

HACCP PRINCIPLES

&

IMPLEMENTATION

Bill Cornelius
The Ohio State University
Adjunct Professor
Process Authority

HACCP

- HA Food Safety **Hazard**

Any property that may cause a food to be unsafe
For human consumption.

Categorized into:

1. Biological
2. Chemical
3. Physical

- CCP **Critical Control Point**

A point, step, or procedure in a food process at
which control can be applied and as a result,
a food safety hazard can be prevented, eliminated,
or reduced to acceptable levels.

- **Documentation**

If it isn't written down it never happen.

HACCP

- ◆ Americans have become increasingly concerned about food safety. Incidences of foodborne illness have received more attention as consumers have become more aware of new pathogens that threaten all of us.
- ◆ HACCP was developed to specifically focus on **“food safety”**.
- ◆ A major focus of the new HACCP system is "Farm to Table". In short, everyone is responsible for safe food products.
- ◆ A major factor in the implementation of HACCP is a shift toward reliance on systems rather than individual defect. It is a preventative maintenance plan rather than a “fix it when it breaks” attitude.
- ◆ HACCP is a concept as well as well as a method of operation. When it comes to pathogens, sight, smell and taste just doesn't get it done.
- ◆ Must have control over the process, the raw materials, the environment, and the people, beginning as early in the food production system as possible.
- ◆ A very important component of the HACCP system is the change between past and future regulatory oversight.
- ◆ **Finally, since we all want to provide a safe food of acceptable quality to its public, it should be everyone from the Farm to the Market to design and implement the means by which such responsibility can be met to the satisfaction of regulatory agencies, or more important, the consuming public.**

HACCP
HAZARD ANALYSIS
&
CRITICAL CONTROL POINTS

The seven principles of HACCP are:

1. Conduct a Hazard Analysis
2. Identify Critical Control Points
3. Establish Critical Limits for Each Critical Control Point
4. Establish Monitoring Procedures
5. Establish Corrective Actions
6. Establish Verification Procedures
7. Establish Recordkeeping Procedures

Developing a HACCP Plan

The Hazard Analysis and Critical Control Points (HACCP) System is a logical, scientific approach to controlling safety problems in food production. When an establishment adopts HACCP, it puts controls in place at each point in the production system where safety problems could occur from biological, chemical, or physical hazards. To start a HACCP system, a company must first write a HACCP plan. It is the intent of this manual to explain how to write a HACCP plan in five preparatory steps and then applying the seven HACCP principles.

The five preliminary HACCP steps are:

1. Bring together the HACCP resources/assemble the HACCP team.
2. Describe the product and its method of distribution.
3. Develop a complete list of ingredients and raw materials used in the product.
4. Develop a process flow diagram.
5. Prerequisite Programs - often referred to as PPs

**PRODUCT DESCRIPTION
&
METHOD OF DISTRIBUTION**

PRODUCT:

1. COMMON NAME:

2. HOW IS IT USED:

3. PACKAGE TYPE:

4. SHELF LIFE LENGTH:

AT WHAT TEMPERATURE:

5. SOLD AT:

6. LABELING INSTRUCTIONS:

7. SPECIAL DISTRIBUTION CONTROL:

APPROVED BY: _____ DATE: _____

PRODUCT AND INGREDIENTS

PRODUCT: Product Name

PRIMARY PRODUCT INGREDIENT(S)

OTHER PRODUCT INGREDIENT(S)

APPROVED BY: _____ **DATE:** _____

Pre-HACCP Step 4 – Develop a Process Flow Diagram

The next step is to construct a process flow diagram that identifies all the steps used to prepare the product, from receiving through final shipment, that are directly under the control of the establishment. The diagram should not be so complex that it is difficult to follow and understand. The diagram must be complete from the beginning of the process to the end. The flow diagram may also include steps that occur before or after the processing occurs in the establishment.

The HACCP team should verify the accuracy of the process flow diagram. This is done by actually walking through the plant to make sure that the steps listed on the diagram describe what really occurs in producing the product.

A sample process flow diagram is included on the following page.

Remember, the purpose of this diagram is to find any places in the establishment at which hazards could occur. (As with all HACCP planning forms, the employee approving the flow diagram correct should sign and date the form for the records.)

Pre-HACCP Step 5 – Prerequisite Programs - often referred to as PPs

Meet the Regulatory Requirements for Sanitation (SSOPs) and current Good Manufacturing Practices (cGMPs)

Sanitation Standard Operating Procedures

Good sanitation is the most basic way to ensure that a safe product is produced. Maintaining good sanitation serves as an excellent foundation for building a HACCP plan. It also demonstrates that plant management has the commitment and resources to successfully implement the HACCP plan. Because it is so important, meeting the regulatory requirements for Sanitation Standard Operating Procedures (SSOPs) is a pre-HACCP requirement that must be carried out in all establishments. In addition to the SSOPs, other prerequisite programs for HACCP can be developed that are extremely useful, such as cGMPs covering operating procedures and equipment maintenance. A written plan describing how a recall will be handled, if one is necessary, is also a valuable prerequisite to developing a HACCP plan.

Pre-HACCP Step 5 is often referred to as Prerequisite Programs

They may be summarized into:

- ⌘ Premises
- ⌘ Receiving
- ⌘ Transportation & Storage
- ⌘ Personnel
- ⌘ Sanitation & Pest Control
- ⌘ Recall Programs

- ◆ Product and Packaging specifications
- ◆ Letters of guarantee
- ◆ Gras
- ◆ Calibrations of Critical Instruments
- ◆ Training

Now the seven principles are ready to be applied to produce a HACCP plan suited to the plant and its process.

PRINCIPLE 1

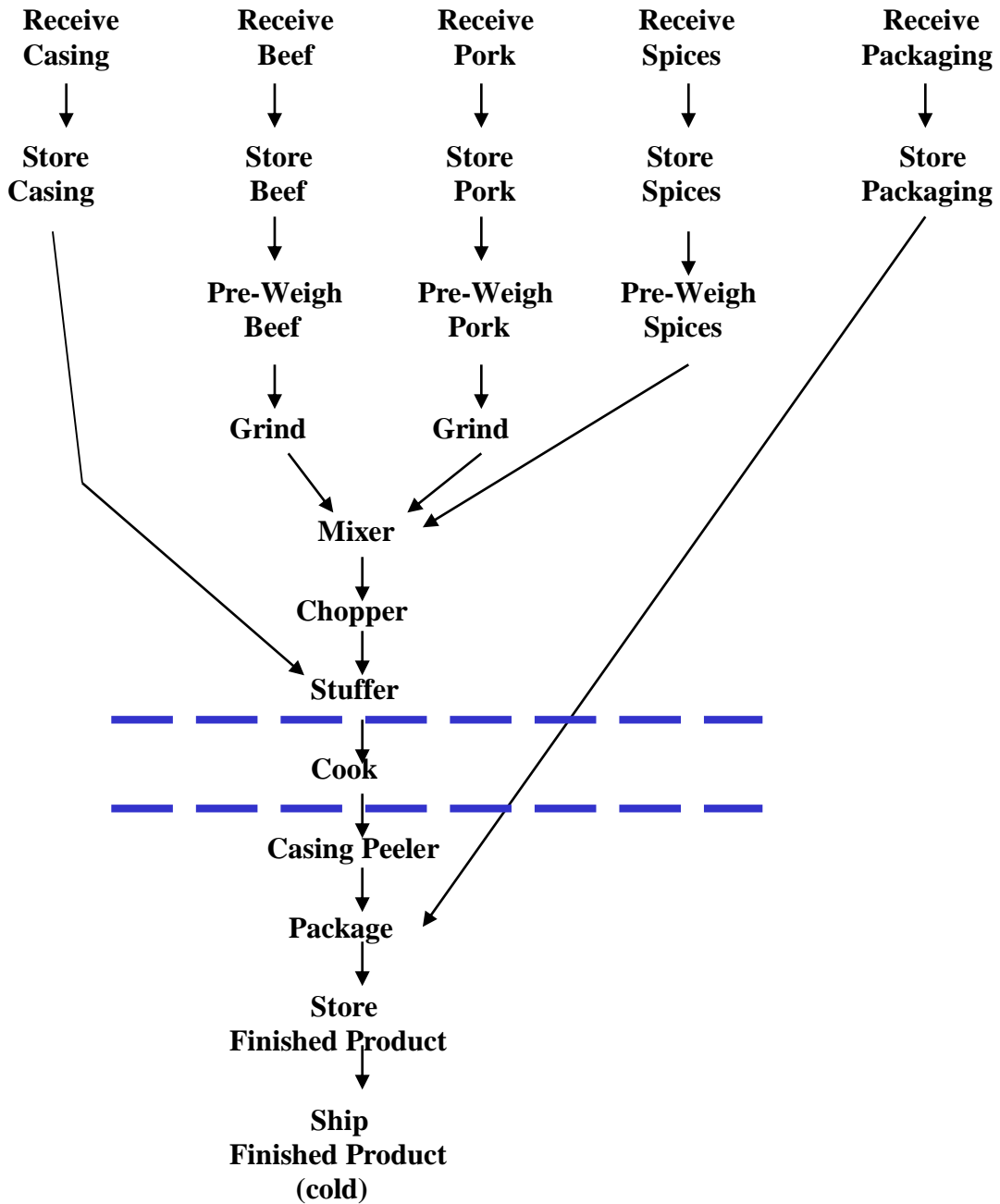
CONDUCT A HAZARD ANALYSIS

HACCP Principle No. 1 States:

***"Conduct a hazard analysis.
Prepare a list of steps in the process
where significant hazards occur and describe
the preventive measures."***

PROCESS FLOW DIAGRAM

Product: Fresh Sausage



APPROVED BY: _____ **Date:** _____

**The regulation defines a food safety hazard as
"any biological, chemical, or physical property
that may cause a food to be unsafe for human consumption."**

The hazard analysis shall include ONLY food safety hazards.

Step 1

Refer to the **Process Flow Diagram**

Step 2

Add each **Process Step** from the **Flow Diagram** onto the “**HAZARD IDENTIFICATION & CCP DETERMINATION**” form:

Step 3

For each **Process Step** and each **Potential Hazard** (Biological, Chemical and Physical) complete the “**HAZARD IDENTIFICATION & CCP DETERMINATION**” form for:

- a. Potential Hazards introduced, controlled or enhanced at this step;
- a. Does this potential hazard need to be addressed in the HACCP plan; and
- b. Why? (Justification for decision made in previous column)
- c. What measures can be applied to prevent, eliminate, or reduce the hazards being addressed in HACCP plan?

Hazard Analysis and CCPs

Product:

Ingredient /Process Step	Potential Hazards, Introduced, controlled, or enhanced at this step ¹	Does this potential hazard need to be addressed in HACCP plan?	Why? (Justification for decision made in previous column ²)	What measures can be applied to prevent, eliminate, or reduce the hazards being addressed in HACCP plan? ³	Is this step a critical control point (CCP)? ⁴
	B				
	C				
	P				
	B				
	C				
	P				
	B				
	C				
	P				
	B				
	C				
	P				
	B				
	C				
	P				

¹ Hazards are classified as: B – Biological C – Chemical P – Physical

² List justification for your decision based upon severity and likely occurrence of the hazard.

³ List control measures within your operation which occur at this or a later step.

⁴ Note CCP number and hazards controlled (e.g. CCP! (B-1) for biological hazard).

PRINCIPLE 2

IDENTIFY CRITICAL CONTROL POINTS

HACCP Principle No. 2 States:

"Identify the Critical Control Points (CCPs) in the process."

- ◆ A *Critical Control Point (CCP)* is defined as "a point, step, or procedure in a food process at which control can be applied and, as a result, a food safety hazard can be prevented, eliminated, or reduced to acceptable levels."
- ◆ For every significant hazard identified, there must be at least one corresponding CCP to control the hazard, although more than one hazard may be controlled at a CCP.

Step 4

For each **Process Step** and each **Potential Hazard** (Biological, Chemical and Physical) complete the "**HAZARD IDENTIFICATION & CCP DETERMINATION**" form for:

> Is this step a critical control point (CCP)?

PRINCIPLE 3

ESTABLISH CRITICAL LIMITS

HACCP Principle No. 3 States:

***"Establish critical limits for preventive measures
associated with each identified CCP."***

The regulation defines *critical limit* as "the maximum or minimum value to which a physical, biological, or chemical hazard must be controlled at a critical control point to prevent, eliminate, or reduce to an acceptable level the occurrence of the identified food safety hazard."

Critical limits are expressed as numbers or specific parameters based on visual observation, such as:

- Temperature - 155 °F
- Time - 20 minutes

Note: the danger zone of 40 F to 140 F

Step 5

For each **Process Step** containing CCPs enter the Critical Limit in the **CRITICAL LIMITS, MONITORING AND CORRECTIVE ACTIONS** form

CRITICAL LIMITS, MONITORING AND CORRECTIVE ACTIONS

PRODUCT:

PROCESS STEP/ CCP	CRITICAL LIMITS	MONITORING PROCEDURES				CORRECTIVE ACTIONS
		WHAT	HOW	FREQUENCY	WHO	

APPROVED BY: _____ **DATE:** _____

PRINCIPLE 4

ESTABLISH MONITORING PROCEDURES

HACCP Principle No. 4 States:

"Establish CCP monitoring requirements.

*Establish procedures for using the
results of monitoring to adjust the process
and maintain control"*

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 will go much more smoothly if the management:

- Monitoring Frequency for *What, How, Frequency* and *Who*?
- Clearly identifies employee positions responsible for monitoring.
- Trains employees monitoring the CCPs in the testing procedures, the critical limits established, the methods of recording test results, and actions to be taken when critical limits are exceeded.
- Ensures that the employees understand the purpose and importance of monitoring.

Step 6

For each **Process Step** containing CCPs enter the Monitoring Procedures (What, How, Frequency and Who) in the **CRITICAL LIMITS, MONITORING AND CORRECTIVE ACTIONS** form

PRINCIPLE 5

ESTABLISH CORRECTIVE ACTIONS

HACCP Principle No. 5 States:

"Establish corrective action to be taken when monitoring indicates that there is a deviation from an established critical limit."

The regulation defines *corrective action* as "procedures to be followed when a deviation occurs."

A deviation is a failure to meet a critical limit.

HACCP is a preventive system to correct problems before they affect the safety of the food.

The corrective actions are to ensure:

- ◆ The cause of the deviation is identified and eliminated;**
- ◆ The CCP will be under control after the corrective action is taken;**
- ◆ Measures to prevent recurrence are established; and**
- ◆ No product that is injurious to health or otherwise adulterated as a result of the deviation is to be distributed for human consumption.**

Corrective Action forms may be created that address:

- 1. The cause of the deviation**
- 2. The corrective action is taken**
- 3. Measures to prevent recurrence**
- 4. The disposition of the product**

Step 7

For each Process Step containing CCPs enter the Corrective Actions in the CRITICAL LIMITS, MONITORING AND CORRECTIVE ACTIONS form_

PRINCIPLE 6

ESTABLISH VERIFICATION PROCEDURES

HACCP Principle No. 6 States:

***"Establish procedures to verify that the HACCP system
is working correctly."***

- ✓ **Simply stated, the HACCP team needs to verify that the HACCP system is working the way it is expected to work.**
- ✓ **By doing these verifications, the establishment will initially evaluate the operation of the HACCP system and then maintain an updated and effective HACCP system.**
- ✓ **Verification may be broken down into three categories:**
 - 1. Validation**
 - 2. Verification**
 - 3. Reassessment**

◆ **Validation - Test that the process with the Critical Limits eliminates the hazard.**

◆ **Verification - Assure that all required information is written down and documented.**

Do what you say and say what you do.

◆ **Reassessment -**

➤ **At least annually**

➤ **Potential new hazards**

➤ **Changes in the preparation, raw materials or raw ingredients, personnel, packaging the finished product or any other changes that could affect the hazard analysis.**

Step 8

List all the validations and verifications activities carried out in the **VERIFICATION AND RECORDKEEPING** form

FULLY COOKED HAM

Smoke House Floor

Date	Batch Number	Time Out of Smoke House	Finished Internal Temperature 148 ° F (155 ° F Target)	Initials	Time of Check	Corrective Actions

Reviewer's Signature: _____

Review Date: _____

VERIFICATION & RECORD KEEPING

PRODUCT:

PROCESS STEP /CCP	VERIFICATION ACTIVITIES	RECORDKEEPING PROCEDURES

APPROVED BY

PRINCIPLE 7

ESTABLISH RECORDKEEPING PROCEDURES

HACCP Principle No. 7 States:

***"Establish effective recordkeeping procedures
that document the HACCP system."***

Maintaining proper HACCP records is an essential part of the HACCP system. Good HACCP records (meaning they are accurate and complete) can be very helpful because:

- **Records serve as written documentation of the establishment's compliance with its HACCP plan.**
- **Records allow the retail facility to trace the history of an ingredient, in-process operations, or a finished product, should problems arise.**
- **Records help identify trends in a particular operation that could result in a deviation if now corrected.**
- **In the event of a product recall, HACCP records could help identify and narrow the scope of such a recall.**
- **Well-maintained records are good evidence in potential legal actions against an establishment.**
- **There may be new HACCP team members and the rationale for certain decisions is forgotten.**

Step 9

List all the Recordkeeping Procedures needed for the HACCP plan in the **VERIFICATION AND RECORDKEEPING** form

Step 10

Provide a summary table

HACCP PLAN SUMMARY

PRODUCT:

Include every Process Step and indicate those with their CCP numbers. But don't need to break each process into biological, chemical and physical

Process Step / CCP	Hazard	Critical Limit	Monitoring	Corrective Action	Verification	Record Keeping

APPROVED BY: _____ DATE: _____