

# “BARE-BONES” OVERVIEW OF HACCP

By Dr. Dennis Buege

## HACCP - Hazard Analysis and Critical Control Points

The HACCP approach to food safety emphasizes the following actions in addressing potential hazards:

- **Prevention**
- **Control**
- **Documentation (Record Keeping)**

It is the primary goal of every food processor to prevent the development of bacterial, chemical or physical hazards in the food they produce. Prevention is best achieved by controlling the processing environment and procedures to keep food safe. Documentation, or keeping records of actions taken at key steps in the process assures that proper control measures were applied, and provides the evidence to prove it. Plant employees are already using many “prevention” and “control” steps to produce safe food. These practices are also the heart of food safety under HACCP.

HACCP is similar to Sanitation Standard Operating Procedures (SSOP’s) in that you:

- describe in writing what you are going to do to produce safe food
- carry out those actions during production
- record observations or measurements at key steps
- verify that you are operating your system as you said you would

HACCP is a plant’s program, developed and operated by the plant. Much of Inspection Service activities under HACCP will consist of verifying that you are following your HACCP program, and keeping records of what you have done.

Although the prevention and control approach of HACCP may also lead to improvements in quality and economic factors in food processing, HACCP itself only addresses food safety.

The HACCP system operates around **7 principles** in controlling hazards in food production:

1. Conduct a **Hazard Analysis** of the process.
2. Identify **Critical Control Points (CCP’s)** in the process.
3. Establish **Critical Limits** for preventative measure(s) at each CCP.
4. **Monitor** CCP’s to determine if they’re in control.
5. Establish **Corrective Actions** to be taken when critical limits aren’t met.
6. Establish an effective **Record Keeping System**.
7. Establish procedures to **Verify** that the HACCP system is working.

The following pages provide simple descriptions of steps in developing a HACCP program, and examples of some of these steps.

## ORGANIZING AND OPERATING YOUR HACCP SYSTEM

The steps often followed in moving into a HACCP system include:

1. **Decide who will lead the development of the HACCP program** (the HACCP team).  
What resources do you need to help develop the program? Learn as much as you can about HACCP from industry publications, training programs, other processors, and inspection personnel. Bring employees into the process.
2. **Which HACCP plans need to be developed?** Products produced in a relatively similar manner can be combined into a single HACCP plan. What can be combined is determined by the product type, and how they are manufactured in your plant. The USDA has identified categories into which like products or procedures can be combined into a single HACCP plan. These include:
  - Slaughter - all species (beef, swine, poultry)
  - Raw - not ground (cuts of beef, pork)
  - Raw - ground (ground beef, fresh sausage)
  - Fully cooked - not shelf stable (wieners, ham, roast beef)
  - Heat treated - shelf stable (jerky, snack sticks)
  - Heat treated - not fully cooked (bacon)
3. **Determine the “prerequisite programs” that are needed to support your HACCP program.** Standard Operating Procedures (SOP’s) and Good Manufacturing Practices (GMP’s) describe in writing the important steps and practices you and your employees will take in producing safe food. SOP’s and GMP’s support HACCP and are an important part of the HACCP system. They are often described as “Prerequisite Programs for HACCP.” Effective SOP’s and GMP’s are preventive and controlling measures which can make potential hazards unlikely to occur. SOP’s and GMP’s must be written down (clearly and simply), and where appropriate records should be maintained to document their effectiveness.

SOP’s and GMP’s may be applied in the following areas to support the HACCP system:

- Sanitation ( SSOP’s )
  - Pre-operational Sanitation - cleaning and sanitizing
  - Operational sanitation- personal hygiene and food handling practices.
- Receiving of meat and non-meat ingredients.
- Controlling temperatures in coolers, freezers and processing areas.
- Storage of meat and non-meat ingredients (including temperature control).
- Building and equipment maintenance.
- Weighing of restricted ingredients (such as nitrite).
- Handling and packaging of ready-to-eat products (separation of raw and cooked).

Several examples of SOP’s are provided on the following pages.

## **Receiving and Storage Standard Operating Procedures XYZ Company**

### Meat

10. Plant will only accept product from an approved source.
11. All containers are inspected for visible contamination, or damage to package that may allow contamination.
  - Reject any contaminated/damaged product and return to supplier.
3. Check temperature of incoming meat products (2 boxes/load)
  - Record temperatures on incoming meat invoices.
  - Reject meat products that are more than 50°F or evaluate product and cool rapidly.
4. Product is to be placed in cooler or freezer immediately on racks approved for specific products.
5. All invoices are checked, initialed and kept on file for review by meat inspection personnel.

### Non-Meat Ingredients

1. Only accept products from approved sources. Letters of guarantee kept on file by plant.
2. Date containers upon arrival and check for damage or contamination.
3. Reject containers that are not acceptable and return to suppliers.
4. Store all meat additives in approved areas.
5. Document receiving by initialing and filing invoices in plant's file.

### Packaging Materials, Cleaning Supplies etc.

1. Accept only products from approved sources.
  - A. Letters of approval or USDA codes kept on file.
  - B. Invoices initialed and kept on file for review.
2. Inspect all products for condition and integrity. Reject any damaged goods and return to supplier.
3. Date containers or materials upon arrival.
4. Store in approved areas and rotate stocks for freshness.
5. Store all cleaning chemicals separate from packaging materials, meat and other food ingredients. Inspect storage areas weekly and document.

### S.O.P. for Monitoring Cooler and Freezer Temperatures

1. A thermometer shall be placed on an inner wall at eye level in each cooler and freezer
2. Thermometers shall be calibrated once each month by comparing with another previously calibrated thermometer.
3. Temperature shall be checked and recorded Monday thru Saturday on a daily basis.
4. Fresh kill cooler thermometer shall also be checked and recorded at the end of the kill days.

One month/sheet. Keep on clipboard in handy spot.

| Sample Temperature Log Sheet |      |                                  |                             |                        |          |
|------------------------------|------|----------------------------------|-----------------------------|------------------------|----------|
| Date                         | Time | Temperature<br>Fresh Kill Cooler | Temperature<br>Aging Cooler | Temperature<br>Freezer | Initials |
|                              |      |                                  |                             |                        |          |
|                              |      |                                  |                             |                        |          |
|                              |      |                                  |                             |                        |          |
|                              |      |                                  |                             |                        |          |
|                              |      |                                  |                             |                        |          |
|                              |      |                                  |                             |                        |          |
|                              |      |                                  |                             |                        |          |
|                              |      |                                  |                             |                        |          |
|                              |      |                                  |                             |                        |          |
|                              |      |                                  |                             |                        |          |

### **S.O.P. for Vacuum Packing Ready-to-Eat Products**

1. Packaging shall only take place if the packaging area has been properly cleaned and sanitized (see SSOP for procedures).
2. Product shall remain in cooler until packaging to prevent sweating.
3. Personnel shall have a clean frock or apron and shall wash and sanitize hands prior to touching product to be packaged.
4. Operator shall wear rubber or plastic gloves.
5. No cross contamination of raw and cooked product shall occur.
6. Equipment used in raw processing areas shall not be permitted in finished product packaging areas unless properly cleaned and sanitized (see SSOP for procedures).
7. Product shall be refrigerated immediately after packaging.

### **S.O.P. for Product Code Dating and Batching for Identifying in Case a Recall is Needed**

- All products leaving the plant shall either have a production date or a Julian date on each package corresponding to a batch sheet for a specific lot.
- Batch sheets will be part of the recording and verification records for each category's HACCP plan.

4. **For each HACCP plan, perform the following “Pre-HACCP steps:”**
- Describe the product(s)
  - List the ingredients
  - Prepare a flow diagram of all steps in the process

Describe the Product (or Category of Product)

1. Process Category.
2. Product Name(s).
3. How It Will Be Used (further process, wholesale, retail etc.).
4. Type of Package (if several types used-- list all).
5. Length of Shelf Life (expected shelf life at what temperature).
6. Labeling Instructions that relate to safety, (“Keep Refrigerated,” safe handling statement, etc.).
7. Special Distribution Control (lot codes, distribution temperatures, etc.).

List all the Ingredients

List all meat or non-meat ingredients which are used in the product or group of products. This will call attention to ingredients which have special safety considerations, such as pork (trichinosis), poultry (higher cooking temperatures required), nitrite (anti-microbial when present, toxic if present in excess) and allergens (soy, dairy, nut proteins etc.).

There is flexibility in how you list the ingredients. Some plants just have two lists: meat and non-meat ingredients. Some plants use more categories, such as meat, spices/ flavorings, restricted ingredients, binders/ extenders, etc. Other plants attach copies of formulation sheets for individual products with the HACCP plan.

Prepare a Process Flow Diagram

Write down in flow chart form all steps carried out in producing the product, from receiving the meat and non-meat ingredients, to storing the finished product. Show where non-meat ingredients, casings, packaging, etc. enter the process. It is important to verify that the process flow diagram you write down accurately describes what actually takes place in your plant.

The following pages provide examples of:

- Product descriptions
- Ingredient lists
- Process flow diagrams

**Meat Science and Muscle Biology Laboratory  
University of Wisconsin-Madison**

**PRODUCT(S) DESCRIPTION**

**PRODUCT:** Fully Cooked - Not Shelf Stable II (Cooked Sausages)

**THE FOLLOWING QUESTIONS NEED TO BE ANSWERED WHEN DEVELOPING THE PRODUCT DESCRIPTION:**

1. **COMMON NAME?** Wieners\*  
Ring Bologna  
Summer Sausage  
Snack Stix  
Braunschweiger  
Polish Sausage  
Smoked Bratwurst
2. **HOW IS IT TO BE USED?** Ready-to-eat or reheated
3. **TYPE OF PACKAGE?** Paper wrap, polywrap and vacuum packaged
4. **LENGTH OF SHELF LIFE, AT WHAT TEMPERATURE?** 30 days at 40°F or less  
6 mos at 0°F or less
5. **WHERE WILL IT BE SOLD?** Usually not sold (manufactured for class demo purposes - given away). If sold, picked up by customer directly from laboratory.
6. **LABELING INSTRUCTIONS?** If sold, required label elements  
Keep Refrigerated  
Lot Code (date)
7. **IS SPECIAL DISTRIBUTION CONTROL NEEDED?** No - product distributed directly to customers from laboratory

**DATE:** \_\_\_\_\_

**APPROVED BY:** \_\_\_\_\_

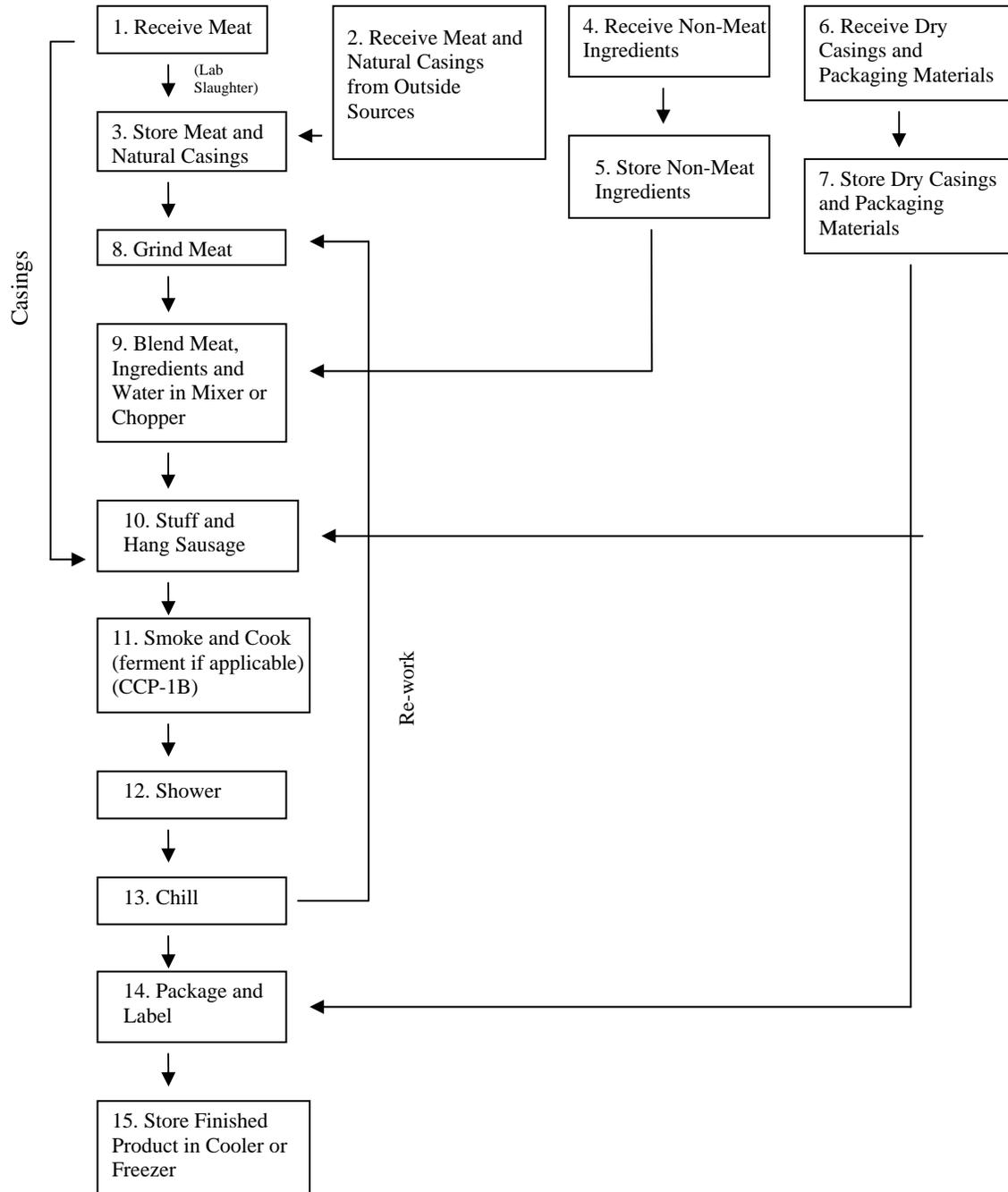
\*Formulation sheets for each individual product, listing individual ingredients, will be kept with this HACCP plan.

**PRODUCT INGREDIENTS**

**PRODUCT: Fully Cooked - Not Shelf Stable II (Cooked Sausages)**

| <b>MEAT AND MEAT BYPRODUCTS</b>                          | <b>NONMEAT FOOD INGREDIENTS</b>                                  | <b>BINDERS/EXTENDERS</b>  |
|--|--|---|
| Beef<br>Pork<br>Lamb<br>Chicken<br>Turkey                |  | Non-fat dry milk  |
| <b>SPICES/FLAVORINGS</b>                                 | <b>RESTRICTED INGREDIENTS</b>                                    | <b>PRESERVATIVES/ACIDIFIERS</b>                                     |
| Salt<br>Sugar<br>Dextrose<br>Spices<br>Flavorings<br>MSG | Sodium nitrite<br>Sodium erythorbate<br>Sodium tripoly phosphate | Lactic acid starter culture<br>Lactic citric acid<br>(encapsulated) |
| <b>OTHER</b>   |  |   |
| Water  |  |   |

## Fully Cooked – Not Shelf Stable II (Cooked Sausages)



5a. **Conduct a hazard analysis** - evaluate each step in the process for the potential presence of a food safety hazard. Determine if the hazard is significant (reasonably likely to occur). The hazard analysis should consider the likelihood of any of the following hazards occurring at each step in the process.

- biological hazards (bacteria)
- chemical hazards (pesticides, cleaning compounds, allergens)
- physical hazards (wood, metal, glass)

5b. **Determine “preventive measures” to address any potential hazards**

Note: Steps taken as part of the Sanitation Standard Operating Procedures (SSOPs), other Standard Operating Procedures (SOPs) and Good Manufacturing Practices (GMPs) can make many hazards unlikely to occur. Below are some possible preventive measures.

1. Check product temperature and condition at receiving.
2. Check broken boxes at receiving for possible biological (B), chemical (C) or physical (P) contamination.
3. Monitor storage coolers and freezers to maintain proper temperature control.
4. Store ingredients properly to prevent B, C or P contamination. Maintain adequate separation of product ingredients and non-food chemicals (cleaning supplies, pesticides, etc.)
5. Have letters of guarantee on hand for non-meat ingredients and packaging materials which contact the products (update annually).
6. Monitor weighing of restricted ingredients (such as sodium nitrite).
7. Operate SSOPs to provide properly cleaned and sanitized facilities and equipment. Train employees in safe food handling practices.
8. Cook product to proper temperature/time endpoints to insure adequate destruction of pathogens.
9. Properly chill cooked products to prevent growth of surviving heat resistant spores.
10. Maintain effective separation of raw and cooked products (including equipment/clothing used in raw and cooked areas).
11. Provide proper labels on products (“Safe Handling” statements for fresh products, ingredient statements which point out if allergens are present, etc.).
12. Train employees in sanitary dressing procedures for animal slaughter.

6. **Determine which steps in the process will be a Critical Control Points (CCP’s)** - - a CCP is a point, step or procedure in a process, at which control can be applied and where significant food safety hazards can be prevented, eliminated and or reduced to an acceptable level.

If a significant food safety hazard is identified at a step, it must be controlled in one of three ways:

- A critical control point is instituted at that step.
- A critical control point at a later step is identified to control the hazard.
- The significant hazard is addressed by the sanitation standard operating procedures (SSOPs).

Examples of steps which could be possible CCPs include:

- Receiving
- Storage of refrigerated products
- Processing of raw product (product temperature)
- Addition of ingredients
- Cooking
- Fermentation
- Chilling cooked products
- Certain slaughter/dressing procedure

The following pages present an example of a hazard analysis for cooked sausage.

7. **Establish a Critical Limit(s) at each CCP.** This is the target level or limit for a measurement or observation which must be met at the CCP to insure safety or reduce risk. A critical limit might be:

- receiving temperature and appearance of meat and poultry.
- a cooler freezer or processing room temperature.
- a product temperature during processing (raw products).
- monitor weighing a sensitive ingredient (nitrite).
- an internal temperature of a cooked product.
- pH of a product.
- temperature drop in cooked product during chilling
- proper operation of a metal detector.
- an observation of zero fecal contamination on carcasses after slaughter.

8. **Establish monitoring procedures** to determine if the critical limit is being met in the process. They are planned measurements or observations to assess if CCPs are under control. Monitoring provides a record of what was done. Describe the monitoring procedure in terms of:

- who will monitor.
- what will be monitored.
- when will it be monitored.
- how will it be monitored

Measurements or observations should be recorded at the time they are made, and must be accompanied by person's initials, date and time.

9. **Plan for Corrective Actions** to be taken if the Critical Limit is not met. This is planning in advance what to do if a deviation from the critical limit occurs, to bring the process back into control. Corrective actions taken must be written down, and initialed and dated.

Documentation of corrective action must address the following four points:

- cause of deviation and how was it eliminated
- corrective action taken to insure CCP is under control
- measures taken to prevent recurrence of deviation
- disposition of product (assurance that no adulterated product will enter commerce)

**Hazard Identification/Preventive Measures**

**Cooked Sausages (Fully Cooked - Not**

**Shelf Stable I)**

| Process Step   | Potential Hazard |  | What Control Measures Can Be Applied To Prevent The Hazard                                   | Is Hazard Significant And Reasonably, Likely To Occur? |     | CCP # |
|--|------------------|--|--|--|-----|-------|
| 1. Receive meat (from lab slaughter)                     | B                | Pathogens* in meat                       | Controlled at CCP-1B (step 11).  | B  | Yes |       |
|  | P                | None                                     | No history of problems.  | P  | No  |       |
|  | C                | None                                     | No history of problems.  | C  | No  |       |
| 2. Receive meat and natural casings from outside sources | B                | Pathogens present                        | Receiving program checks meat for temperature and condition; controlled at CCP-1B (step 11). | B  | Yes |       |
|  | P                | Foreign material                         | Letter of guarantee (casings); meat visually checked during processing.                      | P  | No  |       |
|  | C                | Harmful chemicals                        | Letter of guarantee (casings).   | C  | No  |       |
| 3. Store meat and natural casings                        | B                | Growth of pathogens                      | Cooler and freezer temperatures monitored regularly. Controlled at CCP-1B (step 11).         | B  | Yes |       |
|  | P                | None                                     | Proper storage procedures prevent contamination.   | P  | No  |       |
|  | C                | None                                     | Proper storage procedures prevent contamination.   | C  | No  |       |
| 4. Receive non-meat ingredients                          | B                | Pathogens may be present in spices       | Letters of guarantee from suppliers. Controlled at CCP-1B (step 11).                         | B  | No  |       |
|  | P                | Foreign material in ingredients          | Letters of guarantee from supplier.  | P  | No  |       |
|  | C                | Harmful chemicals present in ingredients | Letters of guarantee from supplier.  | C  | No  |       |

“Cooked.Sausage”,

HACCP #1, 12-3-03

\*Pathogens of concern include *Salmonella*, *E. coli* O157:H7, and *Campylobacter*.

Hazards: B=Biological, C=Chemical, P=Physical

**Hazard Identification/Preventive Measures**

**Cooked Sausages (Fully Cooked - Not Shelf Stable I)**

| Process Step                                   | Potential Hazard |   | What Control Measures Can Be Applied To Prevent The Hazard  | Is Hazard Significant And Reasonably, Likely To Occur? |     | CCP # |
|--|------------------|---|---|--|-----|-------|
|  |                  |   |   |  |     |       |
| 5. Store non-meat ingredients                  | B                | None  | Proper storage conditions prevent contamination.  | B  | No  |       |
|  | P                | None  | Proper storage conditions prevent contamination.  | P  | No  |       |
|  | C                | None  | Proper storage conditions prevent contamination.  | C  | No  |       |
| 6. Receive dry casings and packaging materials | B                | None  | No history of problems.   | B  | No  |       |
|  | P                | None  | No history of problems.   | P  | No  |       |
|  | C                | Harmful chemicals in casings or vacuum bags.  | Letters of guarantee from suppliers.  | C  | No  |       |
| 7. Store dry casings and packaging materials   | B                | None  | Proper storage conditions prevent contamination - SSOP.   | B  | No  |       |
|  | P                | None  | Proper storage conditions prevent contamination - SSOP.   | P  | No  |       |
|  | C                | None  | Proper storage conditions prevent contamination - SSOP.   | C  | No  |       |
| 8. Grind meat                                  | B                | Pathogens in meat, and cross contamination of pathogens from environment and people | SSOP directs effective pre-op. and operational sanitation; controlled at CCP-1B (cooking).  | B  | Yes |       |
|  | P                | Bone, metal or employee personal items  | Visual inspection for foreign materials as meat is ground. SSOP outlines employee dress code to prevent personal items from getting into product. | P  | No  |       |
|  | C                | None  | SSOP, no history of problems.   | C  | No  |       |

Hazards: B=Biological, C=Chemical, P=Physical

**Hazard Identification/Preventive Measures**

**Cooked Sausages (Fully Cooked - Not Shelf Stable I)**

| Process Step                                   | Potential Hazard |   | What Control Measures Can Be Applied To Prevent The Hazard                                 | Is Hazard Significant And Reasonably, Likely To Occur? |     | CCP #  |
|--|------------------|---|--|--|-----|--------|
| 9. Mixing meat, non-meat ingredients and water | B                | Pathogens in meat, and cross contamination of pathogens from environment and people | SSOP directs effective pre-op. and operational sanitation. Controlled at CCP-1B (cooking). | B  | Yes |        |
|  | P                | None  | No history of problems.  | P  | No  |        |
|  | C                | None  | No history of problems - SSOP.   | C  | No  |        |
| 10. Stuff and hang sausages                    | B                | Pathogens in meat, and cross contamination of pathogens from environment and people | SSOP directs effective pre-op. and operational sanitation. Controlled at CCP-1B (cooking). | B  | Yes |        |
|  | P                | None  | No history of problems.  | P  | No  |        |
|  | C                | None  | No history of problems.  | C  | No  |        |
| 11. Smoke and cook                             | B                | Survival of pathogens   | Cook to appropriate temperature/time to destroy pathogens.                                 | B  | Yes | CCP-1B |
|  | P                | None  | No history of problems.  | P  | No  |        |
|  | C                | None  | No history of problems - SSOP.   | C  | No  |        |
| 12. Cold shower                                | B                | None  | No history of problems (potable water).  | B  | No  |        |
|  | P                | None  | No history of problems.  | P  | No  |        |
|  | C                | None  | No history of problems (potable water).  | C  | No  |        |

Hazards: B=Biological, C=Chemical, P=Physical

**Hazard Identification/Preventive Measures**

**Cooked Sausages (Fully Cooked - Not**

**Shelf Stable I)**

| Process Step                                    | Potential Hazard   | What Control Measures Can Be Applied To Prevent The Hazard   | Is Hazard Significant And Reasonably, Likely To Occur? | CCP #  |
|---|--|--|--|--------|
| 13. Chill                                       | B Growth of spore-forming pathogens ( <i>clostridium perfringens</i> ) due to improper cooling                   | Product is placed into cooler within 60 minutes after cold shower. Product temperature is monitored to insure compliance with stabilization guidelines.    | B Yes  | CCP-2B |
|   | B Cross contamination with pathogens ( <i>Listeria monocytogenes</i> )   | Safe food handling practiced by employees. Strict separation of raw and cooked products, equipment, and clothing (SSOP).                                   | B No   |        |
|   | P None   | No history of problems.  | P No   |        |
|   | C None   | No history of problems.  | C No   |        |
| 14. Package and label                           | B Cross contamination of pathogens (including <i>Listeria monocytogenes</i> ) to cooked product during packaging | Proper cleaning and sanitizing per SSOP. Safe food handling practiced by employees. Strict separation of raw and cooked products, equipment, and clothing. | B No   |        |
|   | P None   | No history of problems.  | P  |        |
|   | C Allergens in product   | Proper label is placed on product.   | C  |        |
| 15. Store finished product in cooler or freezer | B None   | Proper storage procedures prevent contamination. Temperature control in coolers/freezers.  | B No   |        |
|   | P None   | Proper storage conditions prevent contamination.   | P No   |        |
|   | C None   | Proper storage conditions prevent contamination.   | C No   |        |

Hazards: B=Biological, C=Chemical, P=Physical

10. **Establish an effective Record Keeping System.** Daily records to be kept include:
  - measurements or observations at each Critical Control Point (initialed and dated)
  - any corrective action taken (initialed and dated)
  - verification activities carried out (initialed and dated)
  - pre-shipment or pre-use review-- this a review of the CCP records before the product is shipped or used, to again verify that each CCP has been properly monitored, the critical limit has been achieved, and the result is documented. The pre-shipment review requires a full signature and date.
  - Measurements or observations associated with SOPs/GMPs which, when properly operating, make hazards unlikely to occur.
  
11. **Establish Procedures to Verify that the HACCP System is operating as intended.** Some examples of verification procedures include:
  - checking over the CCP monitoring records to insure that all measurements or observations were made as intended.
  - calibrating thermometers and other instruments to insure that they are making accurate measurements.
  - watching an employee take a measurement or make an observation, to insure that it is carried out as described in the HACCP plan.
  
12. After the HACCP plan is developed, it is operated by recording the required measurements or observations at critical control points, and at SOPs and GMPs as needed, to document control of the system.

HACCP plans can be modified whenever necessary to improve safety, or make their operation more effective or convenient. The HACCP plan should be signed by a trained individual after it is initially developed, and whenever changes are made to it.

The following pages present a summary HACCP plan, showing the critical limit, monitoring procedure, corrective actions, verification procedures and proposed record keeping for the designated CCP (Critical Control Point). A possible recording log for the CCP is included, as well as a corrective action record.

## HACCP Plan for Fully Cooked - Not Shelf Stable II (Cooked Sausages)

### Meat Science and Muscle Biology Laboratory

- Processing Step:** No. 11 - - Cooking/Smoking
- CCP #:** CCP-1B
- CCP Description:** Cooking of product to destroy pathogens
- Critical Limits:** Internal product temperature of at least 150°F for 72 seconds (Appendix A)
- Monitoring:** A calibrated smokehouse probe will be placed in the largest product (if there is variation in size), to permanently record the internal temperature of the product during cooking. A second calibrated probe controls the operation of the house, and will shut down the house when the desired internal temperature is met (this probe will likewise be placed in one of the largest sized products). The smokehouse operator will record the internal temperature achieved by the recording thermometer. As a verification procedure, at least quarterly the smokehouse operator will likewise take the internal temperature of the largest product with a calibrated hand-held thermometer, at the conclusion of cooking.
- Corrective Action:** If the product internal temperature fails to reach at least 150°F for 72 seconds the cooking record will be examined to determine if any other safe combination of time and temperature from Appendix A has been met. If a safe combination has not been met/achieved, cooking will continue (or restart if product has been chilled) until the critical limits have been met. The corrective action response will comply with all elements of 417.3.
- Records:** Smokehouse operator will record product internal temperature on the cooking log at the conclusion of cooking, and will initial and date the entry.
- Verification:** Meat Lab Manager or designee will check the cooking log weekly to ensure that the temperatures for each batch have been taken and recorded, and are acceptable. Thermometers will be calibrated monthly. At least annually one sample of packaged product will be tested for the presence of *Salmonella*, *E. coli*0157:H7 and *Listeria monocytogenes*. The Meat Lab Manager or his designee will observe monitoring of cooked product temperature at least semi-annually.

Date: \_\_\_\_\_ Approved By: \_\_\_\_\_

**HACCP Plan for Fully Cooked - Not Shelf Stable II (Cooked Sausages)**

**Meat Science and Muscle Biology Laboratory**

**Processing Step:** No. 13 - Chilling

**CCP#:** CCP - 2B

**CCP Description:** Chilling of products to prevent growth of heat-resistant spores

**Critical Limits:** From 130°F to 80°F in less than 5 hours and from 80°F to 45°F in less than 10 hours (Appendix B)

**Monitoring:** The Meat Lab Manager or designee will monitor product temperatures with a calibrated thermometer or continuous recording instrument at regular intervals during chilling to determine compliance with the critical limit.

**Corrective Action:** If it is determined that product is chilling too slowly to meet the critical limits, it will be moved to a freezer to achieve cooling critical limits. A determination will be made as to why an adequate chilling rate was not achieved, and adjustments made to the cooling process. If product fails to meet the critical limits, the extent of the deviation and severity of the risk will be considered, with product either being released to commerce, recooked or destroyed. The corrective action response will comply with all elements of 417.3

**Records:** The person responsible for monitoring will record product, date, time and product temperatures on a cooling log.

**Verification:** Meat Lab Manager or designee will check the cooling log weekly to ensure that the temperatures for each batch have been taken and recorded, and are acceptable. Thermometers will be calibrated monthly. At least semi-annually the plant manager or his designee will observe monitoring of cooling times/temperatures.

Date: \_\_\_\_\_

Approved By: \_\_\_\_\_





# Corrective Action Record

Date \_\_\_\_\_ Time \_\_\_\_\_

Product(s): \_\_\_\_\_

Lot ID: \_\_\_\_\_

Deviation: \_\_\_\_\_

Amount of Product: \_\_\_\_\_

**1. Cause of deviation and how was it eliminated:**

**2. Corrective action taken to insure CCP is under control:**

**3. Measures taken to prevent recurrence of deviation:**

**4. Disposition of product (no adulterated product will enter commerce):**

**Individuals Involved (signatures):**

\_\_\_\_\_/date\_\_\_\_\_

\_\_\_\_\_/date\_\_\_\_\_