pdf?MOD=AJPERES.

⁷ FSIS Directive 10,010.3, Traceback Methodology for *Escherichia Coli* (*E. Coli*) O157:H7 in Raw Ground Beef Products and Bench Trim, available at: <http://www.fsis.usda.gov/wps/wcm/connect/ae5e81d0-c636-4de1-93f3-7a30d142ae69/10010.3.pdf?MOD=AJPERES>.

because of the need to create or modify records forms.

Response: FSIS has provided sample grinding logs in this rule and the proposed rule. Small businesses may use these logs, or any other recordkeeping system they wish, to record the required information. FSIS believes that the recordkeeping requirements are straightforward and do not require extensive training or guidance materials. FSIS has also not adopted the proposed requirements that grinders record and maintain records of the weight of each source material used in a grinding lot, and the names, points of contact, and phone numbers of each official establishment supplying source material.

In addition, as is discussed above, FSIS has advised official establishments and retailers to maintain these types of records since 2002. Nonetheless, in response to comments, this final rule provides that retailers and official establishments will have 180 days from the date of publication of this final rule to comply with its requirements. This effective date should provide industry sufficient time to comply with the requirements because FSIS has simplified the requirements originally proposed, and FSIS will ensure that establishments and retailers are aware of the new requirements through the outreach activities discussed below and through partnering with the States and other organizations, such as retail organizations.

9. Training

Comment: One consumer group recommended face-to-face contact by FSIS with entities that grind raw beef to explain the rule's requirements. A beef producers' trade group encouraged FSIS to conduct outreach through webinars and by attending industry meetings. One individual stated that operators should be trained to understand the risks of *E. coli* in grinding. Another individual suggested more training on keeping logs, proper attire, and hand-washing. A State agriculture department believed it would incur costs associated with responding to questions from grinders and training State personnel to field such questions appropriately.

Response: As noted above, the

recordkeeping requirements in the final rule are straightforward and do not require extensive training or guidance materials. FSIS will update its 8 Sanitation Guidance for Beef Grinders, which includes sample grinding logs and instructions, and will hold *Available at: http://www.fsis.usda.gov/shared/PDF/Sanitation_Guidance_Beef_Grinders.pdf.

webinars to explain the requirements of this final rule and answer questions from official establishments, retailers, and other organizations. FSIS will also provide guidance to small businesses through its Small Plant Help Desk and *Small Plant News* newsletter, and at industry conferences, exhibitions and workshops.

10. Retention and Maintenance of Records

Comment: A food-safety non-profit organization suggested that records required under this rule be retained for at least ninety days. A grocery store chain believed six-to-twelve months would be adequate. A retail trade group believed six months was appropriate. The latter two commenters mentioned that frozen beef should be consumed within three to four months.

Response: While ground beef is safe indefinitely if kept frozen, it will lose quality over time. FSIS recommends consuming fresh ground beef within two days and frozen ground beef within four months.⁹ These recommendations suggest that records documenting the grinding of raw beef need only be kept for a short period of time. However, the Agency is aware that consumers do not always follow such recommendations, sometimes keeping ground beef in their freezers for up to a year, for example.

FSIS is therefore requiring in the final rule that official establishments and retailers maintain the prescribed records for one year (9 CFR 320.3).

Comment: A trade group representing food safety officials stated that records should always be maintained at the location where the beef was ground.

Response: This final rule amends 9

CFR 320.2 to require that official establishments and retail stores maintain the required records at the place where the raw beef is ground. This approach, along with the shorter record retention period being required in 9 CFR 320.3, balances the burden on retailers of storing records for the necessary period of time with the needs of investigators to have such records available at the grinding location.

11. Enforcement

Comment: Three individuals stated that FSIS should assess additional fines or penalties to enforce the final rule's requirements. A consumer group recommended FSIS perform verification checks at retailers to monitor

compliance. A trade group representing available at:

⁹ FSIS Ground Beef and Food Safety,

food safety officials asked how FSIS would enforce the rule and urged FSIS to work more cooperatively with State and local food safety agencies. The commenter also recommended that local officials have access to the new records, as they are often involved at the earliest stages of an outbreak.

Response: The FMIA provides FSIS with authority to require specified persons, firms, and corporations to keep records that will fully and correctly disclose all transactions involved in their businesses subject to the FMIA and to provide access to facilities, inventory, and records (21 U.S.C. 642). If official establishments do not maintain the required records, FSIS will issue noncompliance records. FSIS may also take any regulatory control actions as defined in 9 CFR 500.1(a), including the tagging of product, equipment, or areas.

FSIS personnel conduct in-commerce surveillance related to wholesomeness, adulteration, misbranding, sanitation, and

recordkeeping.¹⁰ When this rule becomes final, FSIS compliance investigators will verify that retail grinders meet the recordkeeping requirements. If compliance investigators find they do not, they may issue a Notice of Warning to the retail store.

If FSIS personnel find noncompliance at an official establishment, the Agency could issue non-compliance reports, letters of warning, or request the Department of Justice to initiate a civil proceeding in Federal court to enjoin the defendant from further violations of the applicable laws and regulations. If FSIS personnel find noncompliance at a retail facility, the Agency may issue notices of warning or request the Department of Justice to initiate a civil proceeding to enjoin the defendant from further violations of the applicable laws and regulations.

States with their own meat and poultry inspection (MPI) programs will need to be aware of the requirements of this rule and are required to enforce requirements "at least equal to" the Federal inspection program. Therefore, they will need to require that establishments under State inspection maintain records consistent with what FSIS is requiring.

FSIS will also explore ways to partner with States, with or without MPI programs, so that State employees can provide information about the

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¹⁰ FSIS Directive 8080.1, Rev. 4, *Methodology for Conducting In-Commerce*

possible, and provide other information that will enhance the efficiency and but preserves the information needed by investigators. *Comment:* A effectiveness of store efforts. FSIS intends to provide information to State and local officials about the grinding logs requirement during regular monthly and average number of suppliers at retail, suggesting that beef is ground Webinars that FSIS conducts for State MPI Directors and State HACCP every day, several times per day as needed, and with several different Contacts and Coordinators.

FSIS also routinely cooperates with State and local authorities to conduct effective foodborne illness investigations, including by sharing epidemiological data, records, and investigative resources. FSIS intends to provide information to State and local authorities during the course of these illness investigations about the role that grinding logs can play in facilitating these investigations.

12. Grinding Frequency and Time Burden

Comment: To reduce costs, a grocers'

trade group stated that FSIS should require records only for all source materials used in grinds during a single production day, requiring a new log for production that would begin only after the end-of-day full cleaning of the grinding equipment. Several commenters also stated that many retail stores grind several times per day and may use several different suppliers, significantly increasing recordkeeping costs.

Response: In the proposed rule, FSIS

considered requiring documentation of information on a weekly basis, but rejected this approach because it would be difficult to differentiate between lots ground from different suppliers throughout the week (79 FR 42469). The same holds true for daily logs. In either situation, investigators would be unable to effectively conduct traceback and traceforward activities in the event of an outbreak because of limited detail. FSIS is not dictating how often the required information must be physically recorded. Under the final rule, the required information must be recorded whenever any of the information required for the lot of product being ground changes. For example, if an entity uses the same source material for multiple grinds throughout the day, it would only need to record the source material information (9 CFR 320.1(b)(4)(i)(A)-(C)) once but would need to record the date and time of each grind (9 CFR 320.1(b)(4)(i)(D)). However, if a store or establishment were to start using a different supplier or lot number during the day, it would need to document that change (9 CFR 320.1(b)(4)(i)(B)). This approach minimizes the recordkeeping burden

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establishments and retail stores that grind raw beef. The 2008 study found that 74 percent of chain retail stores and 12 percent of independent retail stores kept grinding logs. Of the stores that kept grinding logs, the study reported that 78 percent of those logs were incomplete (79 FR 42471). Although insufficient voluntary recording is one impetus for this rule, FSIS is not aware of any instance when official establishments and retail stores that were keeping necessary records discarded source material in lieu of recording necessary records. Therefore, FSIS concludes that the costs of recordkeeping will rarely be greater than the costs of discarding bench trim, and that the amount of product discarded as a result of the rule should be negligible.

14. Effect on Small Businesses *Comment:* An independent grocers' trade group stated that the proposed rule would have a significant economic impact on a substantial number of small entities, and, therefore, FSIS must conduct an initial regulatory flexibility analysis. *Response:* While the rule will affect a substantial number of small businesses, the cost of complying with the proposed regulations will be relatively small on a per firm basis. FSIS has provided guidance and a sample grinding log, which FSIS will update as appropriate. Similar guidance is available from other providers, including industry associations. Entities can use these materials to minimize the costs of their recordkeeping programs. In addition, as is discussed above, FSIS will hold webinars to provide small businesses additional information on the rule and will publish information through its Small Plant Help Desk and *Small Plant News* newsletter. The fact that a number of small firms already maintain adequate grinding records suggests that the cost of the practice is not prohibitive to doing business.

15. Definition of a Lot of Ground Beef *Comment:* A beef industry trade group commented that some ground beef producers have different definitions for "lots" or "batches" of ground beef.

Specifically, FSIS is using the low end of time estimates from the comments because, for the final rule, FSIS has significantly reduced the information required to be kept compared to the proposed rule.

13. Waste

Comment: Two individuals and an

independent grocers' trade group stated that retailers would simply throw out bench trim to avoid the recordkeeping requirements.

Response: In its proposed rule, FSIS

considered a 2008 study that found that recording grinding information is already prevalent among official

establishments and retail stores that grind raw beef. The 2008 study found that 74 percent of chain retail stores and 12 percent of independent retail stores kept grinding logs. Of the stores that kept grinding logs, the study reported that 78 percent of those logs were incomplete (79 FR 42471). Although insufficient voluntary recording is one impetus for this rule, FSIS is not aware of any instance when official establishments and retail stores that were keeping necessary records discarded source material in lieu of recording necessary records. Therefore, FSIS concludes that the costs of recordkeeping will rarely be greater than the costs of discarding bench trim, and that the amount of product discarded as a result of the rule should be negligible.

14. Effect on Small Businesses *Comment:* An independent grocers'

trade group stated that the proposed rule would have a significant economic impact on a substantial number of small entities, and, therefore, FSIS must conduct an initial regulatory flexibility analysis.

Response: While the rule will affect a substantial number of small businesses, the cost of complying with the proposed regulations will be relatively small on a per firm basis.

FSIS has provided guidance and a sample grinding log, which FSIS will update as appropriate. Similar guidance is available from other providers, including industry associations. Entities can use

these materials to minimize the costs of their recordkeeping programs. In addition, as is discussed above, FSIS will hold webinars to provide small businesses additional information on the rule and will publish information through its Small Plant Help Desk and *Small Plant News* newsletter. The fact that a number of small firms already maintain adequate grinding records suggests that the cost of the practice is not prohibitive to doing business.

15. Definition of a Lot of Ground Beef *Comment:* A beef industry trade group commented that some ground beef producers have different definitions for "lots" or "batches" of ground beef.

¹¹ Food Marketing Institute, Comprehensive Guide Meat Ground at Retail Recordkeeping and Sanitation, available at: <http://www.fmi.org/docs/default-source/food-safety-best-practice-guides/meat-ground-at-retail-comprehensive-guide.pdf?sfvrsn=6>. Conference for Food Protection, Guidance Document for the Production of Raw Ground Beef at Various Types of Retail Food Establishments, available at: <http://www.foodprotect.org/media/guide/CFP%20Beef%20Grinding%20Log%20Template%20Guidance%20Document%20-%208-2014.pdf>.

Response: FSIS did not propose a definition for a "lot" of ground beef in the proposed rule. In response to this comment, and for the sake of consistency in implementing this final rule, FSIS has added a new 9 CFR 320.1(b)(4)(iii), which defines a lot.

Implementation

All retailers and official establishments will have 180 days from the date of publication of this final rule to comply with its requirements.

As is discussed above, this rule does not prescribe the method by which official establishments and retail stores must keep the required information but does require that the information be kept at the location where the beef is ground. The records must be retained for one year after the transaction giving rise to the record (grinding) occurred. FSIS will update its

Sanitation Guidance for Beef Grinders,¹² which currently includes sample grinding logs and instructions, and hold webinars to explain the requirements of the final rule and answer questions from official establishments, retailers, and other organizations. FSIS will also provide information to small businesses through its Small Plant Help Desk and *Small Plant News* newsletter. FSIS will provide guidance to State MPI programs on the requirements of this rule and seek to partner with States to ensure that the requirements of this rule are communicated to official establishments inspected by State MPI programs and to retail stores that grind raw beef. FSIS will also work with States and universities around the nation to conduct outreach workshops targeted to retailers and official establishments to explain the requirements of the rule.

Records of the required information must be made available to authorized USDA officials upon request (9 CFR 300.6(a)(2)). These officials may examine and copy such records (9 CFR 320.4). At official establishments, FSIS inspection personnel will verify compliance. As is discussed above, if FSIS personnel find noncompliance at an official establishment, the Agency could issue non-compliance reports, letters of warning, or request the Department of Justice to initiate a civil proceeding in Federal court to enjoin the defendant from further violations of the applicable laws and regulations. At retail stores, FSIS compliance investigators will verify that retail grinders meet the recordkeeping requirements. If compliance investigators find they do not, the

¹² Available at: <http://www.fsis.usda.gov/shared/PDF/Sanitation%20Guidance%20Beef%20Grinders.pdf>.

Agency may issue a ~~Notice of the Rule~~ or request the Department of Justice to initiate a civil proceeding to enjoin the defendant from further violations of the applicable laws and regulations.

Executive Orders 12866 and 13563 and Regulatory Flexibility Act

Executive Orders 12866 and 13563 direct agencies to assess costs and benefits of available regulatory alternatives and, if regulation is necessary, to select regulatory approaches that maximize net benefits (including potential economic, environmental, public and safety effects, distributive impacts, and equity). Executive Order 13563 emphasizes the importance of quantifying both costs and benefits, of reducing costs, of harmonizing rules, and of promoting flexibility. This rule has been designated a "non-significant regulatory action" under section 3(f) of Executive Order 12866.

Accordingly, this rule has not been reviewed by the Office of Management and Budget.

In updating the preliminary regulatory impact analysis of the proposed rule, FSIS has made several changes in response to public comments and newly available information. Specifically, FSIS has made the following

changes in the final regulatory impact analysis:

- D Increased the number of retail firms in the baseline using new U.S. Census Bureau data;
- D Added assumptions about the percentage of retail firms that grind raw beef;
- D Incorporated new distributions relating to source materials used to reflect the complexity of grinding operations;
- D Adjusted the time estimates for recordkeeping activities, the frequency of recordkeeping tasks, and the number of active grinding days per week based on comments received;
- D Added estimates of labor to incorporate recordkeeping for grinds, including pieces of trim and customer-requested grinds;
- D Updated the wage rate and benefits factor for firm employees that record or maintain required records based on the newest available information;
- D Added discussion about unquantified costs associated with maintaining records for customer-requested grinds; and
- D Expanded the benefits discussion to include benefits not previously addressed, such as the mitigation of costly spillover effects from foodborne illness outbreaks, and the incentive traceability provides to produce safe product.

During investigations of foodborne illness outbreaks attributed to ground beef, grinding records are an important part of the traceback and traceforward processes. Without accurate records, it is difficult to identify where ground beef components originated. If investigators cannot identify a source, it is likely that adulterated product will remain in commerce and more consumers will eat the product and become ill. Delays in identifying the source of contamination can also negatively affect sales of ground beef due to loss in consumer confidence. Despite efforts by FSIS, industry associations, and other regulators to provide retailers and official processing establishments with guidance and examples of best practices, the current level of recordkeeping is still less than what is needed for timely and accurate traceability investigations.

Traceability systems are a potential way to lessen the costs of foodborne illness outbreaks and other food safety events. In the case of private regulation, each firm will ultimately decide what level of traceability to implement on the basis of costs and potential benefits, such as smaller losses of reputation and reduced liability costs during foodborne illness

outbreaks.¹³ Some firms may decide not to invest at all. Insufficient traceability, however, is not optimal for the industry as

a whole.¹⁴ In some cases industry associations and third parties can influence firms to adopt traceability measures, but in the case of grinding records, these efforts

have not achieved an acceptable level. Forms of private regulation, such as

those currently in place for raw beef grinding entities, are vulnerable to firms that do not invest their fair share to the detriment of others, commonly referred to as the "free rider" problem.¹⁶ In the event of a foodborne illness outbreak

¹³ Hobbs, Jill E., (2004) "Information Asymmetry and the Role of Traceability Systems," *Agribusiness*, Vol. 20 (4), 397-415, available at: <http://onlinelibrary.wiley.com/doi/10.1002/agr.20020/pdf>.

¹⁴ McEvoy, David M. and Souza-Monteiro, Diogo M., (2008) "Can an Industry Voluntary Agreement on Food Traceability Minimize the Cost of Food Safety Incidents?" *12th Congress of the European Association of Agricultural Economists*, Gent, Belgium, July 26-29, available at: <http://ageconsearch.umn.edu/bitstream/43860/2/397.pdf>

¹⁵ Gould, Hannah L. et al. (2011) "Recordkeeping Practices of Beef Grinding Activities at Retail Establishments," *Journal of Food Protection*, Vol. 74 (6), 1022-1024, available at: <http://www.ncbi.nlm.nih.gov/pubmed/21669085>.

¹⁶ Havinga, Tetty, (2006) "Private Regulation of Food Safety by Supermarkets," *Law and Policy*, Vol. 28 (4), 515-533, available at: <http://www.ru.nl/publish/pages/552245/havingasupermarketslapo2006.pdf>.

attributed to ground beef, if traceback is conducted at an entity that maintains adequate records, there is a strong chance that the source of contamination will be identified. When this happens, losses in reputation, consumer confidence, and sales are generally limited to the firm supplying the adulterated product. Other firms, such as the retailers (both those that invest in traceability and those that do not), are to some degree insulated from negative spillover effects. In this case, free-rider firms—those that do not invest in traceability—benefit from the investments of others.

If, however, traceback occurs at a firm

that does not invest in recordkeeping, the chances of investigators successfully tracing adulterated product to its source are low. An illness outbreak attributed to ground beef in which the source is unidentified will negatively affect ground beef producers and retailers indiscriminately. In this case, firms that have invested in traceability will bear costs that could have been avoided were it not for the free-rider firm. Mandatory recordkeeping requirements will help to eliminate insufficient traceability systems and therefore mitigate the free rider problem.

Inadequate traceability systems can also contribute to moral hazard, which, in the case of ground beef, is a lack of

incentives to produce a safe product.¹⁷ Producers of ground beef components endeavor to produce safe product because the consequences of producing unsafe product are great. However, if adulterated ground beef is often unable to be traced back to its source, producers face less risk when the components they produce are unsafe.

Mandatory recordkeeping requirements can help to reduce moral hazard by increasing the chances that adulterated product is traced back to its source, thereby strengthening the incentives for fabricators of ground beef components to supply the safest product that they can produce.

Industry Baseline

FSIS has identified four groups of businesses that will be subject to the final rule.

1. Official, federally-inspected establishments that grind beef: FSIS used information from PHIS to determine the number of federally inspected establishments subject to FSIS sampling of ground beef product for *E. coli* O157:H7 and *Salmonella* in the past calendar year (2014). To ensure that only those establishments that receive ground beef components from a supplier are included in the total, FSIS excluded those establishments that also slaughtered beef in the past calendar

year.¹⁸ Using the Hazard Analysis and Critical Control Point (HACCP) size categories available in PHIS, FSIS determined that there are 12 large establishments and 1,132 small (including HACCP size small and HACCP size very small) establishments that fall into this category.

2. Supermarkets and other grocery stores that grind beef: FSIS used data from the U.S. Census Bureau to determine the number of grocery stores in the U.S. Specifically, FSIS used the 2012 Statistics

of U.S. Business (SUSB) data set¹⁹ to determine the number of stores under the North American Industry Classification System (NAICS) code 445110—Supermarkets and Other

Grocery (except Convenience) Stores. FSIS found that there are 21,543 stores owned by large firms (≥500 employed), and 44,504 stores owned by small firms (<500 employed). FSIS is aware that not all supermarkets and grocery stores grind beef in store.

However, for the purposes of the cost estimate, FSIS assumed that 100 percent of supermarkets and grocery stores grind beef. While this results in a minor overestimate, FSIS lacks the data needed to support a different assumption.

3. Meat markets that grind beef: FSIS used the 2012 SUSB Census data to determine the number of stores under the NAICS code 445210—Meat Markets. FSIS found that there are 123 stores owned by large firms, and 5,105 stores owned by small firms. The NAICS code for meat markets includes six subcategories, three of which do not grind beef, including Baked Ham Stores, Frozen Meat Stores, and Poultry Dealers. To account for these stores, FSIS assumed that 50 percent of large stores and 50 percent of small stores in this category grind beef.

Warehouse clubs and supercenters that grind beef: FSIS used the 2012 SUSB Census data to determine the number of stores under the NAICS code 452910—Warehouse Clubs and Supercenters. FSIS determined that there are 5,124 such stores owned by large firms, and 40 stores owned by small firms. FSIS is aware that not all warehouse clubs and supercenters grind beef in store. To account for this, FSIS assumed that 20 percent of large stores and

100 percent of small stores grind beef.²⁰

TABLE 4—ENTITIES THAT GRIND RAW BEEF

Entity type Establishment type	Total entities		Percent grinding		Entities grinding	
	Large	Small	Large	Small	Large	Small
Official Establishments	12	1,132	100	100	12	1,132
Supermarkets and Other Grocery Stores	21,543	44,504	100	100	21,543	44,504
Meat Markets	123	5,105	50	50	62	2,553
Warehouse Clubs and Supercenters	5,124	40	20	100	1,025	40
Total	26,802	50,781			22,641	48,229

Values in Table may not sum to totals because of rounding.

¹⁷ Starbird, S. A., Amanor-Boadu, V., and Roberts, T. (2008) "Traceability, Moral Hazard, and Food Safety," *12th Congress of the European Association of Agricultural Economists*, available at: http://ageconsearch.umn.edu/bitstream/43840/2/EAAE_0398.pdf

¹⁸ If an official establishment slaughters beef, then it is likely the only source of components for its own ground beef production, and therefore it would

not need to keep records pertaining to suppliers. While it is possible that some official establishments both slaughter beef and receive components from other official establishments for grinding, the number of such establishments is likely very small.

¹⁹ U.S. Census Bureau, (2012), *Statistics of U.S. Businesses*, accessed January 28, 2015, available at: <http://www.census.gov/scon/susb/>.

²⁰ FSIS was able to determine that the majority of large stores in this category do not grind beef in store because two large firms which account for approximately 80 percent of supercenters have ceased this practice. These firms purchase beef pre-ground and pre-packaged from federally inspected establishments or have it shipped from one of their other branded chains.

To estimate the number of entities that are already maintaining adequate records, FSIS used a Centers for Disease Control and Prevention (CDC) study of ground beef recordkeeping practices at retail stores and applied the distributions in the study to the entities that grind raw beef. The study found that 74 percent of chain retail stores and 12 percent of independent retail stores kept grinding logs. Of the stores that kept grinding logs, the study reported 78

percent of those logs as incomplete.²¹ For the purposes of this estimate, FSIS used the chain stores surveyed in the study as a proxy for large retailers and official establishments, and the independent stores as a proxy for small retailers and official establishments. Therefore, the recordkeeping distribution of large entities based on the survey results is approximately 16 percent complete (74 percent*(1-78 percent)), 58 percent incomplete (74

percent*78 percent), and 26 percent no records. For small entities, the distribution is approximately 3 percent complete (12 percent*(1-78 percent)), 9 percent incomplete (12 percent*78 percent), and 88 percent no records. FSIS applied these distributions to the set of all grinding entities in Table 4, above. The current recordkeeping practices of beef grinding entities are displayed in Table 5.

TABLE 5—BASELINE RECORDKEEPING PRACTICES AT ENTITIES THAT GRIND RAW BEEF

Entity size	Recordkeeping	Distribution (percent)	Entities
Large	Complete	16	3,686
	Incomplete	58	13,069
	No Records	26	5,887
	Total		22,641
Small	Complete	3	1,273
	Incomplete	9	4,514
	No Records	88	42,441
	Total		48,229

Values in table may not sum to Totals because of rounding.

Alternative Regulatory Approaches

FSIS considered a number of alternatives designed to achieve the regulatory objective outlined in the Need for the Rule section. The final rule was chosen as the least burdensome, technically acceptable regulatory approach to ensure that adequate grinding records are maintained for the purposes of outbreak investigation and product trace back. While some alternatives would result in lesser costs to industry, and some alternatives would result in more complete information for outbreak investigators, in FSIS's judgment the final rule is the alternative that maximizes net benefits. Cost estimates were developed for the final rule but not for the rejected alternatives because the costs for these alternatives are discernibly higher or lower because of the amount of time spent on recordkeeping.

Alternatives Considered

(1) Encouraging rather than requiring grinding records: FSIS provided industry voluntary guidelines (see Table 2) in 2009. As stated previously, the Agency has concluded that a policy of voluntary guidelines for recordkeeping has not ensured that all official establishments and retail stores maintain complete records that will ensure quick identification of contaminated product.

²¹ See footnote 3.

(2) Regulated Daily Recordkeeping Program: FSIS considered requiring that retail stores and official establishments maintain grinding records such that each producer recorded grinding activities once per day, and information on all suppliers that were used during that day but not on when during the day those suppliers were used. Daily recording may have been sufficient if entities typically cleaned their equipment once a day, rarely changed suppliers, and conducted few grinds per day, but FSIS has found that the majority of retailers grind product and clean their equipment multiple times per day. A single daily recordkeeping task is, therefore, insufficient to provide the necessary information for traceback and could inhibit FSIS's ability to identify suppliers during ongoing outbreaks. In addition, the time savings of daily recordkeeping over per-grind recordkeeping is likely low since most of the same information will need to be kept. Therefore, FSIS rejected this alternative.

(3) The Final Rule: The chosen alternative requires that retail stores and official establishments maintain grinding records such that each producer must record the required information whenever any of the required information for the lot of product being ground changes. To minimize the burden placed on these entities, FSIS has removed certain

pieces of information from the requirements that were included in the proposed rule, ensuring that only the necessary information for traceability is maintained. Requiring records that pertain to each individual grind guarantees that investigators will be able to identify the components included in an adulterated package of ground beef, creating a narrower list of potential sources of adulterated product and increasing the chances that the source of contamination is identified. FSIS has determined that this alternative is the least burdensome option that achieves the regulatory objective.

More Detailed Recordkeeping Program: FSIS also considered expanding the proposed recordkeeping requirements to include all fields suggested in the 2009 FSIS guidance (all fields in the Table 2 sample log). This approach would provide FSIS with more detailed records to use during an investigation, which may improve traceability slightly. However, the small improvement in the trace back process provided by the additional level of detail would place an unnecessarily large burden on those entities that grind product and must keep records. Any such small improvement would not outweigh the costs incurred for keeping the more detailed records. For this reason, FSIS decided to require that only the most critical information be recorded. Other information, including

that which appears on the sample log is voluntary.

The costs and benefits of the final rule and each regulatory alternative are displayed in Table 6.

TABLE 6—REGULATORY ALTERNATIVES CONSIDERED

Alternative	Costs	Benefits
(1) Encouraging Voluntary Recordkeeping.	No additional costs	No additional benefits.
(2) Regulated Daily Recordkeeping.	Slightly less costly alternative to industry due to small time savings over per-grind recordkeeping.	Improvement over voluntary recordkeeping because records are required and must be created every day of grinding, but the records will in most cases not be detailed enough to facilitate traceability. Therefore, any benefits that can realistically be expected will be minimal, and the objective of facilitating traceability will not be met.
(3) The Final Rule.	\$59.3 million (\$48.5 million to \$70.2 million) annual costs to the industry, plus additional costs associated with recording the source of trim and customer-requested grind components. Potential slight costs to consumers.	Achievement of regulatory objective resulting in benefits to consumers in the form of averted foodborne illness; to retailers and official establishments grinding components from suppliers in the form of less costly outbreaks and recalls, and to official establishments supplying ground beef components in the form of less costly recalls and insulation from costly spillover effects during food safety events.
(4) More Detailed Recordkeeping.	Most costly alternative to industry	Achievement of regulatory objective resulting in the benefits described above. Potential for small increase in traceback speed and therefore small increase in avoided illnesses.

Alternative Regulatory Approaches

FSIS considered a number of alternatives designed to achieve the regulatory objective outlined in the Need for the Rule section. The final rule was chosen as the least burdensome, technically acceptable regulatory approach to ensure that adequate grinding records are maintained for the purposes of outbreak investigation and product trace back. While some alternatives would result in lesser costs to industry, and some alternatives would result in more complete information for outbreak investigators, in FSIS's judgment the final rule is the alternative that maximizes net benefits. Cost estimates were developed for the final rule but not for the rejected alternatives because the costs for these alternatives are discernibly higher or lower because of the amount of time spent on recordkeeping.

Alternatives Considered

(1) Encouraging rather than requiring grinding records: FSIS provided industry voluntary guidelines (see Table 2) in 2009. As stated previously, the Agency has concluded that a policy of voluntary guidelines for recordkeeping has not ensured that all official establishments and retail stores maintain complete records that will ensure quick identification of contaminated product.

(2) Regulated Daily Recordkeeping Program: FSIS considered requiring that retail stores and official establishments maintain grinding records such that each producer recorded grinding activities once per day, and information on all suppliers that were used during that day but not on when during the day those suppliers were used. Daily recording may have been sufficient if entities typically cleaned their equipment once a day, rarely changed suppliers, and conducted few grinds per day, but FSIS has found that the majority of retailers grind product and clean their equipment multiple times per day. A single daily recordkeeping task is, therefore, insufficient to provide the necessary information for traceback and could inhibit FSIS's ability to identify suppliers during ongoing outbreaks. In addition, the time savings of daily recordkeeping over per-grind recordkeeping is likely low since most of the same information will need to be kept. Therefore, FSIS rejected this alternative.

(3) The Final Rule: The chosen alternative requires that retail stores and official establishments maintain grinding records such that each producer must record the required information whenever any of the required information for the lot of product being ground changes. To minimize the burden placed on these entities, FSIS has removed certain

pieces of information from the requirements that were included in the proposed rule, ensuring that only the necessary information for traceability is maintained. Requiring records that pertain to each individual grind guarantees that investigators will be able to identify the components included in an adulterated package of ground beef, creating a narrower list of potential sources of adulterated product and increasing the chances that the source of contamination is identified. FSIS has determined that this alternative is the least burdensome option that achieves the regulatory objective.

More Detailed Recordkeeping Program: FSIS also considered expanding the proposed recordkeeping requirements to include all fields suggested in the 2009 FSIS guidance (all fields in the Table 2 sample log). This approach would provide FSIS with more detailed records to use during an investigation, which may improve traceability slightly. However, the small improvement in the trace back process provided by the additional level of detail would place an unnecessarily large burden on those entities that grind product and must keep records. Any such small improvement would not outweigh the costs incurred for keeping the more detailed records. For this reason, FSIS decided to require that only the most critical information be recorded. Other information, including

²¹ See footnote 3.

only trim in others (trim-only). While there are likely other combinations of practices, and not all entities will fall

into the three defined categories, these categories are sufficient for the purposes

of the cost estimate. The categorization of entities is displayed in Table 7.

TABLE 7—ENTITIES CATEGORIZED BY TYPES OF GRINDING PERFORMED

Size	Recordkeeping	Entities	Trim or no trim	Trim practices	Entities
Large ...	Incomplete	13,069	Using Trim (91%)	Trim-Only (90%)	10,703
			No Trim (9%)	With Trim (10%)	1,189
	No Records	5,887	Using Trim (91%)	Trim-Only (90%)	4,821
			No Trim (9%)	With Trim (10%)	536
Small	Incomplete	4,514	Using Trim (61%)	Trim-Only (52%)	1,432
			No Trim (39%)	With Trim (48%)	1,322
	No Records	42,441	Using Trim (61%)	Trim-Only (52%)	13,462
			No Trim (39%)	With Trim (48%)	12,427
					16,552

Values in table may not sum to Totals because of rounding.

FSIS assigned time estimates for each of the three types of grinds based on public comments. For no trim grinds, FSIS assumed that recordkeeping would take approximately 1 minute per grind.²⁴ For with trim grinds, FSIS assumed that the number of components would approximately double, and therefore recordkeeping would take about 2 minutes. For trim-only grinds, FSIS assumed that recordkeeping would vary depending on the number of sources and take approximately 6 to 10 minutes per grind.²⁵ If an entity is keeping complete records, FSIS assumed that it would not incur any additional costs; if an entity is keeping no records, it would incur costs associated with the full labor time estimate, and if an establishment is keeping incomplete records, FSIS assumed it would incur costs associated with half of the labor time estimate.

FSIS also relied on public comments to estimate the number of grinding activities completed per day. FSIS consequently estimated that the average entity grinds 4 to 5.5 times per day,²⁶ with the exception of those that do trim-only grinding. For those entities, FSIS estimated that they would complete no

trim grinds 4 to 5.5 times per day and then perform an additional trim-only grind (for a total of 5 to 6.5 per day). Further, FSIS estimated that approximately 90 percent of retailers perform customer-requested grinds, and that those grinds make up 1 percent of the total grinds.²⁷ FSIS estimated that the recordkeeping for customer-requested grinds would take about 1 minute. Customer-requested grinds were not applied to official establishments. Finally, FSIS estimated that the average retailer grinds 6 days per week.²⁸

To illustrate the time estimate, FSIS has provided the following example of a retail store that does trim-only grinds, performs customer-requested grinds, and has incomplete records:

D Low Estimate: [4 grinds per day] × 1 min per grind (no trim) + 1 grind per day] × 6 min per grind (trim-only) + [5 grinds (no trim + trim-only) * 1/99] × 1 min per grind (customer request)] × 6 days per week × 50 percent (incomplete records) = 30.2 minutes per week.

D High Estimate: [5.5 grinds per day] × 1 min per grind (no trim) + 1 grind per day] × 10 min per grind (trim-only) + [6.5 grinds (no trim + trim-only) * 1/99] × 1 min per grind (customer request)] ×

6 days per week × 50 percent (incomplete records) = 46.7 minutes per week.

If the store in the example above started with no records, the 50-percent factor would be removed, increasing the time burden to 60.3 to 93.4 minutes per week. If instead the store were an official establishment, the customer grinds would be removed, resulting in a burden of 30 to 46.5 minutes per week.

Time estimates were calculated for each entity in Table 7 and then multiplied by 52 weeks for an annual estimate. To calculate the cost of this added labor, FSIS estimated that the recordkeeping would be performed by an employee paid at the Bureau of Labor Statistics "Butchers and Meat Cutters" (occupation code 51-3021) mean hourly wage rate of \$14.40.³⁰ To account for benefits paid to these employees, such as paid leave and retirement contributions, FSIS applied a benefits factor of 1.412³¹ to the wage rate, resulting in a total compensation rate of \$20.33 per hour. FSIS then multiplied the labor time estimates by the total compensation rate estimate to get the total annual cost of labor, displayed in Table 8.

²⁴ "60 seconds to fill each grind log entry"—Docket ID# FSIS-2009-0011-0035, available at: <http://www.regulations.gov/#!documentDetail;D=FSIS-2009-0011-0035>.

²⁵ "8 minutes per day to log beef trim," × 2 minutes to account for varying number of components—Docket ID# FSIS-2009-0011-0035, available at: <http://www.regulations.gov/#!documentDetail;D=FSIS-2009-0011-0035>.

²⁶ Low estimate: "Grinds raw beef 4x per day"—Docket ID# FSIS-2009-0011-0034, available at: <http://www.regulations.gov/#!documentDetail;D=FSIS-2009-0011-0034>. High estimate: Midpoint of "3-8 batches a day"—Docket ID# FSIS-2009-0011-0040, available at: <http://www.regulations.gov/#!documentDetail;D=FSIS-2009-0011-0040>.

www.regulations.gov/#!documentDetail;D=FSIS-2009-0011-0040.

²⁷ "90 percent of the retailers that grind beef in store perform grinds at a consumer's request . . . the figure is 1 percent or less"—Docket ID# FSIS-2009-0011-0047, available at: <http://www.regulations.gov/#!documentDetail;D=FSIS-2009-0011-0047>.

²⁸ "6x per week"—Docket ID# FSIS-2009-0011-0034, available at: <http://www.regulations.gov/#!documentDetail;D=FSIS-2009-0011-0034>.

²⁹ (1/99) is the factor used to calculate the number of customer-requested grinds as 1 percent of the total grinds.

³⁰ Bureau of Labor Statistics, May 2013 National Occupational Employment and Wage Estimates, accessed February 2, 2015, available at: <http://www.bls.gov/oes/current/oes1nat.htm>.

³¹ Bureau of Labor Statistics, Employer Costs for Employee Compensation, September 2014, accessed February 2, 2015, available at: <http://www.bls.gov/news.release/ecec.t06.htm>. Wages and salaries as a percentage of total compensation are estimated at 70.8% for all service-providing industries, with total benefits accounting for the other 29.2%. To estimate total compensation, FSIS applied a benefits factor of (29.2%/70.8% + 1) = 1.412 to the hourly wage rate.

TABLE 8—ANNUAL LABOR COSTS

Entity size	Low estimate (\$mil)	High estimate (\$mil)	Midpoint estimate (\$mil)
Large	12.24	18.70	15.47
Small	33.54	48.74	41.14
Total	45.78	67.44	56.61

Values in table may not sum to Totals because of rounding.

To account for record storage costs, FSIS again used distributions of recordkeeping practices from the aforementioned CDC study.³² According to the study, 36 percent of retailers that maintain records keep them for greater than 1 year, 39 percent keep records for 6 months to 1 year, and 25 percent keep records for less than 6 months. FSIS assumed that grinding records for a full year could be kept in 3 square feet of storage space, and that the cost of that storage would be approximately \$15.50 annually.³³ FSIS then assumed that those retail stores that already kept records, but for less than 6 months, would incur \$46.50 in costs for a full

year of storage (3 sq. ft. × \$15.50), and those entities that already kept records for 6 months to 1 year would pay half the annual cost, or \$23.25. Those entities keeping records for greater than 1 year would have no additional costs because they are already maintaining records at the minimum level.

The distribution from the CDC study was applied to the number of retail stores keeping complete or incomplete records, and then multiplied by the assumed annual cost of storage. The retail stores that do not keep records will incur the \$46.50 in costs for a full year of storage.

For official establishments, FSIS assumed that those already maintaining

records would be keeping those records for at least 2 years, as required by 9 CFR 320.3(a). For these establishments there would be cost savings associated with one year of reduced storage time equivalent to \$46.50. For official establishments not maintaining records, there would be an additional cost of \$46.50. FSIS applied the cost savings to those official establishments keeping records and the additional costs to those official establishments keeping no records, and added those costs and savings to the recordkeeping costs estimated for retail stores. The results are displayed in Table 9.

TABLE 9—ANNUAL RECORD STORAGE COSTS

Entity size	Affected entities	Storage costs (\$mil)
Large	16,613	0.62
Small	46,194	2.08
Total	62,807	2.70

Values in table may not sum to Totals because of rounding.

The total cost to industry was calculated as a sum of the previously estimated costs. The results of the

annual industry cost estimate are displayed in Table 10.

TABLE 10—TOTAL ANNUAL INDUSTRY COSTS

Entity size	Low estimate (\$mil)	High estimate (\$mil)	Midpoint estimate (\$mil)	Unqualified costs
Large	12.86	19.32	16.09	Additional costs associated with the grinding of trim and customer requested grinds.
Small	35.63	50.83	43.23	
Total	48.48	70.15	59.32	

Values in table may not sum to Totals because of rounding.

Cost to Consumers

This rule will not result in any direct costs to consumers. It is possible that retailers and official establishments that grind raw beef will pass on a portion of the increased cost of grinding to

consumers. In most cases these costs should be small. In the case of customer-requested grinds, consumers may end up paying a small fee, as is presently customary at some retail stores. While this practice may

discourage some consumers, the facts that customer-requested grinds are so infrequent, and fees are already applied at some locations, suggest that fees will not cause major disruptions to ground beef sales. Therefore FSIS expects that

¹² See footnote 3.

¹³ Cassidy Turley, National Retail Review Winter 2014, accessed February 3, 2015, available at <http://dtz.cassidyturley.com/DesktopModules/>

[CassidyTurley/Download/Download.aspx?contentId=3926&fileName=Cassidy_Turley_National_Retail_Review_Winter_2014.pdf](http://dtz.cassidyturley.com/DesktopModules/Download/Download.aspx?contentId=3926&fileName=Cassidy_Turley_National_Retail_Review_Winter_2014.pdf) FSIS used the national average quoted rate for Community/

Neighborhood/Strip Shopping Centers (see page 11) to approximate the cost of storing records at a retail store.

any indirect costs to consumers will be minimal.

Cost to Agency

FSIS does not anticipate that the Agency or other regulators will incur additional costs as a result of this rule. FSIS has provided guidance to retailers that grind raw beef and will continue outreach efforts to ensure that retailers are aware of the rule and are able to comply. FSIS will also hold webinars and provide guidance on the new recordkeeping requirements.

FSIS will conduct a retrospective analysis to quantify what effects, if any, the final rule has on Agency resources. To do so, FSIS will examine the following:

- Number, length, and outcome of recall effectiveness checks.
- Regulatory noncompliance citations at official establishments for the proposed revisions to 9 CFR 320.1(b)(4).

We determined to not examine the overtime hours for enforcement, district office, and recall staff on a per-outbreak basis, as suggested in the proposed rule. The overtime hours cannot directly link to outbreaks.

Expected Benefits of the Final Rule

Public Health Benefits

Mandatory grinding logs with a minimum level of necessary information will improve FSIS investigators' ability to trace implicated product to its source, recommend timely and accurate recalls, remove adulterated product from commerce, and prevent illnesses at later stages of outbreaks.

the likelihood that adulterated product is able to be traced back to its source. When FSIS identifies official establishments producing adulterated product, it takes steps to assess their production processes through comprehensive food safety assessments and follow-up evaluations. In doing so, FSIS is able to identify poor practices and deficiencies in process control and to require changes to resolve these issues. In some cases these assessments lead to findings that are valuable to industry as a whole, and the lessons learned can be documented and disseminated in the form of guidance.

Improvements to production practices and process control, whether at implicated official establishments or Mandatory grinding logs will increase³⁴ For a visual representation of the potential for averted illnesses due to quicker investigations and an earlier recall, please refer to Figure 1 of the FDA other establishments that have benefited from lessons learned, will result in reductions in foodborne illness outbreaks.

Firms that supply ground beef components will have incentives to apply the guidance developed as a result of previous outbreak investigations and to improve the safety of their product in general. As traceability systems improve as a result of better recordkeeping, liability for food safety events will be shifted from retailers to suppliers. This shift will reduce the prevalence of moral hazard— explained previously in the Need for the Rule section— thereby incentivizing supplier firms to produce safer product through the potential for adverse consequences of supplying unsafe product, such as reputation loss and litigation.³⁵ Therefore, by improving traceability through better recordkeeping, this rule has the potential to promote a safer supply of ground beef for consumers.

Benefits to Retailers and Official Establishments That Grind Raw Beef

Retailers and official establishments that grind raw beef products purchased from a supplier will benefit from mandatory recordkeeping because investigators have a better chance of tracing the adulterated product back to the supplier. Investigations that end at the retail level often result in recalls that are very costly for retailers because they bear the burden of product loss and compensating customers for returned product. These recalls can also negatively affect the brand of the store or chain, resulting in a loss in consumer confidence and a loss in sales. In some cases outbreak investigations that end at the retail level could result in exposure to legal

liability.³⁶ Accurate records increase the likelihood that contaminated product is traced to its source, lessening the impact of recalls on retailers and official establishments that purchase ground beef components from suppliers.

For retailers that are already maintaining accurate records, there will be benefits from the reduction in free rider firms, as explained previously in the Need for the Rule section. Fewer free rider firms will decrease the chances that outbreak investigations go unresolved, which can greatly reduce

the cost to retailers. When a source is not identified, an outbreak may indiscriminately affect firms selling and producing ground beef. The fresh spinach outbreak in 2006 is a prime example of the consequences of an outbreak where the source of contamination is in doubt.

Bagged spinach was associated with infections of *E. coli* O157:H7, but because no individual processor could be identified as having been the source of the outbreak, FDA and CDC issued a public alert advising consumers not to eat bagged spinach and eventually advised consumers not to eat all fresh spinach. Six companies issued voluntary recalls in September 2006. Sales of spinach plummeted from \$14.3 million in September to \$3.7 million in October and did not recover fully until January

2008.³⁷ An outbreak caused by a single firm, which was identified weeks after public warnings and recalls took place, ended up causing serious losses to the entire industry. Mandatory recordkeeping increases the chances that an investigator identifies the source of contamination, thereby increasing the chances that an outbreak will have minimal impact on uninvolved firms.

Benefits to Official Establishments That Supply Ground Beef Components

Official establishments supplying retail stores and processing establishments with ground beef components will also benefit from the increased ability of FSIS investigators to identify sources of contamination.

When individual establishments are found to be suppliers of adulterated product, other uninvolved establishments are insulated from large spillover effects such as those illustrated in the spinach recall described above.

Identifying the source establishment will likely be even more significant for official establishments because ground beef components make up a greater portion of their sales than ground beef would at a retail store. Mandatory recordkeeping could help to preserve consumer confidence and ground beef sales in the event of a foodborne illness outbreak, benefiting all firms that are uninvolved in the outbreak, while penalizing the establishment that supplied the adulterated product.

Another potential benefit for official establishments is a reduction in the scope of ground beef recalls. All else being equal, more accurate grinding records should result in the

identification of specific lots of implicated product and therefore a narrower recall.³⁸ Smaller recalls will result in lower costs from product loss and reimbursement and recall execution costs such as advertising and public relations management. In some cases, smaller recalls as a result of better recordkeeping could even minimize sales losses, because a recall could be limited to a smaller geographical region

thereby reducing losses in consumer confidence.

Finally, official establishments will benefit from lessons learned during recalls and follow-up assessments at entities linked to foodborne illness outbreaks. As recordkeeping practices at retail and official processing establishments improve, more outbreaks will be able to be traced to their source. This traceback will initiate further

examination of current practices and could lead to the identification of significant issues that, if corrected, would benefit official establishments generally.

Net Benefits of the Final Rule

The total costs and benefits achieved as a result of the final rule are displayed in Table 11.

TABLE 11—NET BENEFITS OF THE FINAL RULE

Costs:	
Labor.....	\$56.6 million annually (\$45.8 million to \$67.4 million).
Storage.....	\$2.7 million annually.
Unquantified Costs	Non-labor costs associated with recordkeeping for the grinding of trim and customer requested grinds. Potential slight costs to consumers in the form of ground beef price increases.
Benefits:	
Unquantified Benefits	Benefits to consumers in the form of averted foodborne illnesses as a result of contaminated ground beef. Benefits to retailers and official establishments grinding raw beef in the form of less costly food safety events, such as outbreaks and recalls. Benefits to official establishments supplying ground beef components in the form of less costly recalls and insulation from costly spillover effects during food safety events.

Regulatory Flexibility Analysis

The FSIS Administrator certifies that, for the purpose of the Regulatory Flexibility Act (5. U.S.C. 601–602), the final rule will not have a significant economic impact on a substantial number of small entities in the United

States. While the rule does affect a large number of small businesses, the average per entity annual cost is relatively low, at approximately \$905 (746 to 1,064). This estimate does not include unquantified costs associated with customer-requested grinds. These costs

will vary by retail store, but the total cost of compliance across the industry will be low because of the relatively small number of customer requested grinds. Table 12 provides a summary of the small entities affected by the final rule and the average annual cost.

TABLE 12—TOTAL COSTS AND AVERAGE COST PER ENTITY FOR SMALL BUSINESSES

Entity type	Entities	Total annual cost (\$mil)	Average annual cost (\$)
Retailer	46,649	42.22	905.16
Official	1,132	1.00	885.63
Total	47,781	43.23	904.70

Values in table may not sum to Totals because of rounding.

There is a multitude of guidance already available that small businesses can use, and FSIS has provided a sample grinding log in this final rule that can be used. These resources will help to keep the cost of implementing a new recordkeeping program low. In general, as the size of the business and the amount of ground product sold gets smaller, so too will the number of suppliers and components used, and the number of grinds performed. The smaller scale of production should contribute to lower average costs for smaller businesses. Moreover, the fact that some small firms are already

maintaining adequate records shows that the cost of the practice is not prohibitive to doing business.

Paperwork Reduction Act

In accordance with section 3507(d) of the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 *et seq.*), the new information collection requirements included in this final rule have been submitted for approval to the Office of Management and Budget (OMB).

Title: Records to be Kept by Official Establishments and Retail Stores that Grind Raw Beef Products.

Type of Collection: New.

Abstract: Under this final rule, all official establishments and retail stores that grind raw beef products for sale in commerce, including products ground at a customer's request, will have to maintain certain records.

The required records will have to include the following information:

(A) The establishment numbers of the establishments supplying the materials used to prepare each lot of raw ground beef product.

(B) All supplier lot numbers and production dates.

(C) The names of the supplied materials, including beef components

³⁸ Resende-Filho, Moises A. and Rubin, Brian L. "Economics of Traceability for Mitigation of Food Recall Costs," prepared for presentation at the International Association of Agricultural

Economists (IAAE) Triennial Conference, Foz do Iguaçu, Brazil, 18-24 August, 2012, available at: http://ageconsearch.umn.edu/bitstream/126193/2/IAAE_2012_Paper.pdf. This paper presents

simulation results of a model that indicated that that presence of a traceability system decreased volumes of recalls by over 90 percent (see Table 3).

and any materials carried over from one production lot to the next,
(D) The date and time each lot of raw

ground beef product is produced, and

(E) The date and time when grinding equipment and other related food-contact surfaces are cleaned and sanitized.

In response to comments, FSIS

removed requirements for entities covered by this rule to provide names, points of contact, and phone numbers for official establishments. Also in response to comments, the Agency eliminated the requirement that the weight of each source component used in a lot of ground beef be kept. However, in response to other public comments, FSIS increased the time estimates for recordkeeping activities, the frequency of recordkeeping tasks, and the number of active grinding days per week. FSIS also increased the number of retail stores that will be affected by the rule.

These changes resulted in a significant increase in the number of burden hours initially estimated in the proposed rule.

Estimate of Burden: FSIS estimates that it would take a maximum of 50.33 hours per respondent annually.

Respondents: Official establishments and retail stores that grind raw beef products.

Estimated Number of Respondents: 65,911.

Estimated Maximum Annual Number of Responses per Respondent: 1,878.

Estimated Maximum Total Annual Recordkeeping Burden: 3,317,493 hours.

Copies of this information collection

assessment can be obtained from Gina Kouba, Paperwork Reduction Act Coordinator, Food Safety and Inspection Service, USDA, 1400 Independence Ave. SW., Room 6065 South Building, Washington, DC 20250-3700; (202) 720-5627.

Executive Order 12988

This final rule has been reviewed under Executive Order 12988, Civil Justice Reform. Under this rule: (1) All State and local laws and regulations that are inconsistent with this rule will be preempted; (2) no retroactive effect will be given to this rule; and (3) no administrative proceedings will be required before parties may file suit in court challenging this rule.

Executive Order 13175

This rule has been reviewed in accordance with the requirements of Executive Order 13175, "Consultation and Coordination with Indian Tribal Governments." E.O. 13175 requires Federal agencies to consult and coordinate with tribes on a government-to-government basis on policies that

have tribal implications, including regulations, legislative comments or proposed legislation, and other policy statements or actions that have substantial direct effects on one or more Indian tribes, on the relationship between the Federal Government and Indian tribes or on the distribution of power and responsibilities between the Federal Government and Indian tribes.

FSIS has assessed the impact of this rule on Indian tribes and determined that this rule does not, to our knowledge, have tribal implications that require tribal consultation under E.O. 13175. If a Tribe requests consultation, the Food Safety and Inspection Service will work with the Office of Tribal Relations to ensure meaningful consultation is provided where changes, additions, and modifications identified herein are not expressly mandated by Congress.

E-Government Act

FSIS and USDA are committed to achieving the purposes of the E-Government Act (44 U.S.C. 3601, *et seq.*) by, among other things, promoting the use of the Internet and other information technologies and providing increased opportunities for citizen access to Government information and services, and for other purposes.

Additional Public Notification

Public awareness of all segments of rulemaking and policy development is important.

Consequently, FSIS will announce this **Federal Register** publication on-line through the FSIS Web page located at: <http://www.fsis.usda.gov/federal-register>.

FSIS also will make copies of this publication available through the FSIS Constituent Update, which is used to provide information regarding FSIS policies, procedures, regulations, **Federal Register** notices, FSIS public meetings, and other types of information that could affect or would be of interest to our constituents and stakeholders.

The Update is available on the FSIS Web page. Through the Web page, FSIS is able to provide information to a much broader, more diverse audience. In addition, FSIS offers an email subscription service which provides automatic and customized access to selected food safety news and information. This service is available at: <http://www.fsis.usda.gov/subscribe>. Options range from recalls to export information, regulations, directives, and notices. Customers can add or delete subscriptions themselves, and have the option to password protect their accounts.

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Send your completed complaint form or letter to USDA by mail, fax, or email: *Mail:* U.S. Department of Agriculture, Director, Office of Adjudication 1400 Independence Avenue SW., Washington, DC 20250-9410

Fax: (202) 690-7442

Email: program.intake@usda.gov.

Persons with disabilities who require alternative means for communication (Braille, large print, audiotape, etc.), should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

List of Subjects in 9 CFR Part 320

Meat inspection, Reporting and recordkeeping requirements.

For the reasons discussed in the preamble, FSIS is amending 9 CFR part 320, as follows:

PART 320—RECORDS, REGISTRATION, AND REPORTS

- 1. The authority citation for part 320 continues to read as follows:

Authority: 21 U.S.C. 601-695; 7 CFR 2.7, 2.18, 2.53

- 2. Amend § 320.1 by adding paragraph (b)(4) to read as follows:

§ 320.1 Records required to be kept.

* * * * *

(b) * * *

(4)(i) In the case of raw ground beef products, official establishments and retail stores are required to keep records that fully disclose:

- (A) The establishment numbers of the establishments supplying the materials used to prepare each lot of raw ground beef product;
- (B) All supplier lot numbers and production dates;

(C) The names of the supplied materials, including beef components and any materials carried over from one production lot to the next;
(D) The date and time each lot of raw ground beef product is produced; and
Done in Washington, DC, on: December 14, 2015.

Alfred V. Almanza,

Acting Administrator.

[FR Doc. 2015-31795 Filed 12-18-15; 8:45 am]

BILLING CODE 3410-DM-P

transfer date established by section 311 of the Dodd-Frank Act, codified at 12 U.S.C. 5411, the powers, duties, and functions formerly performed by the OTS were divided among the FDIC, as to State savings associations, the Office
(E) The date and time when grinding equipment and other related food-

of the Comptroller of the Currency
("OCC"), as to Federal savings

contact surfaces are cleaned and sanitized.

(ii) Official establishments and retail stores covered by this part that prepare ground beef products that are ground at an individual customer's request must keep records that comply with paragraph (b)(4)(i) of this section.

(iii) For the purposes of this section of the regulations, a lot is the amount of ground raw beef produced during particular dates and times, following clean up and until the next clean up, during which the same source materials are used.

* * * * *

■ 3. Revise § 320.2 to read as follows:

§ 320.2 Place of maintenance of records.

(a) Except as provided in paragraph

(b) of this section, any person engaged in any business described in § 320.1 and required by this part to keep records must maintain such records at the place where such business is conducted, except that if such person conducts such business at multiple locations, he may maintain such records at his headquarters' office. When not in actual use, all such records must be kept in a safe place at the prescribed location in accordance with good commercial practices.

(b) Records required to kept under

§ 320.1(b)(4) must be kept at the location where the raw beef was ground.

■ 4. Revise § 320.3 to read as follows:

§ 320.3 Record retention period.

(a) Except as provided in paragraphs

(b) and (c) of this section, every record required to be maintained under this part must be retained for a period of 2 years after December 31 of the year in which the transaction to which the record relates has occurred and for such further period as the

Administrator may require for purposes of any investigation or litigation under the Act, by written notice to the person required to keep such records under this part. (b) Records of canning as required in subpart G of part 318 of this chapter, must be retained as required in
(c) Records required to be maintained

§ 318.307(e); except that records required by § 318.302(b) and (c) must be retained as required by those sections.

FEDERAL DEPOSIT INSURANCE CORPORATION

12 CFR Parts 348 and 390

RIN 3064-AE20

Removal of Transferred OTS Regulations Regarding Management Official Interlocks and Amendments to FDIC's Rules and Regulations

AGENCY: Federal Deposit Insurance Corporation.

ACTION: Final rule.

SUMMARY: The Federal Deposit Insurance Corporation ("FDIC") is adopting a final rule to rescind and remove from the Code of Federal Regulations the transferred OTS regulation entitled "Management Official Interlocks." This subpart was included in the regulations that were transferred to the FDIC from the Office of Thrift Supervision ("OTS") on July 21, 2011, in connection with the implementation of applicable provisions of title III of the Dodd-Frank Wall Street Reform and Consumer Protection Act ("Dodd-Frank Act"). The requirements for State savings associations in the transferred OTS regulation are substantively similar to those in the FDIC's regulation, which is also entitled "Management Official Interlocks" and is applicable for all insured depository institutions ("IDIs") for which the FDIC has been designated the appropriate Federal banking agency.

DATES: The final rule is effective on January 20, 2016.

FOR FURTHER INFORMATION CONTACT:

Jennifer Maree, Counsel, Legal Division,
(202) 898-6543; Mark Mellon, Counsel, Legal Division, (202) 898-3884; Karen Currie, Senior Examination Specialist, (202) 898-3981.

SUPPLEMENTARY INFORMATION:

I. Background

A. The Dodd-Frank Act

The Dodd-Frank Act 1 provided for a substantial reorganization of the regulation of State and Federal savings associations and their holding companies. Beginning July 21, 2011, the 1 Dodd-Frank Wall Street Reform and Consumer associations, and the Board of Governors of the Federal Reserve System ("FRB"), as to savings and loan holding companies. Section 316(b) of the Dodd-Frank Act, codified at 12 U.S.C. 5414(b), provides the manner of treatment for all orders, resolutions, determinations, regulations, and advisory materials that had been issued, made, prescribed, or allowed to become effective by the OTS. The section provides that if such

materials were in effect on the day before the transfer date, they continue to be in effect and are enforceable by or against the appropriate successor agency until they are modified, terminated, set aside, or superseded in accordance with applicable law by such successor agency, by any court of competent jurisdiction, or by operation of law. Section 316(c) of the Dodd-Frank Act, codified at 12 U.S.C. 5414(c), further directed the FDIC and the OCC to consult with one another and to publish a list of the continued OTS regulations that would be enforced by the FDIC and the OCC, respectively. On June 14, 2011, the FDIC's Board of Directors approved a "List of OTS Regulations to be Enforced by the OCC and the FDIC Pursuant to the Dodd-Frank Wall Street Reform and Consumer Protection Act." This list was published by the FDIC and the OCC as a Joint Notice in the **Federal Register** on July 6, 2011.2

Although section 312(b)(2)(B)(i)(II) of the Dodd-Frank Act, codified at 12

U.S.C. 5412(b)(2)(B)(i)(II), granted the OCC rulemaking authority relating to both State and Federal savings associations, nothing in the Dodd-Frank Act affected the FDIC's existing authority to issue regulations under the Federal Deposit Insurance Act ("FDI Act") and other laws as the "appropriate Federal banking agency" or under similar statutory terminology. Section 312(c) of the Dodd-Frank Act amended the definition of "appropriate Federal banking agency" contained in section 3(q) of the FDI Act, 12 U.S.C. 1813(q),

to add State savings associations to the list of entities for which the FDIC is designated as the "appropriate Federal banking agency." As a result, when the FDIC acts as the designated "appropriate Federal banking agency" (or under similar terminology) for State under § 320.1(b)(4) must be retained for one year.

Protection Act, Pub. L. 111-203, 124 Stat. 1376 (2010). 2 76 FR 39247 (July 6, 2011).

Retail Meat and Poultry Processing Guidelines



Association of Food and Drug Officials

Association of Food and Drug Officials Retail Meat and Poultry Processing Guidelines

I. USDA-FSIS Retail Exemption

The mandatory inspection requirements of the Federal Meat Inspection Act (FMIA) and the Poultry Products Inspection Act (PPIA) do not apply to the preparation of meat and poultry products traditionally and usually conducted at retail stores, when conducted at retail stores in normal retail quantities. These exemptions are found in 9 CFR 303.1(d) for red meat and 9 CFR 381.10(d) for poultry. It is important to note that the adulteration and misbranding provisions of the FMIA and PPIA other than the requirement of the official inspection legend do apply to articles that are exempted from inspection. In order to qualify for these exemptions the following requirements must be met.

A. Red Meat

1. Operations of types of traditionally and usually conducted at retail stores are the following:

- (a) Cutting up, slicing, and trimming carcasses, halves, quarters, or wholesale cuts into retail cuts such as steaks, chops, roasts, and freezing such cuts;
- (b) Grinding and freezing products made from meat;
- (c) Curing, cooking, smoking, rendering or refining of livestock fat or other preparation of products, except slaughtering or the retort processing of canned products;
- (d) Breaking bulk shipments of meat products;
- (e) Wrapping or rewrapping meat products.

2. Retail Stores —The requirements to qualify as a retail store are listed in 9 CFR § 303.1(d)(2)(iii). These requirements are as follows:

- (a) The sales of meat products are made to consumers only;
- (b) At least 75 percent, in terms of dollar value, of total sales of meat product represents sales to household consumers, and the total dollar value of sales of product to consumers other-than- household consumers does not exceed the dollar limitation per calendar year set by the FSIS Administrator;
- (c) Only federally or state inspected and passed meat product is handled or used in the preparation of any product;
- (d) No sale of meat product is made in excess of a normal retail quantity as described in Part I. A. 2;
- (e) The preparation of meat products for sale to household consumers is limited to the operations listed in Part I. A. 1. of this section;
- (f) The preparation of meat products for sale to other-than-household consumers is limited to the operations described in Part I. A. 1.

(a), (b), (d), and

3. Retail Sales —The sale of meat products produced in a retail store under the exemption from inspection requirements described in 9 CFR § 301.1(d) is limited to household consumers or hotels, restaurants, or institutions (HRI) only. The term “consumer” is defined in 9 CFR § 303.1(d)(2)(vi) as “any household consumer, hotel, restaurant, or similar institution as determined by the Administrator in specific cases”.

B. Poultry Products

1. Operations of types traditionally and usually conducted at retail stores include any processing of poultry products, except canning and slaughtering of poultry, unless such slaughtering is conducted on live poultry purchased at the retail store and processed by the retail store operator in accordance with the consumer's instruction.

1. A normal retail quantity is any quantity of a poultry product purchased by a household consumer from a retail supplier that does not exceed 75 pounds. A normal retail quantity sold by a retail supplier to other than a household consumer is any quantity that does not exceed 150 pounds.

2. A retail store is a place of business where:

(a) The sales of poultry products are made to consumers only;

(b) At least 75 percent, in terms of dollar value, of total sales of poultry product represents sales to household consumers, and the total dollar value of sales of product to consumers other-than- household consumers does not exceed the dollar limitation per calendar year set by the FSIS Administrator;

(c) Only federally or state inspected and passed poultry product is handled or used in the preparation of any product;

(d) No sale of poultry product is made in excess of a normal retail quantity as described in Part I.

B. 2;

(e) The preparation of poultry products to household consumers is limited to the operations listed in Part I. B. 1. of this section.

C. Recordkeeping Requirements—Any retail store claiming exemption under 9 CFR § 303.1(d) must maintain complete, accurate, and legible records of total monthly purchases and of total monthly sales of meat, meat byproducts, and meat food products in terms of dollar values of the products involved. These records must also separately show total sales to household consumers and total sales to other-than-household consumers. These recordkeeping requirements are detailed in 9 CFR § 303.1(d)(3). These records are required to be maintained for a period of two years after December 31 of the year in which the transaction has occurred and for any further period as FSIS may require for purposes of any investigation or litigation by written notice to the person required to keep these records as described in 9 CFR § 320.3.

D. Adulteration and Misbranding—The adulteration and misbranding provisions of the Federal Meat Inspection Act and 9 CFR Part 300 to end, other than the requirement of the official inspection legend, apply to articles which are exempt from inspection, or not required to be inspected. This includes the requirement that any pork and any product containing pork be prepared only in compliance with any applicable requirement for the destruction of trichina, as provided in 9 CFR § 318.10.

All meat products produced at a retail store for sale to other-than-household consumers must be labeled in accordance with the requirements of 9 CFR Part 317. Each package or container is required to show the following information:

- (a) The name of the product;
- (b) If the product is fabricated from two or more ingredients, the word “ingredients,” followed by a list of the ingredients as prescribed in 9 CFR § 317.2(f);
- (c) The name and place of business of the retail store;

B. Poultry Products

1. Operations of types traditionally and usually conducted at retail stores include any processing of poultry products, except canning and slaughtering of poultry, unless such slaughtering is conducted on live poultry purchased at the retail store and processed by the retail store operator in accordance with the consumer's instruction.

2. A normal retail quantity is any quantity of a poultry product purchased by a household consumer from a retail supplier that does not exceed 75 pounds. A normal retail quantity sold by a retail supplier to other than a household consumer is any quantity that does not exceed 150 pounds.

3. A retail store is a place of business where:

- (a) The sales of poultry products are made to consumers only;
- (b) At least 75 percent, in terms of dollar value, of total sales of poultry product represents sales to household consumers, and the total dollar value of sales of product to consumers other-than- household consumers does not exceed the dollar limitation per calendar year set by the FSIS Administrator;
- (c) Only federally or state inspected and passed poultry product is handled or used in the preparation of any product;
- (d) No sale of poultry product is made in excess of a normal retail quantity as described in Part I.

B. 2;

(e) The preparation of poultry products to household consumers is limited to the operations listed in Part I. B. 1. of this section.

C. Recordkeeping Requirements—Any retail store claiming exemption under 9 CFR § 303.1(d) must maintain complete, accurate, and legible records of total monthly purchases and of total monthly sales of meat, meat byproducts, and meat food products in terms of dollar values of the products involved. These records must also separately show total sales to household consumers and total sales to other-than-household consumers. These recordkeeping requirements are detailed in 9 CFR § 303.1(d)(3). These records are required to be maintained for a period of two years after December 31 of the year in which the transaction has occurred and for any further period as FSIS may require for purposes of any investigation or litigation by written notice to the person required to keep these records as described in 9 CFR § 320.3.

D. Adulteration and Misbranding—The adulteration and misbranding provisions of the Federal Meat Inspection Act and 9 CFR Part 300 to end, other than the requirement of the official inspection legend, apply to articles which are exempt from inspection, or not required to be inspected. This includes the requirement that any pork and any product containing pork be prepared only in compliance with any applicable requirement for the destruction of trichina, as provided in 9 CFR § 318.10.

All meat products produced at a retail store for sale to other-than-household consumers must be labeled in accordance with the requirements of 9 CFR Part 317. Each package or container is required to show the following information:

- (a) The name of the product;
- (b) If the product is fabricated from two or more ingredients, the word “ingredients,” followed by a list of the ingredients as prescribed in 9 CFR § 317.2(f);
- (c) The name and place of business of the retail store;

- (d) An accurate statement of the net quantity of contents;
- (e) Safe handling instructions as described in 9 CFR 317.2(l).

The Secretary of Agriculture may extend the requirements of the Federal Meat Inspection Act to any establishment where meat products are prepared for distribution, if it is determined that, in accordance with the adulteration provisions of the Act, the establishment is producing adulterated products which would clearly endanger the public health.

E. Commonly Asked Questions Concerning the Retail Preparation of Red Meat Products

1.Q: What is the sales limit for products prepared at retail for sale to other-than-household consumers?

A: There are two caps on the sales of products prepared at retail for sale to other-than-household consumers, which cannot be exceeded. No more than 25 percent of the total red meat sales of a retail store can be made to other-than-household consumers. In addition, the total red meat sales to other-than-household consumers cannot exceed the dollar limitation per calendar year set by the FSIS Administrator.

2.Q: Where can I obtain the dollar limitation per calendar year set by the FSIS Administrator?

A: The dollar limitation is adjusted during the first quarter of each calendar year. Notice of the adjusted dollar limitation is published in the FEDERAL REGISTER. This information is available on the USDA-FSIS website.

3.Q: Can a retail store produce multi-ingredient meat products for sale to other-than-household consumers?

A: Yes, provided that the operation will not have a definitive effect on the nature or safety of the product, and that the product is properly labeled with all of the ingredients listed. However, the addition of a curing agent to Italian sausage would affect the nature of the sausage, as well as its safety, and the modified sausage would need to be named to reflect the fact that it is cured, and it would not be eligible for sale to other-than-household consumers.

4.Q: Can a retail store produce a meat product that is cured, cooked, smoked, or rendered or refined livestock fat for sale to other-than-household consumers?

A: No, any of these operations would have a definitive effect on the nature of the product and would have to be produced under either federal or state inspection.

5.Q: Can a retail store produce a meat product that is cured, cooked, smoked, or rendered or refined livestock fat for sale to household consumers?

A: Yes, a retail store can produce and sell these types of meat products to household consumers only and are limited to normal retail quantities.

- (a) Date and time product were ground
- (b) Exact name and type of store-ground product
- (c) Quantity of product ground
- (d) Production code of each lot of store-ground product
- (e) Sell-by or use-by dates
- (f) Other information used to identify the store-ground product

3. Source (supplier) information

- (a) Supplier name and address (city, state, zip code)
- (b) USDA Establishment Number for each source material used
- (c) Product name
- (d) Production date and lot number

4. Cleaning/Sanitizing information (example: date/time, especially significant between varied source materials)

F. *E. coli* O157:H7 Sampling by Meat Inspection Investigators—Federal or State Meat Inspection Investigators are instructed to collect a raw ground beef sample, during operating hours, when the retail store is grinding or has ground product that is still available at the retail store, under one or more of the following circumstances:

1. Grinding primal, subprimals, or boxed beef;
2. Grinding store generated bench trim derived from its own operations;
3. Grinding beef that is labeled “natural” or “all-natural”

Samples are not collected from product that is:

- (a) Case ready (example: consumer-sized packages of ground beef, which were packaged at the official establishment);
- (b) Not ground by the retail store but only portioned into retail trays;
- (c) Reground product (i.e., course ground product from the official establishment which is reground by the retailer into finely ground product);

4. Not cleaning and sanitizing the grinder between the use of different source materials;

5. Grinding purchased trim that is not accompanied by records of negative test results for *E. coli* O157:H7;

6. Using meat cuts (steaks or roasts that the store determines are suitable as an ingredient in raw ground beef) with expired sell-by dates;

7. Grinding and failing to keep records of the federal or state establishment numbers of its suppliers;

8. Mixing irradiated and non-irradiated beef.

HACCP Principles & Application Guidelines

Adopted August 14, 1997

NATIONAL ADVISORY COMMITTEE ON MICROBIOLOGICAL CRITERIA FOR FOODS

The National Advisory Committee on Microbiological Criteria for Foods (NACMCF) is an advisory committee chartered under the U.S. Department of Agriculture (USDA) and comprised of participants from the USDA (Food Safety and Inspection Service), Department of Health and Human Services (U.S. Food and Drug Administration and the Centers for Disease Control and Prevention) the Department of Commerce (National Marine Fisheries Service), the Department of Defense (Office of the Army Surgeon General), academia, industry and state employees. NACMCF provides guidance and recommendations to the Secretary of Agriculture and the Secretary of Health and Human Services regarding the microbiological safety of foods.

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EXECUTIVE SUMMARY

The National Advisory Committee on Microbiological Criteria for Foods (Committee) reconvened a Hazard Analysis and Critical Control Point (HACCP) Working Group in 1995. The primary goal was to review the Committee's November 1992 HACCP document, comparing it to current HACCP guidance prepared by the Codex Committee on Food Hygiene. Based upon its review, the Committee made the HACCP principles more concise; revised and added definitions; included sections on prerequisite programs, education and training, and implementation and maintenance of the HACCP plan; revised and provided a more detailed explanation of the application of HACCP principles; and provided an additional decision tree for identifying critical control points (CCPs).

The Committee again endorses HACCP as an effective and rational means of assuring food safety from harvest to consumption. Preventing problems from occurring is the paramount goal underlying any HACCP system. Seven basic principles are employed in the development of HACCP plans that meet the stated goal. These principles include hazard analysis, CCP identification, establishing critical limits, monitoring procedures, corrective actions, verification procedures, and record-keeping and documentation. Under such systems, if a deviation occurs indicating that control has been lost, the deviation is detected and appropriate steps are taken to reestablish control in a timely manner to assure that potentially hazardous products do not reach the consumer.

In the application of HACCP, the use of microbiological testing is seldom an effective means of monitoring CCPs because of the time required to obtain results. In most instances, monitoring of CCPs can best be accomplished through the use of physical and chemical tests, and through visual observations. Microbiological criteria do, however, play a role in verifying that the overall HACCP system is working. systems.



The Committee believes that the HACCP principles should be standardized to provide uniformity in training and applying the HACCP system by industry and government. In accordance with the National Academy of Sciences recommendation, the HACCP system must be developed by each food establishment and tailored to its individual product, processing and distribution conditions.

In keeping with the Committee's charge to provide recommendations to its sponsoring agencies regarding microbiological food safety issues, this document focuses on this area. The Committee recognizes that in order to assure food safety, properly designed HACCP systems must also consider chemical and physical hazards in addition to other biological hazards.

For a successful HACCP program to be properly implemented, management must be committed to a HACCP approach. A commitment by management will indicate an awareness of the benefits and costs of HACCP and include education and training of employees. Benefits, in addition to enhanced assurance of food safety, are better use of resources and timely response to problems.

The Committee designed this document to guide the food industry and advise its sponsoring agencies in the implementation of HACCP systems.

DEFINITIONS

CCP Decision Tree: A sequence of questions to assist in determining whether a control point is a CCP.

Control: (a) To manage the conditions of an operation to maintain compliance with established criteria. (b) The state where correct procedures are being followed and criteria are being met.

Control Measure: Any action or activity that can be used to prevent, eliminate or reduce a significant hazard.

Control Point: Any step at which biological, chemical, or physical factors can be controlled.

Corrective Action: Procedures followed when a deviation occurs.

Criterion: A requirement on which a judgement or decision can be based.

Critical Control Point: A step at which control can be applied and is essential to prevent or eliminate a food safety hazard or reduce it to an acceptable level.

Critical Limit: A maximum and/or minimum value to which a biological, chemical or physical parameter must be controlled at a CCP to prevent, eliminate or reduce to an acceptable level the occurrence of a food safety hazard.

Deviation: Failure to meet a critical limit.

HACCP: A systematic approach to the identification, evaluation, and control of food safety hazards.

HACCP Plan: The written document which is based upon the principles of HACCP and which delineates the procedures to be followed.

HACCP System: The result of the implementation of the HACCP Plan.

HACCP Team: The group of people who are responsible for developing, implementing and maintaining the HACCP system.

Hazard: A biological, chemical, or physical agent that is reasonably likely to cause illness or injury in the absence of its control.

Hazard Analysis: The process of collecting and evaluating information on hazards associated with the food under consideration to decide which are significant and must be addressed in the HACCP plan.

Monitor: To conduct a planned sequence of observations or measurements to assess whether a CCP is under control and to produce an accurate record for future use in verification.

Prerequisite Programs: Procedures, including Good Manufacturing Practices, that address operational conditions providing the foundation for the HACCP system.

Severity: The seriousness of the effect(s) of a hazard.

Step: A point, procedure, operation or stage in the food system from primary production to final consumption.

Validation: That element of verification focused on collecting and evaluating scientific and technical information to determine if the HACCP plan, when properly implemented, will effectively control the hazards.

Verification: Those activities, other than monitoring, that determine the validity of the HACCP plan and that the system is operating according to the plan.

HACCP PRINCIPLES

HACCP is a systematic approach to the identification, evaluation, and control of food safety hazards based on the following seven principles:

Principle 1: Conduct a hazard analysis.

Principle 2: Determine the critical control points (CCPs).

Principle 3: Establish critical limits.

Principle 4: Establish monitoring procedures.

Principle 5: Establish corrective actions.

Principle 6: Establish verification procedures.

Principle 7: Establish record-keeping and documentation procedures.

GUIDELINES FOR APPLICATION OF HACCP PRINCIPLES

Introduction

HACCP is a management system in which food safety is addressed through the analysis and control of biological, chemical, and physical hazards from raw material production, procurement and handling, to manufacturing, distribution and consumption of the finished product. For successful implementation of a HACCP plan, management must be strongly committed to the HACCP concept. A firm commitment to HACCP by top management provides company employees with a sense of the importance of producing safe food.

HACCP is designed for use in all segments of the food industry from growing, harvesting, processing, manufacturing, distributing, and merchandising to preparing food for consumption. Prerequisite programs such as current Good Manufacturing Practices (cGMPs) are an essential foundation for the development and implementation of successful HACCP plans. Food safety systems based on the HACCP principles have been successfully applied in food processing plants, retail food stores, and food service operations. The seven principles of HACCP have been universally accepted by government agencies, trade associations and the food industry around the world.

The following guidelines will facilitate the development and implementation of effective HACCP plans. While the specific application of HACCP to manufacturing facilities is emphasized here, these guidelines should be applied as appropriate to each segment of the food industry under consideration.

Prerequisite Programs

The production of safe food products requires that the HACCP system be built upon a solid foundation of prerequisite programs. Examples of common prerequisite programs are listed in Appendix A. Each segment of the food industry must provide the conditions necessary to protect food while it is under their control. This has traditionally been accomplished through the application of cGMPs. These conditions and practices are now considered to be prerequisite to the development and implementation of effective HACCP plans. Prerequisite programs provide the basic environmental and operating conditions that are necessary for the production of safe, wholesome food. Many of the conditions and practices are specified in federal, state and local regulations and guidelines (e.g., cGMPs and Food Code). The Codex Alimentarius General Principles of Food Hygiene describe the basic conditions and practices expected for foods intended for international trade. In addition to the requirements specified in regulations, industry often adopts policies and procedures that are specific to their operations. Many of these are proprietary. While prerequisite programs may impact upon the safety of a food, they also are concerned with ensuring that foods are wholesome and suitable for consumption (Appendix A). HACCP plans are narrower in scope, being limited to ensuring food is safe to consume.

The existence and effectiveness of prerequisite programs should be assessed during the design and implementation of each HACCP plan. All prerequisite programs should be documented and regularly audited. Prerequisite programs are established and managed separately from the HACCP plan. Certain aspects, however, of a prerequisite program may be incorporated into a HACCP plan. For example, many establishments have preventive maintenance procedures for processing equipment to avoid unexpected equipment failure and loss of production. During the development of a HACCP plan, the HACCP team may decide that the routine maintenance and calibration of an oven should be included in the plan as an activity of verification. This would further ensure that all the food in the oven is cooked to the minimum internal temperature that is necessary for food safety.

Education and Training

The success of a HACCP system depends on educating and training management and employees in the importance of their role in producing safe foods. This should also include information the control of foodborne hazards related to all stages of the food chain. It is important to recognize that employees must first understand what HACCP is and then learn the skills necessary to make it function properly. Specific

training activities should include working instructions and procedures that outline the tasks of employees monitoring each CCP.

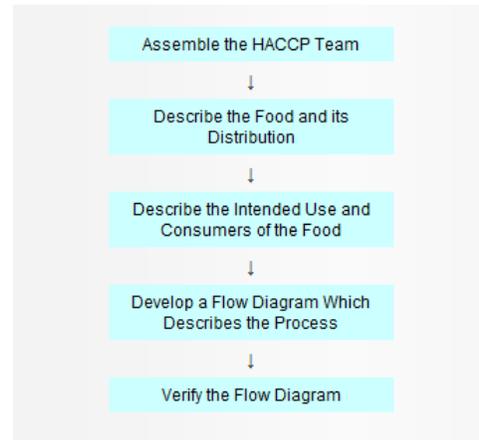
Management must provide adequate time for thorough education and training. Personnel must be given the materials and equipment necessary to perform these tasks. Effective training is an important prerequisite to successful implementation of a HACCP plan.

Developing a HACCP Plan

The format of HACCP plans will vary. In many cases the plans will be product and process specific. However, some plans may use a unit operations approach. Generic HACCP plans can serve as useful guides in the development of process and product HACCP plans; however, it is essential that the unique conditions within each facility be considered during the development of all components of the HACCP plan.

In the development of a HACCP plan, five preliminary tasks need to be accomplished before the application of the HACCP principles to a specific product and process. The five preliminary tasks are given in Figure 1.

Figure 1. Preliminary Tasks in the Development of the HACCP Plan



Assemble the HACCP Team

The first task in developing a HACCP plan is to assemble a HACCP team consisting of individuals who have specific knowledge and expertise appropriate to the product and process. It is the team's responsibility to develop the HACCP plan. The team should be multi disciplinary and include individuals from areas such as engineering, production, sanitation, quality assurance, and food microbiology. The team should also include local personnel who are involved in the operation as they are more familiar with the variability and limitations of the operation. In addition, this fosters a sense of ownership among those who must

implement the plan. The HACCP team may need assistance from outside experts who are knowledgeable in the potential biological, chemical and/or physical hazards associated with the product and the process. However, a plan which is developed totally by outside sources may be erroneous, incomplete, and lacking in support at the local level.

Due to the technical nature of the information required for hazard analysis, it is recommended that experts who are knowledgeable in the food process should either participate in or verify the completeness of the hazard analysis and the HACCP plan. Such individuals should have the knowledge and experience to correctly: (a) conduct a hazard analysis; (b) identify potential hazards; (c) identify hazards which must be controlled; (d) recommend controls, critical limits, and procedures for monitoring and verification; (e) recommend appropriate corrective actions when a deviation occurs; (f) recommend research related to the HACCP plan if important information is not known; and (g) validate the HACCP plan.

Describe the food and its distribution

The HACCP team first describes the food. This consists of a general description of the food, ingredients, and processing methods. The method of distribution should be described along with information on whether the food is to be distributed frozen, refrigerated, or at ambient temperature.

Describe the intended use and consumers of the food

Describe the normal expected use of the food. The intended consumers may be the general public or a particular segment of the population (e.g., infants, immunocompromised individuals, the elderly, etc.).

Develop a flow diagram which describes the process

The purpose of a flow diagram is to provide a clear, simple outline of the steps involved in the process. The scope of the flow diagram must cover all the steps in the process which are directly under the control of the establishment. In addition, the flow diagram can include steps in the food chain which are before and after the processing that occurs in the establishment. The flow diagram need not be as complex as engineering drawings. A block type flow diagram is sufficiently descriptive (see Appendix B). Also, a simple schematic of the facility is often useful in understanding and evaluating product and process flow.

Verify the flow diagram

The HACCP team should perform an on-site review of the operation to verify the accuracy and completeness of the flow diagram. Modifications should be made to the flow diagram as necessary and documented.

After these five preliminary tasks have been completed, the seven principles of HACCP are applied.

Conduct a hazard analysis (Principle 1)

After addressing the preliminary tasks discussed above, the HACCP team conducts a hazard analysis and identifies appropriate control measures. The purpose of the hazard analysis is to develop a list of hazards



which are of such significance that they are reasonably likely to cause injury or illness if not effectively controlled. Hazards that are not reasonably likely to occur would not require further consideration within a HACCP plan. It is important to consider in the hazard analysis the ingredients and raw materials, each step in the process, product storage and distribution, and final preparation and use by the consumer. When conducting a hazard analysis, safety concerns must be differentiated from quality concerns. A hazard is defined as a biological, chemical or physical agent that is reasonably likely to cause illness or injury in the absence of its control. Thus, the word hazard as used in this document is limited to safety.

A thorough hazard analysis is the key to preparing an effective HACCP plan. If the hazard analysis is not done correctly and the hazards warranting control within the HACCP system are not identified, the plan will not be effective regardless of how well it is followed.

The hazard analysis and identification of associated control measures accomplish three objectives: Those hazards and associated control measures are identified. The analysis may identify needed modifications to a process or product so that product safety is further assured or improved. The analysis provides a basis for determining CCPs in Principle 2.



The process of conducting a hazard analysis involves two stages. The first, hazard identification, can be regarded as a brain storming session. During this stage, the HACCP team reviews the ingredients used in the product, the activities conducted at each step in the process and the equipment used, the final product and its method of storage and distribution, and the intended use and consumers of the product. Based on this review, the team develops a list of potential biological, chemical or physical hazards which may be introduced, increased, or controlled at each step in the production process. Appendix C lists examples of questions that may be helpful to consider when identifying potential hazards. Hazard identification focuses on developing a list of potential hazards associated with each process step under direct control of the food operation. A knowledge of any adverse health-related events historically associated with the product will be of value in this exercise.



After the list of potential hazards is assembled, stage two, the hazard evaluation, is conducted. In stage two of the hazard analysis, the HACCP team decides which potential hazards must be addressed in the HACCP plan. During this stage, each potential hazard is evaluated based on the severity of the potential hazard and its likely occurrence. Severity is the seriousness of the consequences of exposure to the hazard. Considerations of severity (e.g., impact of sequelae, and magnitude and duration of illness or injury) can be helpful in understanding the public health impact of the hazard. Consideration of the likely occurrence is usually based upon a combination of experience, epidemiological data, and information in the technical literature. When conducting the hazard evaluation, it is helpful to consider the likelihood of exposure and severity of the potential consequences if the hazard is not properly controlled. In addition, consideration should be given to the effects of short term as well as long term exposure to the potential hazard. Such considerations do not include common dietary choices which lie outside of HACCP. During the evaluation of each potential hazard, the food, its method of preparation, transportation, storage and persons likely to consume the product should be considered to determine how each of these factors may influence the likely occurrence and severity of the hazard being controlled. The team must consider the influence of likely procedures for food preparation and storage and whether the intended consumers are susceptible to a potential hazard. However, there may be differences of opinion, even among experts, as to the likely

occurrence and severity of a hazard. The HACCP team may have to rely upon the opinion of experts who assist in the development of the HACCP plan.

Hazards identified in one operation or facility may not be significant in another operation producing the same or a similar product. For example, due to differences in equipment and/or an effective maintenance program, the probability of metal contamination may be significant in one facility but not in another. A summary of the HACCP team deliberations and the rationale developed during the hazard analysis should be kept for future reference. This information will be useful during future reviews and updates of the hazard analysis and the HACCP plan.

Appendix D gives three examples of using a logic sequence in conducting a hazard analysis. While these examples relate to biological hazards, chemical and physical hazards are equally important to consider. Appendix D is for illustration purposes to further explain the stages of hazard analysis for identifying hazards. Hazard identification and evaluation as outlined in Appendix D may eventually be assisted by biological risk assessments as they become available. While the process and output of a risk assessment (NACMCF, 1997)(1) is significantly different from a hazard analysis, the identification of hazards of concern and the hazard evaluation may be facilitated by information from risk assessments. Thus, as risk assessments addressing specific hazards or control factors become available, the HACCP team should take these into consideration.

Upon completion of the hazard analysis, the hazards associated with each step in the production of the food should be listed along with any measure(s) that are used to control the hazard(s). The term control measure is used because not all hazards can be prevented, but virtually all can be controlled. More than one control measure may be required for a specific hazard. On the other hand, more than one hazard may be addressed by a specific control measure (e.g. pasteurization of milk).

For example, if a HACCP team were to conduct a hazard analysis for the production of frozen cooked beef patties (Appendices B and D), enteric pathogens (e.g., *Salmonella* and verotoxin-producing *Escherichia coli*) in the raw meat would be identified as hazards. Cooking is a control measure which can be used to eliminate these hazards. The following is an excerpt from a hazard analysis summary table for this product.

Step	Potential Hazard(s)	Justification	Hazard to be addressed in plan? Y/N	Control Measure(s)
5. Cooking	Enteric pathogens: e.g., <i>Salmonella</i> , verotoxigenic- <i>E. coli</i>	Enteric pathogens have been associated with outbreaks of foodborne illness from undercooked ground beef	Y	Cooking

The hazard analysis summary could be presented in several different ways. One format is a table such as the one given above. Another could be a narrative summary of the HACCP team's hazard analysis considerations and a summary table listing only the hazards and associated control measures.

Determine critical control points (CCPs) (Principle 2)

A critical control point is defined as a step at which control can be applied and is essential to prevent or eliminate a food safety hazard or reduce it to an acceptable level. The potential hazards that are reasonably likely to cause illness or injury in the absence of their control must be addressed in determining CCPs.

Complete and accurate identification of CCPs is fundamental to controlling food safety hazards. The information developed during the hazard analysis is essential for the HACCP team in identifying which steps in the process are CCPs. One strategy to facilitate the identification of each CCP is the use of a CCP decision tree (Examples of decision trees are given in Appendices E and F). Although application of the CCP decision tree can be useful in determining if a particular step is a CCP for a previously identified hazard, it is merely a tool and not a mandatory element of HACCP. A CCP decision tree is not a substitute for expert knowledge.

Critical control points are located at any step where hazards can be either prevented, eliminated, or reduced to acceptable levels. Examples of CCPs may include: thermal processing, chilling, testing ingredients for chemical residues, product formulation control, and testing product for metal contaminants. CCPs must be carefully developed and documented. In addition, they must be used only for purposes of product safety. For example, a specified heat process, at a given time and temperature designed to destroy a specific microbiological pathogen, could be a CCP. Likewise, refrigeration of a precooked food to prevent hazardous microorganisms from multiplying, or the adjustment of a food to a pH necessary to prevent toxin formation could also be CCPs. Different facilities preparing similar food items can differ in the hazards identified and the steps which are CCPs. This can be due to differences in each facility's layout, equipment, selection of ingredients, processes employed, etc.

Establish critical limits (Principle 3)

A critical limit is a maximum and/or minimum value to which a biological, chemical or physical parameter must be controlled at a CCP to prevent, eliminate or reduce to an acceptable level the occurrence of a food safety hazard. A critical limit is used to distinguish between safe and unsafe operating conditions at a CCP. Critical limits should not be confused with operational limits which are established for reasons other than food safety.



Each CCP will have one or more control measures to assure that the identified hazards are prevented, eliminated or reduced to acceptable levels. Each control measure has one or more associated critical limits. Critical limits may be based upon factors such as: temperature, time, physical dimensions, humidity, moisture level, water activity (aw), pH, titratable acidity, salt concentration, available chlorine, viscosity, preservatives, or sensory information such as aroma and visual appearance. Critical limits must be scientifically based. For each CCP, there is at least one criterion for food safety that is to be met. An example of a criterion is a specific lethality of a cooking process such as a 5D reduction in Salmonella. The critical limits and criteria for food safety may be derived from sources such as regulatory standards and guidelines, literature surveys, experimental results, and experts.

An example is the cooking of beef patties (Appendix B). The process should be designed to ensure the production of a safe product. The hazard analysis for cooked meat patties identified enteric pathogens (e.g., verotoxigenic *E. coli* such as *E. coli* O157:H7, and salmonellae) as significant biological hazards. Furthermore, cooking is the step in the process at which control can be applied to reduce the enteric pathogens to an acceptable level. To ensure that an acceptable level is consistently achieved, accurate information is needed on the probable number of the pathogens in the raw patties, their heat resistance, the factors that influence the heating of the patties, and the area of the patty which heats the slowest. Collectively, this information forms the scientific basis for the critical limits that are established. Some of the factors that may affect the thermal destruction of enteric pathogens are listed in the following table. In this example, the HACCP team concluded that a thermal process equivalent to 155° F for 16 seconds would be necessary to assure the safety of this product. To ensure that this time and temperature are attained, the HACCP team for one facility determined that it would be necessary to establish critical limits for the oven temperature and humidity, belt speed (time in oven), patty thickness and composition (e.g., all beef, beef and other ingredients). Control of these factors enables the facility to produce a wide variety of cooked patties, all of which will be processed to a minimum internal temperature of 155° F for 16 seconds. In another facility, the HACCP team may conclude that the best approach is to use the internal patty temperature of 155° F and hold for 16 seconds as critical limits. In this second facility the internal temperature and hold time of the patties are monitored at a frequency to ensure that the critical limits are constantly met as they exit the oven. The example given below applies to the first facility.

Process Step	CCP	Critical Limits
5. Cooking	YES	Oven temperature: ____ ° F Time; rate of heating and cooling (belt speed in ft/min): ____ ft/min Patty thickness: ____ in. Patty composition: e.g. all beef Oven humidity: ____ % RH

Establish monitoring procedures (Principle 4)

Monitoring is a planned sequence of observations or measurements to assess whether a CCP is under control and to produce an accurate record for future use in verification. Monitoring serves three main purposes. First, monitoring is essential to food safety management in that it facilitates tracking of the operation. If monitoring indicates that there is a trend towards loss of control, then action can be taken to bring the process back into control before a deviation from a critical limit occurs. Second, monitoring is used to determine when there is loss of control and a deviation occurs at a CCP, i.e., exceeding or not meeting a critical limit. When a deviation occurs, an appropriate corrective action must be taken. Third, it provides written documentation for use in verification.



An unsafe food may result if a process is not properly controlled and a deviation occurs. Because of the potentially serious consequences of a critical limit deviation, monitoring procedures must be effective. Ideally, monitoring should be continuous, which is possible with many types of physical and chemical methods. For example, the temperature and time for the scheduled thermal process of low-acid canned foods is recorded continuously on temperature recording charts. If the temperature falls below the scheduled temperature or the time is insufficient, as recorded on the chart, the product from the retort is retained and the disposition determined as in Principle 5. Likewise, pH measurement may be performed

continually in fluids or by testing each batch before processing. There are many ways to monitor critical limits on a continuous or batch basis and record the data on charts. Continuous monitoring is always preferred when feasible. Monitoring equipment must be carefully calibrated for accuracy.

Assignment of the responsibility for monitoring is an important consideration for each CCP. Specific assignments will depend on the number of CCPs and control measures and the complexity of monitoring. Personnel who monitor CCPs are often associated with production (e.g., line supervisors, selected line workers and maintenance personnel) and, as required, quality control personnel. Those individuals must be trained in the monitoring technique for which they are responsible, fully understand the purpose and importance of monitoring, be unbiased in monitoring and reporting, and accurately report the results of monitoring. In addition, employees should be trained in procedures to follow when there is a trend towards loss of control so that adjustments can be made in a timely manner to assure that the process remains under control. The person responsible for monitoring must also immediately report a process or product that does not meet critical limits.

All records and documents associated with CCP monitoring should be dated and signed or initialed by the person doing the monitoring.

When it is not possible to monitor a CCP on a continuous basis, it is necessary to establish a monitoring frequency and procedure that will be reliable enough to indicate that the CCP is under control. Statistically designed data collection or sampling systems lend themselves to this purpose.

Most monitoring procedures need to be rapid because they relate to on-line, "real-time" processes and there will not be time for lengthy analytical testing. Examples of monitoring activities include: visual observations and measurement of temperature, time, pH, and moisture level.

Microbiological tests are seldom effective for monitoring due to their time-consuming nature and problems with assuring detection of contaminants. Physical and chemical measurements are often preferred because they are rapid and usually more effective for assuring control of microbiological hazards. For example, the safety of pasteurized milk is based upon measurements of time and temperature of heating rather than testing the heated milk to assure the absence of surviving pathogens.

With certain foods, processes, ingredients, or imports, there may be no alternative to microbiological testing. However, it is important to recognize that a sampling protocol that is adequate to reliably detect low levels of pathogens is seldom possible because of the large number of samples needed. This sampling limitation could result in a false sense of security by those who use an inadequate sampling protocol. In addition, there are technical limitations in many laboratory procedures for detecting and quantitating pathogens and/or their toxins.

Establish corrective actions (Principle 5)

The HACCP system for food safety management is designed to identify health hazards and to establish strategies to prevent, eliminate, or reduce their occurrence. However, ideal circumstances do not always prevail and deviations from established processes may occur. An important purpose of corrective actions is to prevent foods which may be hazardous from reaching consumers. Where there is a deviation from

established critical limits, corrective actions are necessary. Therefore, corrective actions should include the following elements: (a) determine and correct the cause of non-compliance; (b) determine the disposition of non-compliant product and (c) record the corrective actions that have been taken. Specific corrective actions should be developed in advance for each CCP and included in the HACCP plan. As a minimum, the HACCP plan should specify what is done when a deviation occurs, who is responsible for implementing the corrective actions, and that a record will be developed and maintained of the actions taken. Individuals who have a thorough understanding of the process, product and HACCP plan should be assigned the responsibility for oversight of corrective actions. As appropriate, experts may be consulted to review the information available and to assist in determining disposition of non-compliant product.

Establish verification procedures (Principle 6)

Verification is defined as those activities, other than monitoring, that determine the validity of the HACCP plan and that the system is operating according to the plan. The NAS (1985) (2) pointed out that the major infusion of science in a HACCP system centers on proper identification of the hazards, critical control points, critical limits, and instituting proper verification procedures. These processes should take place during the development and implementation of the HACCP plans and maintenance of the HACCP system. An example of a verification schedule is given in Figure 2.



One aspect of verification is evaluating whether the facility's HACCP system is functioning according to the HACCP plan. An effective HACCP system requires little end-product testing, since sufficient validated safeguards are built in early in the process. Therefore, rather than relying on end-product testing, firms should rely on frequent reviews of their HACCP plan, verification that the HACCP plan is being correctly followed, and review of CCP monitoring and corrective action records.

Another important aspect of verification is the initial validation of the HACCP plan to determine that the plan is scientifically and technically sound, that all hazards have been identified and that if the HACCP plan is properly implemented these hazards will be effectively controlled. Information needed to validate the HACCP plan often include (1) expert advice and scientific studies and (2) in-plant observations, measurements, and evaluations. For example, validation of the cooking process for beef patties should include the scientific justification of the heating times and temperatures needed to obtain an appropriate destruction of pathogenic microorganisms (i.e., enteric pathogens) and studies to confirm that the conditions of cooking will deliver the required time and temperature to each beef patty.



Subsequent validations are performed and documented by a HACCP team or an independent expert as needed. For example, validations are conducted when there is an unexplained system failure; a significant product, process or packaging change occurs; or new hazards are recognized.

In addition, a periodic comprehensive verification of the HACCP system should be conducted by an unbiased, independent authority. Such authorities can be internal or external to the food operation. This should include a technical evaluation of the hazard analysis and each element of the HACCP plan as well as on-site review of all flow diagrams and appropriate records from operation of the plan. A comprehensive verification is independent of other verification procedures and must be performed to ensure that the HACCP plan is resulting in the control of the hazards. If the results of the comprehensive verification identifies deficiencies, the HACCP team modifies the HACCP plan as necessary.

Verification activities are carried out by individuals within a company, third party experts, and regulatory agencies. It is important that individuals doing verification have appropriate technical expertise to perform this function. The role of regulatory and industry in HACCP was further described by the NACMCF (1994) (3).

Examples of verification activities are included as Appendix G.

Figure 2. Example of a Company Established HACCP Verification Schedule

Activity	Frequency	Responsibility	Reviewer
Verification Activities Scheduling	Yearly or Upon HACCP System Change	HACCP Coordinator	Plant Manager
Initial Validation of HACCP Plan	Prior to and During Initial Implementation of Plan	Independent Expert(s) ^(a)	HACCP Team
Subsequent validation of HACCP Plan	When Critical Limits Changed, Significant Changes in Process, Equipment Changed, After System Failure, etc.	Independent Expert(s) ^(a)	HACCP Team
Verification of CCP Monitoring as Described in the Plan (e.g., monitoring of patty cooking temperature)	According to HACCP Plan (e.g., once per shift)	According to HACCP Plan (e.g., Line Supervisor)	According to HACCP Plan (e.g., Quality Control)
Review of Monitoring, Corrective Action Records to Show Compliance with the Plan	Monthly	Quality Assurance	HACCP Team
Comprehensive HACCP System Verification	Yearly	Independent Expert(s) ^(a)	Plant Manager

^(a) Done by others than the team writing and implementing the plan. May require additional technical expertise as well as laboratory and plant test studies.

Establish record-keeping and documentation procedures (Principle 7)

Generally, the records maintained for the HACCP System should include the following:

1. A summary of the hazard analysis, including the rationale for determining hazards and control measures.
2. The HACCP Plan
 - Listing of the HACCP team and assigned responsibilities.
 - Description of the food, its distribution, intended use, and consumer. Verified flow diagram.
 - HACCP Plan Summary Table that includes information for: Steps in the process that are CCPs
 - The hazard(s) of concern. Critical limits Monitoring*

Corrective actions*

Verification procedures and schedule* Record-keeping procedures*

* A brief summary of position responsible for performing the activity and the procedures and frequency should be provided

The following is an example of a HACCP plan summary table:

CCP	Hazards	Critical limit(s)	Monitoring	Corrective Actions	Verification	Records

3. Support documentation such as validation records.
4. Records that are generated during the operation of the plan.

Examples of HACCP records are given in [Appendix H](#).

IMPLEMENTATION AND MAINTENANCE OF THE HACCP PLAN

The successful implementation of a HACCP plan is facilitated by commitment from top management. The next step is to establish a plan that describes the individuals responsible for developing, implementing and maintaining the HACCP system. Initially, the HACCP coordinator and team are selected and trained as necessary. The team is then responsible for developing the initial plan and coordinating its implementation. Product teams can be appointed to develop HACCP plans for specific products. An important aspect in developing these teams is to assure that they have appropriate training. The workers who will be responsible for monitoring need to be adequately trained. Upon completion of the HACCP plan, operator procedures, forms and procedures for monitoring and corrective action are developed. Often it is a good idea to develop a timeline for the activities involved in the initial implementation of the HACCP plan. Implementation of the HACCP system involves the continual application of the monitoring, record-keeping, corrective action procedures and other activities as described in the HACCP plan.

Maintaining an effective HACCP system depends largely on regularly scheduled verification activities. The HACCP plan should be updated and revised as needed. An important aspect of maintaining the HACCP system is to assure that all individuals involved are properly trained so they understand their role and can effectively fulfill their responsibilities.

(1) National Advisory Committee on Microbiological Criteria for Foods. 1997. The principles of risk assessment for illness caused by foodborne biological agents. Adopted April 4, 1997.

(2) An Evaluation of the Role of Microbiological Criteria for Foods and Food Ingredients. 1985. National Academy of Sciences, National Academy Press, Washington, DC.

(3) National Advisory Committee on Microbiological Criteria for Foods. 1994. The role of regulatory agencies and industry in HACCP. *Int. J. Food Microbiol.* 21:187-195.

APPENDIX A

Examples of Common Prerequisite Programs

The production of safe food products requires that the HACCP system be built upon a solid foundation of prerequisite programs. Each segment of the food industry must provide the conditions necessary to protect food while it is under their control. This has traditionally been accomplished through the application of cGMPs. These conditions and practices are now considered to be prerequisite to the development and implementation of effective HACCP plans. Prerequisite programs provide the basic environmental and operating conditions that are necessary for the production of safe, wholesome food. Common prerequisite programs may include, but are not limited to:

Facilities: The establishment should be located, constructed and maintained according to sanitary design principles. There should be linear product flow and traffic control to minimize cross-contamination from raw to cooked materials.

Supplier Control: Each facility should assure that its suppliers have in place effective GMP and food safety programs. These may be the subject of continuing supplier guarantee and supplier HACCP system verification.

Specifications: There should be written specifications for all ingredients, products, and packaging materials.

Production Equipment: All equipment should be constructed and installed according to sanitary design principles. Preventive maintenance and calibration schedules should be established and documented.

Cleaning and Sanitation: All procedures for cleaning and sanitation of the equipment and the facility should be written and followed. A master sanitation schedule should be in place.

Personal Hygiene: All employees and other persons who enter the manufacturing plant should follow the requirements for personal hygiene.

Training: All employees should receive documented training in personal hygiene, GMP, cleaning and sanitation procedures, personal safety, and their role in the HACCP program.

Chemical Control: Documented procedures must be in place to assure the segregation and proper use of non-food chemicals in the plant. These include cleaning chemicals, fumigants, and pesticides or baits used in or around the plant.

Receiving, Storage and Shipping: All raw materials and products should be stored under sanitary conditions and the proper environmental conditions such as temperature and humidity to assure their safety and wholesomeness

Traceability and Recall: All raw materials and products should be lot-coded and a recall system in place so that rapid and complete traces and recalls can be done when a product retrieval is necessary.

Pest Control: Effective pest control programs should be in place.

Other examples of prerequisite programs might include quality assurance procedures; standard operating procedures for sanitation, processes, product formulations and recipes; glass control; procedures for receiving, storage and shipping; labeling; and employee food and ingredient handling practices.

APPENDIX B

Example of a Flow Diagram for the Production of Frozen Cooked Beef Patties



APPENDIX C

Examples of Questions to be Considered When Conducting a Hazard Analysis

The hazard analysis consists of asking a series of questions which are appropriate to the process under consideration. The purpose of the questions is to assist in identifying potential hazards.

A. Ingredients

1. Does the food contain any sensitive ingredients that may present microbiological hazards (e.g., Salmonella, Staphylococcus aureus); chemical hazards (e.g., aflatoxin, antibiotic or pesticide residues); or physical hazards (stones, glass, metal)?
2. Are potable water, ice and steam used in formulating or in handling the food?
3. What are the sources (e.g., geographical region, specific supplier)

B. Intrinsic Factors - Physical characteristics and composition (e.g., pH, type of acidulants, fermentable carbohydrate, water activity, preservatives) of the food during and after processing.

1. What hazards may result if the food composition is not controlled?
2. Does the food permit survival or multiplication of pathogens and/or toxin formation in the food during processing?

3. Will the food permit survival or multiplication of pathogens and/or toxin formation during subsequent steps in the food chain?
4. Are there other similar products in the market place? What has been the safety record for these products? What hazards have been associated with the products?

C. Procedures used for processing

1. Does the process include a controllable processing step that destroys pathogens? If so, which pathogens? Consider both vegetative cells and spores.
2. If the product is subject to recontamination between processing (e.g., cooking, pasteurizing) and packaging which biological, chemical or physical hazards are likely to occur?

C. Microbial content of the food

1. What is the normal microbial content of the food?
2. Does the microbial population change during the normal time the food is stored prior to consumption?
3. Does the subsequent change in microbial population alter the safety of the food?
4. Do the answers to the above questions indicate a high likelihood of certain biological hazards?

D. Facility design

1. Does the layout of the facility provide an adequate separation of raw materials from ready-to-eat (RTE) foods if this is important to food safety? If not, what hazards should be considered as possible contaminants of the RTE products?
2. Is positive air pressure maintained in product packaging areas? Is this essential for product safety?
3. Is the traffic pattern for people and moving equipment a significant source of contamination?

C. Equipment design and use

1. Will the equipment provide the time-temperature control that is necessary for safe food?
2. Is the equipment properly sized for the volume of food that will be processed?
3. Can the equipment be sufficiently controlled so that the variation in performance will be within the tolerances required to produce a safe food?
4. Is the equipment reliable or is it prone to frequent breakdowns?
5. Is the equipment designed so that it can be easily cleaned and sanitized?
6. Is there a chance for product contamination with hazardous substances; e.g., glass?
7. What product safety devices are used to enhance consumer safety?
 - metal detectors
 - magnets
 - sifters
 - filters
 - screens
 - thermometers
 - bone removal devices
 - dud detectors
8. To what degree will normal equipment wear affect the likely occurrence of a physical hazard (e.g., metal) in the product?
9. Are allergen protocols needed in using equipment for different products?

G. Packaging

1. Does the method of packaging affect the multiplication of microbial pathogens and/or the formation of toxins?
2. Is the package clearly labeled "Keep Refrigerated" if this is required for safety?
3. Does the package include instructions for the safe handling and preparation of the food by the end user?
4. Is the packaging material resistant to damage thereby preventing the entrance of microbial contamination?
5. Are tamper-evident packaging features used?
6. Is each package and case legibly and accurately coded?
7. Does each package contain the proper label?
8. Are potential allergens in the ingredients included in the list of ingredients on the label?

H. Sanitation

1. Can sanitation have an impact upon the safety of the food that is being processed?
2. Can the facility and equipment be easily cleaned and sanitized to permit the safe handling of food?
3. Is it possible to provide sanitary conditions consistently and adequately to assure safe foods?

G. Employee health, hygiene and education

1. Can employee health or personal hygiene practices impact upon the safety of the food being processed?
2. Do the employees understand the process and the factors they must control to assure the preparation of safe foods?
3. Will the employees inform management of a problem which could impact upon safety of food?

H. Conditions of storage between packaging and the end user

1. What is the likelihood that the food will be improperly stored at the wrong temperature?
2. Would an error in improper storage lead to a microbiologically unsafe food?

I. Intended use

1. Will the food be heated by the consumer?
2. Will there likely be leftovers?

J. Intended consumer

1. Is the food intended for the general public?
2. Is the food intended for consumption by a population with increased susceptibility to illness (e.g., infants, the aged, the infirmed, immunocompromised individuals)?
3. Is the food to be used for institutional feeding or the home?

APPENDIX D

Examples of How the Stages of Hazard Analysis are used to Identify and Evaluate Hazards*

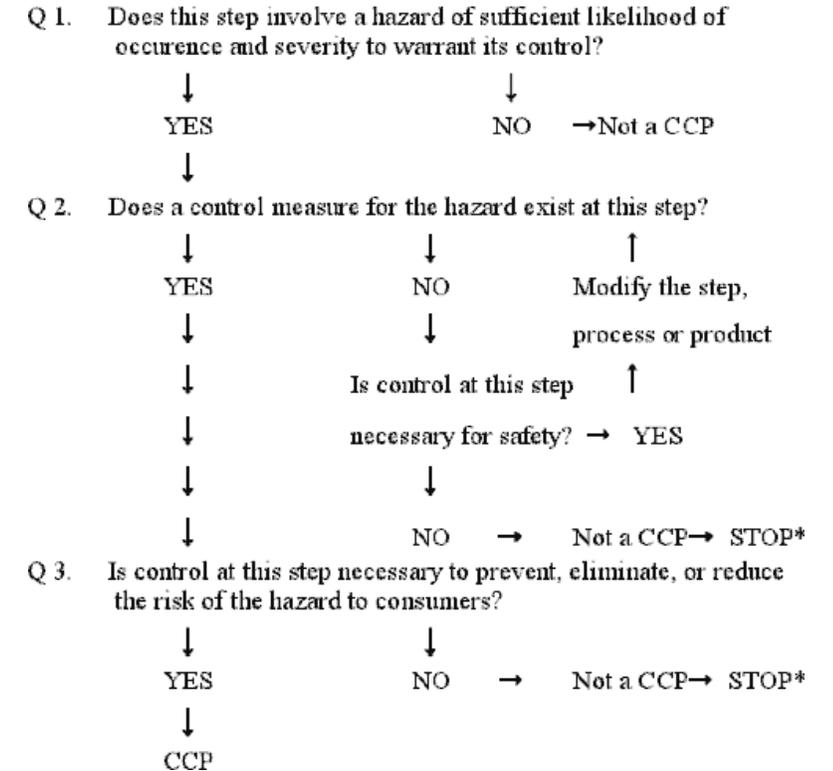
Hazard Analysis Stage		Frozen cooked beef patties produced in a manufacturing plant	Product containing eggs prepared for foodservice	Commercial frozen pre-cooked, boned chicken for further processing
Stage 1: Determine potential Hazard hazards associated Identification with product		Enteric pathogens (i.e., E. coli O157:H7 and Salmonella)	Salmonella in finished product.	Staphylococcus aureus in finished product.
Stage 2: Hazard Evaluation	<i>Assess severity of health consequences if potential hazard is not properly controlled.</i>	Epidemiological evidence indicates that these pathogens cause severe health effects including death among children and elderly. Undercooked beef patties have been linked to disease from these pathogens.	Salmonellosis is a food borne infection causing a moderate to severe illness that can be caused by ingestion of only a few cells of Salmonella.	Certain strains of S. aureus produce an enterotoxin which can cause a moderate foodborne illness.
	<i>Determine likelihood of occurrence of potential hazard if not properly controlled.</i>	E. coli O157:H7 is of very low probability and salmonellae is of moderate probability in raw meat.	Product is made with liquid eggs which have been associated with past outbreaks of salmonellosis. Recent problems with Salmonella serotype Enteritidis in eggs cause increased concern. Probability of Salmonella in raw eggs cannot be ruled out. If not effectively controlled, some consumers are likely to be exposed to Salmonella from this food.	Product may be contaminated with S. aureus due to human handling during boning of cooked chicken. Enterotoxin capable of causing illness will only occur as S. aureus multiplies to about 1,000,000/g. Operating procedures during boning and subsequent freezing prevent growth of S. aureus, thus the potential for enterotoxin formation is very low.
	<i>Using information above, determine if this potential hazard is to be addressed in the HACCP plan.</i>	The HACCP team decides that enteric pathogens are hazards for this product. Hazards must be addressed in the plan.	HACCP team determines that if the potential hazard is not properly controlled, consumption of product is likely to result in an unacceptable health risk. Hazard must be addressed in the plan.	The HACCP team determines that the potential for enterotoxin formation is very low. However, it is still desirable to keep the initial number of S. aureus organisms low. Employee practices that minimize contamination, rapid carbon dioxide freezing and handling instructions have been adequate to control this potential hazard. Potential hazard does not need to be addressed in plan.

APPENDIX E

Example I of a CCP Decision Tree

Important considerations when using the decision tree:

- The decision tree is used after the hazard analysis.
- The decision tree then is used at the steps where a hazard that must be addressed in the HACCP plan has been identified.
- A subsequent step in the process may be more effective for controlling a hazard and may be the preferred CCP.
- More than one step in a process may be involved in controlling a hazard.
- More than one hazard may be controlled by a specific control measure.



B. Verification should be conducted:

1. Routinely, or on an unannounced basis, to assure CCPs are under control.
2. When there are emerging concerns about the safety of the product.
3. When foods have been implicated as a vehicle of foodborne disease.
4. To confirm that changes have been implemented correctly after a HACCP plan has been modified.
5. To assess whether a HACCP plan should be modified due to a change in the process, equipment, ingredients, etc.

C. Verification reports may include information on the presence and adequacy of.

1. The HACCP plan and the person(s) responsible for administering and updating the HACCP plan.
2. The records associated with CCP monitoring.
3. Direct recording of monitoring data of the CCP while in operation.
4. Certification that monitoring equipment is properly calibrated and in working order.
5. Corrective actions for deviations.
6. Sampling and testing methods used to verify that CCPs are under control.
7. Modifications to the HACCP plan.
8. Training and knowledge of individuals responsible for monitoring CCPs.
9. Validation activities.

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7. Modifications to the HACCP plan.
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APPENDIX H

Examples of HACCP Records

A. Ingredients for which critical limits have been established.

1. Supplier certification records documenting compliance of an ingredient with a critical limit.
2. Processor audit records verifying supplier compliance.
3. Storage records (e.g., time, temperature) for when ingredient storage is a CCP.

B. Processing, storage and distribution records

1. Information that establishes the efficacy of a CCP to maintain product safety.
2. Data establishing the safe shelf life of the product; if age of product can affect safety.
3. Records indicating compliance with critical limits when packaging materials, labeling or sealing specifications are necessary for food safety.
4. Monitoring records.
5. Verification records.

C. Deviation and corrective action records.

D. Employee training records that are pertinent to CCPs and the HACCP plan.

E. Documentation of the adequacy of the HACCP plan from a knowledgeable HACCP expert.

2. BEST PRACTICES AND PROCESSES FOR CLEANING AND SANITIZING FOR RETAIL GROCERS/FOODSERVICE

The information in this manual has been compiled using expert knowledge, industry expertise, the sanitation law, as well as extensive research and development from the following organizations:

- All Florida Paper, LLC
- United States Department of Agriculture
- Spartan
- Starco Chemical

Disclosure:

The following information is not legal advice. It is for educational and informational purposes only. If you need legal advice, consult the United States Department of Agriculture directly, or a licensed attorney.

2.1 Benefits of Sanitation:

Why should you care?

As a business owner, there are both tangible and intangible benefits of adopting, and effectively operating a cleaning and sanitation program. Some of these benefits are:

- ✓ Law compliance
- ✓ Prevent lawsuits
- ✓ Attract better employees
- ✓ Build customer loyalty
- ✓ Increase revenues
- ✓ Enhanced customer experience
- ✓ Improve USDA Store Ratings, and avoid penalties
- ✓ Increase Shelf Life
- ✓ Improve Reputation

2.2 The Basics of a Successful Sanitation Program:

A three-word definition of Food Sanitation is **Protection from Contamination**. All food products must be protected from contamination. Sanitation is a dynamic and ongoing function and cannot be sporadic or something that can be turned on once a day, once a week, etc. Therefore, another definition could be: "**Sanitation is a Way of Life**".

- ✓ Proper sanitation contributes to the control of bacteria.
- ✓ Safety and quality of a program must be driven by upper management.
- ✓ Consumer protection and product safety must be priorities.

- ✓ Quality is an integral part of any great sanitation program.
- ✓ Your sanitation program should always be looking at ways to view improvement as an ongoing basis.
- ✓ Training is a critical part of a sanitation program. It is only as effective as the people who implement the program.
- ✓ Within your sanitation program, there will always be microorganisms. They can be in the form of Bacteria, Fungi, and Viruses among others.
- ✓ Their growth is typically affected by Nutrients (food), Temperature, Moisture, Atmosphere, pH, Inhibitors (chemicals).
- ✓ The groups of microorganisms we are most concerned with are Pathogens (disease-causing organisms), and spoilage bacteria (caused from food spoilage).

Controls will be critical to your program. If you do not carefully design, control, and monitor your program, it will never achieve your expectations or the expectations of your consumers.

When establishing your plan, consider the following:

- ✓ Written procedures
- ✓ Effectiveness
- ✓ Safety oriented
- ✓ Practical
- ✓ Training
- ✓ Visual aids to support the program
- ✓ Ongoing feedback
- ✓ Continuous improvement and innovation
- ✓ Updated regularly

Employee training:

Training should focus on the fundamentals of sanitation, food microbiology, and the critical importance of food safety and quality.

Remind them of the importance of pre-rinsing, washing, post-rinsing, and sanitizing.

Training must be continuous and provide clear, accurate information so the “human” element functions as well as the cleaning solutions of your product.

Why do we clean?

The Food and Drug Administration Good Manufacturing Practices (GMP's) require you to produce foods that are safe and wholesome which have been produced, processed, stored, and distributed under sanitary conditions. Sanitation will ultimately lead to prosperous and respected companies or ones that falter and eventually go out of business.

The Center for Disease Control estimates that between ten to twenty billion dollars per year are spent on foodborne illness. Upwards to 9,000 individuals may ultimately die from consuming unsanitary foods and beverages, many of whom are children or the elderly.

Food safety is market driven, not regulation dependent. Consumer confidence is critical. It pays to do it right always, and it requires a dedicated team.

2.3 Science Behind Cleaning:

Principles of the Cleaning Process:

Cleaning is defined as removing or treating unwanted material on a surface. Each step along the way in the process contributes to the success of the program. Please keep in mind the following when cleaning:

- 1. Preparation (pre-rinse):** This includes removing all food product, gross soils, etc. and packaging materials from the area. Also included will be disassembling of equipment for cleaning, covering equipment not to be cleaned or contaminated, sweeping, shoveling, or squeegeeing gross soils for appropriate disposal. In other words, rinsing down the soiled surface.
- 2. Wash:** Applying appropriate detergents and/or cleaners to the individual equipment, whether it be manual, foaming, COP (clean out of place), or in CIP (clean in place) systems.
- 3. Rinse and repeat:** As in thoroughly rinsing the surface as well as inspecting to verify cleanliness in your critical control point areas.

4. **Sanitize:** In other words, reducing the levels of bacterial to safe and acceptable levels to provide a safe and quality product.

Detergent Properties:

Webster defines a detergent as any product, soap, or synthetic that removes soil. A detergent typically possesses and uses the following to remove soils from a surface:

✓ **Wetting:** Breaks down surface tension.

✓ **Penetration:** Gets down into the dirt film. Some detergents have good wetting agents while others good penetrating agents. A good detergent will combine both of these characteristics.

✓ **Emulsification:** This is where the fats and soils are broken into small particles which can be mixed and easily carried away by water. Good emulsifiers exhibit hydrophilic (water loving) and lipophilic (oil loving) characteristics.

✓ **Soil suspension:** This prevents the settling of solids or, in other words, reduces re-deposition. Detergents will also contain wetting agents (provide greater penetration of the surface soil) and chelating agents (enable the product to function more effectively with hard water).

2.4 Science Behind Sanitation:

Components of Cleaning Compounds:

- ✓ **Water:** Is the primary component of all liquid sanitation products and their in-use solutions.
 - ✓ **Acids:** Used primarily for the removal of hard water minerals such as calcium, magnesium, and iron.
 - ✓ **Alkaline:** Aid in the removal of organic soils, such as oil, grease, protein, carbohydrates, and fats.
 - ✓ **Chlorine:** Used as an additive to improve product performance on difficult soils. Can also be used as a disinfectant and sanitizer.
 - ✓ **Chelating Agents:** Used as an aid in alkaline cleaning products enabling the product components to function more effectively in hard water.
 - ✓ **Wetting Agents:** Allows product to promote greater penetration of the surface soil contributing to improved results.
- Controllable Factors in Cleaning:
- ✓ **Dilution Ratio:** Label directions for product dilutions have been established to achieve the best cost and performance. Keep in mind, disinfectants and sanitizers dilutions are based on actual bacterial kill data derived from standard testing guidelines.

✓ **Temperature:** Temperature can affect activity level of cleaning solutions. Viscosity of fatty soils will decrease with increases in temperature. Thus the warmer the system, the more efficiencies gained with the cleaning operation.

✓ **Time:** Effective soil removal includes added contact time for the cleaning solution on specific soil. A minimum of five minutes up to fifteen minutes provides positive results.

✓ **Agitation:** Mechanical agitation (i.e. high pressure, circulation, hand scrubbing with brush or pad) will assist breakdown of soil and the surface being cleaner.

Soil Identification:

✓ **Lipids (fat and oil):** Relatively easy to remove by rinsing with hot water (125°F or warmer). The melting point of animal fat is 120°F. When lipids are “cooked” on a surface, a heavy duty alkaline is required to break down the soil for its removal.

Appearance: Off white/white yellow film

✓ **Proteins (blood, muscle, and cartilage):** Easy to remove with high pressure. Lukewarm water at best, used to rinse with medium duty alkaline cleaner with good wetting properties is effective. Addition of chlorine greatly increases the cleaning effectiveness.

Appearance: Bluish white film

✓ **Carbohydrates (sugars and starch):** Cold rinse with high pressure water will remove starch build ups. Medium duty alkaline cleaner will remove these soils.

Appearance: Bluish white film

✓ **Hard Water Scale (mineral deposits, and calcium):** Difficult to remove as build up occurs over time. Acid cleaners work best to dissolve these deposits.

2.5 Maintaining a Clean and Sanitary Workplace:

Personal Hygiene:

A foodservice employee can contaminate food by hands. Some examples:

✓ After touching anything that could contaminate hands.

- ✓ By being sick with a stomach or intestinal “bug” that includes vomiting and/or diarrhea, etc.
- ✓ After caring for a person with a stomach or intestinal “bug.”
- ✓ By having an infected burn, wound, or other injury, and not covering it properly.
- ✓ When taking prescribed or over-the-counter medications (the medicine can get on the food)

A person who feels completely healthy may be the host of a harmful microorganism and not know it. Some foodborne illnesses do not cause symptoms until the most infectious stage has passed (Hepatitis A), and some harmful organisms remain in a person’s body after the symptoms have disappeared (Salmonella bacteria).

Use Guidelines for Good Personal Hygiene:

Food handlers must have the highest standards of personal hygiene because they have the potential of making many people sick when their standards are lowered.

- ✓ Wash hands properly, frequently, and at appropriate times.
- ✓ Keep fingernails trimmed, filed, and maintained so the edges and surfaces are cleanable and not rough. Best practice is not to wear fingernail polish or artificial fingernails.

- ✓ Keep hair and body clean; bathe every day.
- ✓ Wash hands before putting on single-use gloves and change gloves frequently.
- ✓ Avoid bare-hand contact with ready-to-eat food.
- ✓ Maintain good health.
- ✓ Treat and bandage wounds and sores. When hands are bandaged, single-use gloves should be worn at all times to protect the bandage and keep it from falling into food.
- ✓ When feeling ill, alert the foodservice manager and avoid working with food.

Dress for Food Safety Success:

An important part of good personal hygiene is clean and appropriate dress. Every foodservice employee should wear a uniform made of a material that can withstand hot water during laundering. It is important to:

- ✓ Wear a clean, appropriate uniform every day. Change uniforms as often as necessary to prevent bacteria on soiled clothing from spreading to the hands and then to food.
- ✓ Wear a clean apron when preparing food and take it off when leaving the food preparation area. An apron should be removed to go on break, eat lunch, smoke, or use the restroom.
- ✓ Change an apron if it becomes soiled.

✓ Avoid wearing jewelry other than a plain ring, such as a wedding band, when preparing or serving food. For the use of medical information jewelry follow the recommendations from the State or local public health department.

✓ Wear a hair restraint to keep hair and particles in the hair from falling into food.

✓ Wear comfortable, low-heeled, closed-toe shoes with soles that prevent slipping.

Use Common Sense as a Guide When Working with Food:

An important part of good personal hygiene is clean and appropriate dress. Every foodservice employee should wear a uniform made of a material that can withstand hot water during laundering. Guidelines for Foodservice Employees Working with or Near Food:

✓ Know when and how to wash hands; avoid using a food preparation sink or a three-compartment sink to wash hands.

✓ Taste food the correct way. Place a small amount of food from the food container into a small bowl, step away from the food container, and taste the food with a teaspoon. Remove the used bowl and teaspoon to the dish room. Never reuse a bowl or spoon already used for tasting. Wash hands immediately after tasting.

✓ Never taste a food that includes a raw ingredient of animal origin. For example, never taste cookie dough that includes raw eggs.

✓ Follow the foodservice rules for when to eat, smoke, and chew gum. Do not eat, smoke, chew gum, or use tobacco when preparing foods.

✓ When feeling ill, alert the foodservice manager and avoid working with food.

✓ Do not work with food when experiencing nausea, vomiting, diarrhea, fever, a sore throat, or jaundice (yellow skin and eyes), or after caring for someone at home with those symptoms.

✓ Do not work with food after being diagnosed with a foodborne illness.

Operating a Food-Safe Facility:

Know the Characteristics of a Food-safe Facility:

- ✓ It is designed for easy cleaning and maintenance. The workflow prevents clean and soiled items from crossing paths during food production and service.
- ✓ The floors, walls, and ceilings are free of dirt, litter, and moisture.
- ✓ The service line and serving stations are clean and neat.
- ✓ The exhaust fans and hoods are clean and operating properly.
- ✓ All types of storage areas – the dry storage room, the refrigerators, and the freezers – are in excellent condition. There is NO damage or spoilage, NO broken or torn packages, and NO bulging or leaking cans. Floors are clean, dry, and uncluttered.
- ✓ Cleaning supplies and chemicals are stored AWAY from food supply areas. Measuring utensils used for chemicals are stored with the chemical and are never used with or near food.
- ✓ Restrooms are convenient, clean, adequately stocked with soap and paper towels, and have warm running water.
- ✓ Garbage is kept away from food preparation areas.
- ✓ Garbage containers are leak-proof, waterproof, pest-proof, durable, easy to clean and sanitize, and have tight-fitting lids.

- ✓ Spills are cleaned immediately.
- ✓ Garbage is disposed of properly and promptly.
- ✓ There is no evidence of infestation from bugs or other pests.

A food-safe facility should have scheduled operating procedures for cleaning and maintaining, including the following:

- ✓ Floors, walls, and ceilings.
- ✓ Service lines and dispensers.
- ✓ Ventilation.
- ✓ Restrooms.
- ✓ Trash collection areas.
- ✓ Pest control.

Maintain Clean Floors, Walls, and Ceilings:

Establish routine cleaning procedures for walls, floors, and ceilings. The facility should be free of dirt, litter, and moisture. Corners and hard-to-reach places should also have routine cleaning.

- ✓ Clean walls around food preparation and cooking areas daily with a cleaning solution or by spraying with a pressure nozzle.

✓ Sweep or vacuum floors daily, then clean them using a spray method or by mopping. Mark the area being cleaned with signs or safety cones to prevent an accident. Avoid creating dust or water splashes during food preparation times. Set aside a routine cleaning time after the main hours of food preparation. Spills should be cleaned immediately.

✓ Swab ceilings – instead of spraying them – to avoid soaking lights and ceiling fans. Clean light fixtures with a sponge or cloth. Establish a routine cleaning schedule based on the needs of the foodservice.

Maintain a Clean & Sanitary Service Line and Serving Stations:

Establish a routine daily cleaning schedule for the service lines and serving stations, as seen below.

✓ Assign an employee to set up and maintain each service line or serving station for each meal services.

✓ Clean and sanitize the hot and cold wells of the service line after every meal.

✓ Clean and sanitize dispensers, such as beverage dispensers or coffee machines after every use. Follow equipment cleaning guidelines.

- ✓ Clean up spills immediately.

Maintain Good Ventilation:

Good ventilation eliminates condensation and other airborne contaminants. It also does the following:

- ✓ Reduces the accumulation of dirt in the food preparation area;
- ✓ Reduces odors, gases, and fumes; and
- ✓ Reduces mold growth by reducing humidity.

To promote good ventilation, be sure to do the following:

- ✓ Use exhaust fans to remove odors and smoke.
- ✓ Use hoods over cooking areas and dishwashing equipment.
- ✓ Check exhaust fans and hoods regularly to make sure they are clean and operating properly.
- ✓ Clean hood filters routinely according to the instructions provided by the hood manufacturer.

Maintain Clean Employee Restrooms:

Employee as well as customer restrooms should be convenient, sanitary, and adequately stocked with the following:

- ✓ Warm water at 100 °F for hand washing.
- ✓ Liquid soap.
- ✓ Nail brush (Follow State and local public health department recommendations).
- ✓ Disposable paper towels and/or air blowers.
- ✓ Toilet paper.
- ✓ Covered trash container that opens with a foot pedal.
- ✓ Clean Restrooms Daily and Keep the Doors Closed. Remove Trash Daily.

Maintain Clean and Neat Trash Collection Areas:

- ✓ Garbage must be kept away from food preparation areas. It should not be allowed to accumulate anywhere except in designated garbage storage areas.
- ✓ Garbage containers must be leak-proof, waterproof, pest-proof, durable, and easy to clean and sanitize.
- ✓ Garbage containers should be cleaned and sanitized frequently and thoroughly, inside and out.
- ✓ Trash receptacles should be emptied often so garbage does not overflow from containers.

Cleaning & Sanitizing Smallware:

Smallware is a collective term used to include dishes, flatware, preparation and serving utensils, measuring devices, cooking pots and pans, and small equipment that can be moved to the three - compartment sink or dishwasher for cleaning and sanitizing.

Follow State Public Health Department Regulations on How to Clean and Sanitize Smallware.

Chemical Sanitizing:

Chemical Sanitizing can be accomplished by immersing an object in, or wiping it down with, a sanitizing solution and allowing the solution to remain in contact with the surface for a specified amount of time.

The three most common chemical sanitizers are the following:

✓ **Chlorine** – This sanitizer is the most commonly used and is the cheapest. It is effective in hard water, but is inactivated by hot water above 120 °F. Chlorine bleach solutions must be tested regularly and changed as necessary to ensure that the solution is working to sanitize. Using too much chlorine in a solution can pit stainless steel and aluminum surfaces, while using too little will not sanitize the surface.

✓ **Iodine** – Iodine is more expensive and less effective than chlorine. However, an iodine sanitizing solution is not as quickly inactivated by food particles as a chlorine solution.

✓ **Quaternary ammonium compounds (Quats)** – The sanitizer is not as quickly inactivated by food particles as a chlorine solution, is noncorrosive to metal surfaces, and nonirritating to skin. It

Heat Sanitizing:

Heat Sanitation involves exposing equipment to high heat for an adequate length of time. This may be done manually by immersing equipment into water maintained at a temperature of 171° F to 195° F for at least 30 seconds.

In a dishwashing machine, a good rule of thumb is to wash at 150° F and rinse at 180° F. But remember, temperature may vary depending on the type of machine used and requirements of the State and local public health department.

Thermometers and heat-sensitive tapes and labels are available for determining whether adequate sanitation temperatures have been achieved.

Manually Sanitize Smallware in a Three-Compartment Sink:

To properly clean and sanitize smallware, the kitchen must have a sink with at least three separate compartments for manually cleaning, rinsing, and sanitizing, or a mechanical dishwasher that functions properly.

There should be a separate area for scraping and rinsing food and debris into a garbage container or disposal before washing and a separate drain board for clean and soiled items.

✓ **Step One:** Clean and sanitize sinks that will be used for washing and sanitizing smallware.

✓ **Step Two:** Scrape and rinse food into garbage container or disposal. Pre-soak items, such as flatware, as necessary. Then:

1. **In the first sink,** immerse and wash the smallware in Spectrum #1 (a dish detergent solution) at 110° F or the temperature specified on the cleaning agent manufacturer's label instructions. Use a brush or a cloth to loosen and remove any remaining visible food particles.
2. **In the second sink,** rinse using clear, clean hot water (110° F) to remove all traces of food, debris, and Spectrum #1.
3. **In the third sink,** sanitize, using one of the following options:

Chemical: Immerse the clean items in a Spectrum #2 (a chemical sanitizing solution) at the appropriate temperature for the correct amount of time. Be sure all surfaces of the clean items are covered with hot water or Spectrum #2 solution. Check the concentration of Spectrum #2 (the chemical sanitizer) at regular intervals using a test kit.

Be aware that hot water inactivates some chemical sanitizers, so read and correctly follow the manufacturer's directions for using the chemical. Or,

Heat: Immerse or spray rinse clean items in hot water at 171° F to 195° F for at least 30 seconds. Some State public health department codes require the temperature to be at 180° F.

✓ **Step Three:** Air dry all items on a drain board. Wiping can re-contaminate equipment and can remove the sanitizing solution from the surfaces before it has finished working.

✓ **Step Four:** Store. Make certain all smallware is dry in order to avoid retaining moisture that fosters bacterial growth.

Sanitize Smallware in a Mechanical Dishwasher:

When sanitizing smallware (dishes, trays, flatware, glasses) in a dishwasher, follow the manufacturer's procedures. Check the temperature of the water in the wash and rinse cycle.

- ✓ Wash at 150 °F
- ✓ Rinse at 180 °F

The temperature may vary depending on the type of dishwashing machine used and requirements of the State and local public health department.

Although dishwashers have temperature gauges for each compartment, it is useful to confirm that the gauge is accurate using another type of thermometer. There are two types of thermometers that can be used to confirm the accuracy of dishwasher thermometer gauges.

✓ **Waterproof maximum/minimum-registering thermometer:** This type of thermometer is placed in a dish rack to go through the dishwasher cycle with soiled trays and flatware. It is set to register the highest temperature of the cycle to confirm that the required temperature is reached in a sanitizing rinse cycle.

✓ **Self-adhering temperature-sensitive label:** This type of sensor attaches to the surface of a clean dish/tray and changes color to record the dishware surface temperature during dishwashing. Labels are available for various temperatures.

For example, to determine whether the temperature in the final sanitizing rinse of a dishwasher reaches 180° F, a single temperature 180° F label could be attached to a clean tray to go through the cycle. When the temperature has been reached, the label changes color. The label can be removed from the tray at the end of the dishwasher cycle and placed in a log to document temperature.

How Should Large Equipment be Cleaned and Sanitized?

To keep large or in-place equipment free of harmful levels of bacteria or other contaminants, it is necessary to clean and sanitize all surfaces that will come into contact with food. This is especially important after any possible contamination such as slicing a deli meat on a slicer or mixing a meat salad in a mixer.

Wash, rinse, and sanitize tables, stoves, sinks, slicers, choppers, mixers, and large cooking utensils after each use. This rule also applies to equipment used to clean other food contact surfaces.

Scrub surfaces, such as cutting boards, with a detergent solution and a stiff-bristled nylon brush. Then rinse in clear, clean water, and sanitize solution after every use. For the use and care of wooden cutting boards, surfaces, or utensils, follow State and local public health department recommendations. Synthetic cutting boards can be sanitized in a three-compartment sink or in a dishwasher, depending on their size. Follow State and local public health department recommendations.

Use the Chemical Method to Sanitize Equipment:

- ✓ **Step One:** Unplug electrically powered equipment, such as meat slicers and mixers.
- ✓ **Step Two:** Remove loose food particles and scraps.
- ✓ **Step Three:** Wash, rinse, and sanitize any removable parts using the manual immersion method.
- ✓ **Step Four:** Wash the remaining food-contact surfaces and rinse with clean water. Wipe down with a chemical sanitizing solution.
- ✓ **Step Five:** Clean surfaces that do not come in contact with food using a clean wiping cloth. Allow all parts to air dry before reassembling. Clean the wiping cloth before and during use by rinsing it in a sanitizing solution.
- ✓ **Step Six:** Re-sanitize the external food-contact surfaces of the parts that were handled when the equipment was reassembled.

Maintain an Effective Pest Control Program:

Prevention is critical in pest control, and following these steps can be crucial.

- ✓ Have an ongoing pest prevention program and regular pest control by a licensed pest control operator. This is best practice for every institutional foodservice operation.

✓ Keep pests out by doing the following:

- Fill openings or cracks in walls and floors with putty, plastic wood, or a similar product.
- Fill openings around pipes or equipment fittings.
- Screen all windows, doors, and outer openings. Keep them in good repair.
- Use self-closing doors that open outward.
- Inspect food supplies before storing or using them.
- Keep food in labeled containers approved for food storage. They should have tight-fitting lids.
- Do not store food or containers directly on the floor.
- Remove and destroy any food that is infested.
- Maintain proper temperatures in storage areas.
- Clean grease traps regularly to prevent a grease build-up that could cause a drain blockage. Drain blockage could lead to overflow which causes an un-pleasant odor, contamination, and attracts pests.
- Install an air door at food service entrances to prevent bugs from flying in.

What Pests are Seen Most Often in Foodservice Facilities?

Cockroaches: Cockroaches live and breed in holes, damp places, behind boxes, in seams of bags, and in folds of paper. They like any place that is dark, warm, moist, and hard to clean.

Cockroaches' hairy legs are full of debris and disease-causing organisms such as bacteria, fungi, parasite eggs, and viruses. One female cockroach produces millions of offspring in her lifetime.

Since cockroaches generally search for food at night, seeing one in the daytime is a sign of a major infestation. Other signs of infestation include:

- ✓ A strong, oily odor,
- ✓ Feces that look like large grains of pepper, and
- ✓ Brown, dark brown, dark red, or black capsule-shaped egg cases.

Flies: Flies feed on human and animal wastes and garbage and can transport a wide range of foodborne illnesses. They can enter a building through holes the size of a pinhead and can contaminate food with their mouth, footpads, hair, or feces. One female can produce thousands of offspring in one breeding season. Flies are attracted to places protected from the wind and to edges such as garbage can rims. They lay their eggs in warm decaying material protected from sunlight and are fond of human waste areas. In warm summer weather, flies can mature from larvae to adults in only 6 days.

Rodents: Rodents carry many disease-causing organisms and parasites. In fact, one fecal dropping from a rat can contain several million bacteria. When rodents leave feces, urine, and other filth on food products and around the facility, these organisms can be easily transmitted

Rodents are prolific breeders, producing as many as 50 offspring in a span of 1 year. They tend to hide during the day, but can be spotted by telltale signs. These signs include the following:

- ✓ Droppings.
- ✓ Gnawing.
- ✓ Tracks on dusty surfaces.
- ✓ Nesting materials.
- ✓ Holes in baseboards, wall board, and in other wood.

Who's Responsible?

Food safety is everybody's business. This chapter has presented guidelines for maintaining a safe environment for food preparation and service. To have a safe environment for food preparation and service, every person in foodservice must be committed to high standards of sanitation.

Manager's Responsibilities:

- ✓ Know requirements for maintaining a sanitary workplace.

- ✓ Use a daily, weekly, and monthly cleaning schedule to assign routine tasks.
- ✓ Establish standard procedures for cleaning specific areas of the foodservice facility such as the restroom, storeroom, refrigerators and freezers, preparation area, dining area, and service line.
- ✓ Teach and coach employees on how to maintain a sanitary workplace.
- ✓ Hold employees responsible for cleaning and sanitizing assigned areas using the procedures that have been established.
- ✓ Have routine inspections to ensure that sanitation standards are met. Use an inspection form developed specifically for the foodservice organization.
- ✓ Take pride in operating a clean and food-safe foodservice.

Employee's Responsibilities:

- ✓ Follow standard procedures for cleaning and sanitizing specific areas of the foodservice facility.
- ✓ Ask the manager for help as needed to know how to clean and sanitize the specifically assigned areas.
- ✓ Take pride in operating a clean and sanitary foodservice.

2.6 Developing a Program:

Components in Developing a Sanitation Program

The operation of a sanitation program requires a planned program which includes the following components:

- ✓ Training
- ✓ Cleaning procedures
- ✓ Sanitizing procedures
- ✓ Evaluation
- ✓ Supervision

Other factors to be included in a sanitation program are:

- ✓ Management involvement and support consisting of developing, implementing, and evaluating the sanitation program. It is also recommended you use your chemical supplier as another resource.
- ✓ Outline goals and objectives along with developing written procedures.

- ✓ Supervisory personnel must be competent and well trained.
- ✓ Training for sanitation staff must be viewed as an ongoing basis.
- ✓ The sanitation program must be evaluated on a continual basis to ensure its success in the facility.

In putting your program together, consideration should also be given to the following objectives when cleaning and sanitizing the facility:

- ✓ Control microbial activity
- ✓ Preserve the quality, safety, and freshness of the food products
- ✓ Maintain a clean work environment for the employees
- ✓ Maximize the life span of the equipment and facilities

One of the keys to success for the program is having an adequate water supply. Consideration needs to be given to the quality, quantity, temperature, and pressure which will contribute to the success of the program.

Lastly, it becomes equally important to incorporate the fundamentals of cleaning and sanitizing which include:

- ✓ Choosing the "right" product
- ✓ Selecting the "right" sanitizer
- ✓ Identify soils and using the "right" products and/or equipment to remove them.
- ✓ Consider the dynamics of cleaning: Dilution ratio; temperature; time and agitation.

2.7 Procedures, Chemicals and Equipment

Customized Training, Audit, and Inspection Step-by-Step Procedures.

Material Safety Data Sheets (MSDS)

Products and Equipment:

Benefits of the Three-Compartment Sink: The three (3) Compartment Sink is a chemical management system that provides low cost, consistent dilutions, and outstanding performance; plus is easy to use by employees. The system features an E-gap actuator with ¼ ounces per gallon preset dilutions that provide superior cleaning results. It will fill the sink quickly and to desired levels.

Products for the Three-Compartment Sink:

- ✓ Detergent Sanitizer
- ✓ Four Station 32-Ounce Spray Bottle Rack
- ✓ Sanitizer Test Kit Station
- ✓ SPECTRUM #1 – Dish Detergent
- ✓ SPECTRUM #2 – Sanitizer

Benefits of the High-Flow Cleaning System: Cleaning up is easy with HydroChem. It will clean, rinse, and sanitize at the touch of the lever mark "Detergent", "Rinses" or "Sanitizer", and the switching from one function to the next is just the twist of a handle. HydroChem not only simplifies cleaning and sanitation, it also delivers more effective cleaning. The automatically diluted solution is mixed more accurately and consistently than manually mixed solutions. Labor productivity increases as well.

Products for the High-Flow Cleaning System:

- ✓ SprayClean Dispenser
- ✓ Hose
- ✓ Spray Gun w/Quick Connect Nozzle
- ✓ Foam wand
- ✓ Brass Quick Coupler Set
- ✓ Mobile Sprayer
- ✓ SPECTRUM #2 – Sanitizer
- ✓ SPECTRUM #3 – High Foam Degreaser

Benefits of the Clean on the Go Dispenser: Clean-on-the-Go Steel Dispenser will be installed at the back of the store for dispensing the General Cleaning Products. It has a capacity of four different products available by simple dial and select the product or the bucket fill application. Easy, one handed filling or trigger spray bottles.

Products for the Clean on the Go Dispenser:

✓ **Disinfectant:** HdqC 2 is a neutral pH, quaternary disinfectant cleaner formulated to kill a broad spectrum of microorganisms on high gloss floors, walls and other hard, nonporous surfaces.

✓ **Glass Cleaner:** BioRenewables Glass Cleaner incorporates a state-of-the-art surfactant system offering excellent surfactant/wetting agents with emulsification abilities through the use of more readily biodegradable alternative surfactant chemistries. Clean on the Go BioRenewables Glass Cleaner may be used to clean and polish any hard surface not harmed by water.

✓ **Floor Cleaner:** Damp Mop is a No rinse floor cleaner concentrate reduces time and labor cost of daily maintenance of high gloss, metal-interlock floor finishes.

Quickly and effortlessly removes dirt and other surface soils in heavily trafficked areas.

Quick drying. Leaves no residue or haze to dull floor finish.

Pleasant lemon fragrance. Biodegradable. Phosphate free.

✓ **Restroom Cleaner:** NABC Concentrate is a broad range germicidal cleaner-disinfectant concentrate specifically designed to clean and disinfect toilet bowls, urinals and other hard, nonporous restroom surfaces. Nonacid. Non alkaline.

NABC Concentrate is non-caustic and non-abrasive. Use on nearly any hard, nonporous surface without fear of etching or pitting.

Towel & Tissue Dispensers:

Tissue Dispenser:

The Dubl-Serv® side-by-side tissue dispenser accommodates two rolls of patented OptiCore® tissue.

Designed for controlled-use dispensing and optimum savings in maintenance time and costs, the DublServ® side-by-side tissue is targeted to service any market's needs.

The enclosed, front-facing tissue is kept clean and hygienic, but easily accessible. A locking cover helps to prevent product pilferage.

Towel Dispenser:

Unique and elegant, the OptiServ Hybrid® is ideal for office buildings, colleges and universities, and high-traffic washrooms.

It offers the benefit of electronic touch-free dispensing as well as the convenience of mechanical dispensing when desired.

In either mode the OptiServ Hybrid® delivers a single pre-measured towel that discourages users to take only what is needed to reduce waste.

Products to Prevent Cross Contamination by Color Coding:

✓ Color Coded Supermarket Brush Kits:

Bakery Kit

Meat Kit

Deli Kit

Seafood Kit

Produce Kit

✓ Color Coded Cutting Boards

✓ Color Coded Mop Buckets

✓ Color Coded Waste Containers & Lids.

Soaps & Deodorizers:

- ✓ Restroom Auto Sanitizer
- ✓ Purell Soap Dispenser
- ✓ Gojo Soap Dispenser

Safety Equipment

- ✓ Chemical Resistant Gloves
- ✓ Safety Goggles
- ✓ Aprons
- ✓ Hairnets
- ✓ Beard cover



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