EAGLE Certification Group
SERVICE • INTEGRITY • VALUE

Fundamentals of HACCP

Roger Roeth
Executive Technical Officer

2016

Why Is It Important?

Food Safety & HACCP

- Why is it important?
- Foodborne illness
- Allergies
- Food security issues
- Globalization of food
- Company liability
- Need to know the product is safe to eat

History of Food Safety

- 1906 – Upton Sinclair's book "The Jungle" drives the passage of the Meat Inspection Act
- 1939 – First Food Standards issued
- 1982 – FDA publishes the first Red Book
- 1990 – Nutrition Labeling & Education Act
- 1995 – "Mega Reg" issued in meat industry

History of HACCP

- NASA contracts with Pillsbury in late 1950's to manufacture foods for manned space flights
  - Could not afford to have sick astronauts
  - Goal was a process that would prevent occurrence of food safety hazards
  - Concept was named Hazard Analysis Critical Control Points (HACCP)
  - HACCP concept was presented to public in 1971 at the National Conference of Food Protection
  - HACCP recommended for all establishments under the 2003 FDA Food Code

Codex Alimentarius

- Has become the main global reference point for consumers, food producers and processors
- Goal is to formulate and harmonize food standards and ensure their global implementation
- Internationally recognized standards for commodities, hygienic practices, food additives, contaminants, etc.
- Internationally recognized standard for HACCP
  - Most Food Safety Management Systems utilize the Codex model for HACCP

HACCP Key Terms

- **HACCP**
  - System which identifies, evaluates and controls hazards which are significant for food safety
- **Hazard**
  - A biological, chemical, physical agent in or of food with the potential to cause an adverse health effect
- **Critical Control Point (CCP)**
  - Food safety step at which control can be applied and is essential to prevent, eliminate or help reduce a food safety hazard to an acceptable level

HACCP Key Terms

- **Pre-Requisite Programs (PRP)**
  - Basic conditions and activities that are necessary to maintain a hygienic environment throughout the food chain suitable for production, handling and provision for safe food for human consumption
- **Validation**
  - Obtaining evidence that the control measures managed by the HACCP plan are capable of being effective

HACCP Key Terms

- **Verification**
  - The application of methods, procedures, tests and other evaluations in addition to monitoring to determine compliance with the HACCP plan
- **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 the food safety hazard

What is HACCP?

- Systematic method that provides a baseline for food safety
- Designed to prevent occurrence of food borne hazard
- Logical
- Science-based
- Can work with any type food production system or any food

Role of Prerequisite Programs

- Provides the basic conditions and activities that are necessary to maintain hygienic environment through the food chain
- Must be in place before HACCP
- Ensures basic requirements are met
- Provides direct support to HACCP

Prerequisite Programs

- Examples of Prerequisite Programs
  - Cleaning and Sanitizing
  - Pest Control
  - Personnel Hygiene
  - Construction and Layout of Building
  - Management of Purchased Materials
  - Traceability and Recall
  - Employee Training

HACCP 7 Principles

1. **Hazard Analysis**
2. **Identify CCP**
3. **Establish Critical Limit**
4. **Monitoring CCP**
5. **Corrective Action**
6. **Verification**
7. **Records**

HACCP 12 Application Steps

1. Assemble Food Safety Team
2. Describe the Product
3. Identify Intended Use
4. Flow Diagram
5. On-site Verification of Flow Diagram
6. Risk Assessment/Hazard Analysis
7. Identify CCP
8. Establish Critical Limit
9. Establish a Monitoring Procedure for each CCP
10. Establish Corrective Action
11. Establish Verification Procedures
12. Establish Documentation and Record Keeping

HACCP 12 Application Steps

- **Step 1 – Assemble the Food Safety Team**
  - Select a HACCP coordinator
  - Multi-discipline
  - People directly involved in daily activities
  - Ensures direct involvement from top management
  - Knowledge of team
    - ➢Understand the product process
    - ➢Understand HACCP
  - Use of consultants

- **Step 2 – Describe the Product**
  - What is the product?
  - What is the nature of the product?
  - What type of storage and distribution is required?
  - What is the shelf life of the product?
  - Are there any special considerations to be addressed?
  - How is the product produced?
  - What raw materials will be used?

HACCP 12 Application Steps

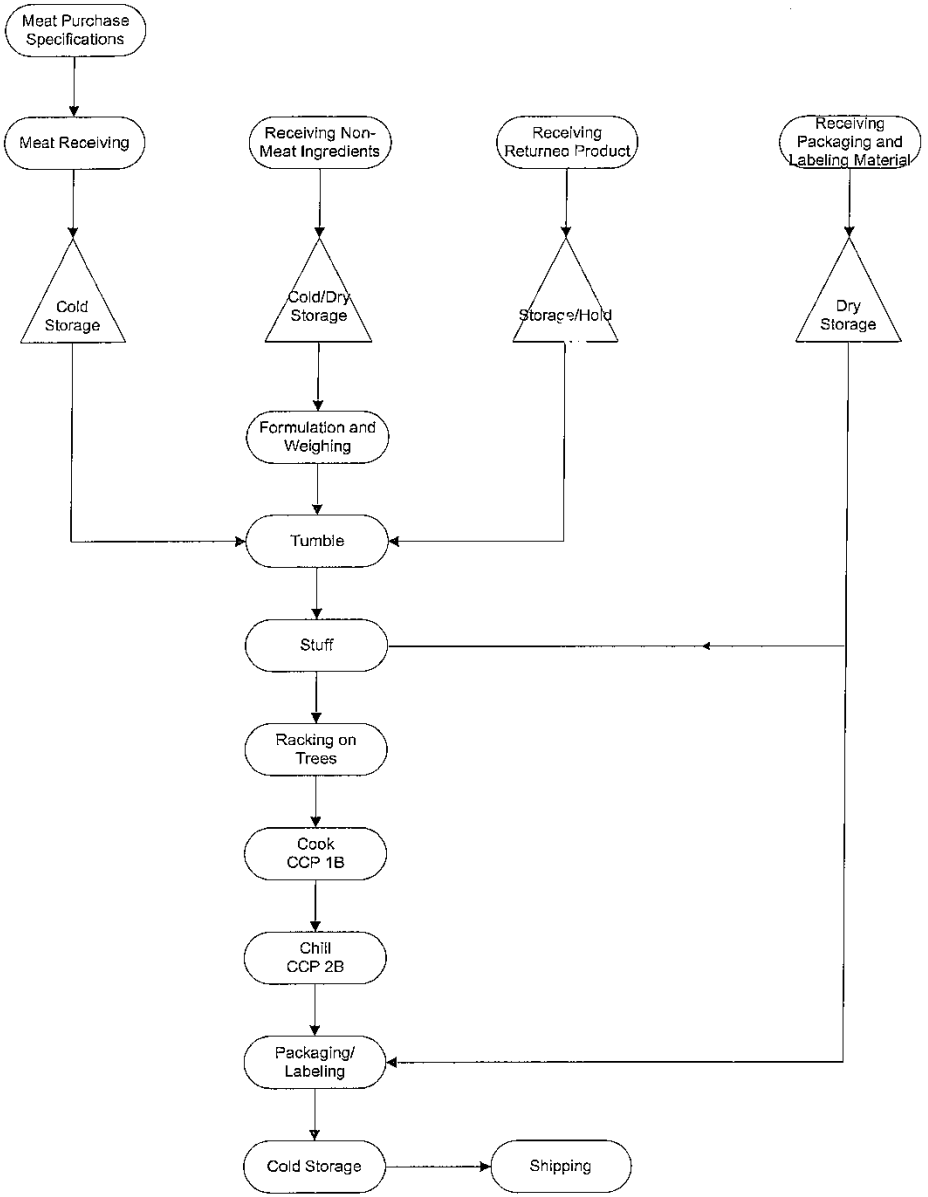
- **Step 3 – Intended Use**
  - Users and consumers of product
    - Immuno-compromised individuals
  - Expected and potential handling issues
  - Preparation procedures
  - Consider misuse of product

HACCP 12 Application Steps

- **Step 4 – Flow Diagram**
  - Document each step of process
    - Include every step of the process including receipt of raw materials and packaging
    - Include addition of rework
  - Helpful to identify equipment in flow diagram
  - Identify any special instructions

EAGLE Certification Group
SERVICE • INTEGRITY • VALUE

Flow Diagram



- **Step 5 – On-Site Verification of the Flow Diagram**
  - **Verify** the accuracy of flow diagram
  - Actually **walk through plant**
  - Make sure the steps listed on the diagram **describe what really occurs** in producing the product
  - **Verify** with HACCP team
  - **Interview employees** on the processing line

HACCP 12 Application Steps

The hazard analysis needs to be specific to the organization and its processes.

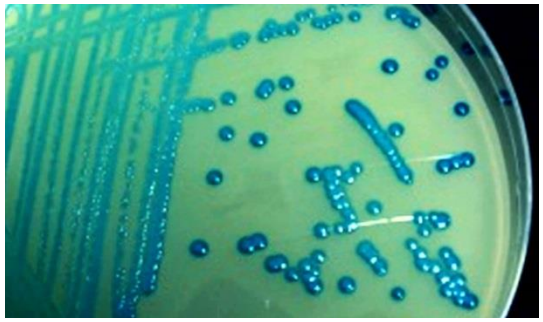
- **Step 6 – Perform Hazard Analysis**
  - Involve the HACCP Team
  - Evaluate raw materials, ingredients, packaging
  - Evaluate each step in the process flow diagram
  - Identify the hazards at each step
  - List the hazards
  - Identify the acceptable level of hazard
  - Consider Control Measures

Step 6 – Perform Hazard Analysis *(continued)*

- **List all potential hazards**
  - Identify hazards that can reasonably expected considering all previous steps
  - Consider each step in the process
  - Consider previous steps that might introduce a hazard
  - Consider process equipment, utilities, services and surroundings
  - Consider preceding and following links in the food chain

Step 6 – Perform Hazard Analysis *(continued)*

- **Types of Hazards**
  - Biological
    - Pathogenic Bacteria – Listeria monocytogenes, E coli 0157:H7, Salmonella
    - Pathogenic Viruses – Norwalk Virus
    - Toxin produced by bacteria



  - Chemical
    - Naturally occurring poisons – aflatoxins, mycotoxins and shellfish toxins
    - Cleaning chemicals
    - Lubricants and paints
    - Allergens

EAGLE Certification Group
SERVICE • INTEGRITY • VALUE

Step 6 – Perform Hazard Analysis *(continued)*

- **Type of Hazards** *(continued)*
  - Physical
    - Glass
    - Metal
    - Plastic
    - Harvest debris (i.e. – rocks, roots, metal objects, gloves)
    - Bone (i.e. – ground beef production)

EAGLE Certification Group
SERVICE • INTEGRITY • VALUE

Step 6 – Perform Hazard Analysis *(continued)*

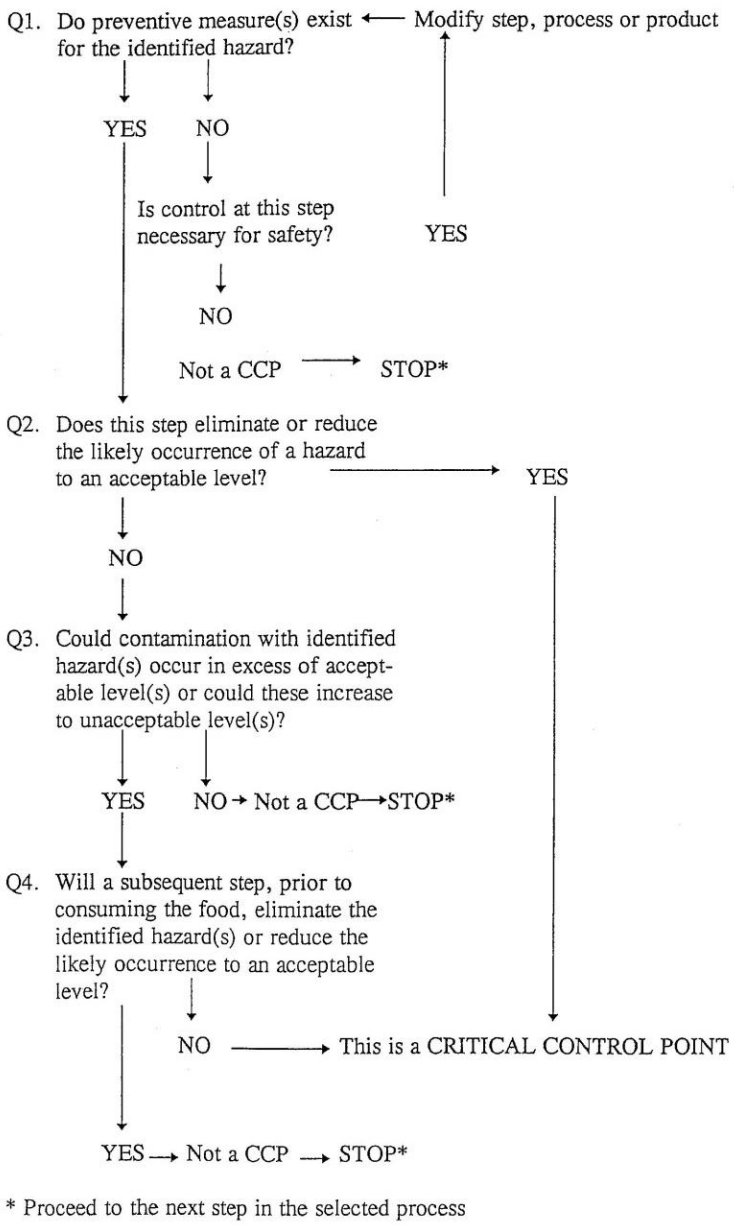
- **Control Measures**
  - Based on outcome of hazard assessment
  - Must be capable of:
    - **Preventing** the hazard
    - **Eliminating** the hazard
    - **Reducing** the hazard to acceptable levels

HACCP 12 Application Steps

- **Step 7 – Identify the CCP**
  - Use only for product safety
  - Must be associated with a specific hazard
  - Must be measurable
  - Must be able to be controlled
  - Use CCP Decision Tree

CPP Decision Tree

The NACMCF (1992) CCP decision tree. (Apply at each point where an identified hazard can be controlled.)



* Proceed to the next step in the selected process

- **Step 8 – Establishing Critical Limits for Each CCP**
  - Needed for each CCP
  - Expressed as numbers or specific parameters
  - Based on sound scientific data
  - Must meet regulatory requirements
  - Must assure that a safe unadulterated product is produced
  - May need more than one critical limit to control a specific hazard

Step 8 – Establishing Critical Limits for Each CCP *(continued)*

- Typical Critical Limits
  - Time/Temperature
  - Humidity
  - Water Activity
  - pH
  - Label verification
  - Line clearance
  - Metal detection

Step 8 – Establishing Critical Limits for Each CCP *(continued)*

- **Precooked Ground Beef Patty**
  - Final internal temperature
  - Minimum time at final temperature
  - Process Controls important – reduce failures
    - Patty thickness
    - Oven temperature
    - Belt speed
    - Ingoing patty temperature

HACCP 12 Application Steps

- **Step 9 – Establish Monitoring System for Each CCP**
  - Who, What, When and How
  - Identify best monitoring procedure
  - Determine frequency
  - Random or continuous monitoring
  - Testing procedure
  - Identify and train employee
  - Sign off records

Step 9 – Establish Monitoring System for Each CCP *(continued)*

- **Monitoring Frequency Important**
  - Ask key questions to determine
    - How frequent to keep process under control?
    - How much out of compliant product are you able to hold?
    - How much liability are you willing to accept?

Step 9 – Establish Monitoring System for Each CCP *(continued)*

- **Monitoring Tips**
  - Clearly identify the employee monitoring
  - Train employees
    - Testing procedures
    - Critical limits
    - How to record results
    - Corrective actions
  - Understand why you are monitoring

- **Step 10 – Establish Corrective Actions**
  - Determine the corrective action for each CCP
    - More than one corrective action may be needed
  - Corrective actions should:
    - Determine the disposition
    - Correct the cause – include prevention
    - Demonstrate CCP is back under control
    - Maintain records of corrective action

Step 10 – Establish Corrective Actions *(continued)*

- **Main Concern for Corrective Action**
  - Ensure that no product that was injurious to health or otherwise adulterated as a result of a HACCP deviation, enter commerce.
  - Non-conforming product procedure
    - Responsibilities to place and remove from hold
    - Segregation identified

HACCP 12 Application Steps

- **Step 11 – Establish Verification Procedures**
  - Occur on an ongoing basis
  - Use methods in addition to those used in monitoring
    - Include both observation and record review
    - Calibration
  - Performed by a different person than the one monitoring
  - Identify frequency of verification checks

EAGLE Certification Group
SERVICE • INTEGRITY • VALUE

Step 11 – Establish Verification Procedures *(continued)*

- **Difference between Verification and Validation**
  - Verification
    - Is my system working?
    - Confirmed internally
  - Validation
    - Are my control measures and critical limits capable of being effective?
    - Confirmed externally (in most cases)

HACCP 12 Application Steps

- **Step 12 – Establish Documentation and Record Keeping**
  - If it is not recorded – it is not done!
  - Develop forms to document HACCP system
  - Identify employees responsible for recording data
  - Well-maintained records are good evidence in potential legal actions
  - Identify record retention

Step 12 – Establish Documentation and Record Keeping *(continued)*

- **Documentation Examples**
  - Hazard analysis
  - CCP determination
  - Critical limit determination
  - Validation data

EAGLE Certification Group
SERVICE • INTEGRITY • VALUE

Step 12 – Establish Documentation and Record Keeping *(continued)*

- **Record Examples**
  - Cooking records
  - Cooking chart
  - Chill records
  - Metal detection records
  - pH test results
  - Verification records

EAGLE Certification Group
SERVICE • INTEGRITY • VALUE

HACCP Master Sheet

Battered and Breaded Chicken Pieces

Critical Control Point (CCP)	Hazard	Critical Limits of the Preventive Measures	Monitoring				Corrective Action	Records	Verification
			What	How	Frequency	Who			
Frying CCP2(B)	Bacterial pathogens	Oil temperature ≥ 450° F	Temp-erature	Temp-erature recorder, low tempera-ture alarm	Continual recording	Fryer operator checks and initials recorder chart	Hold product if low temperature. Notify Q.A. Evaluate effect of low temperature, adjust fryer if necessary.	Fryer operator log, recorder chart, record internal temp. of chicken, QA calibration records.	Q.A. will calibrate recorder and alarm each month. Daily record review and initial. Check oil temp. each shift and compare with recorder. Measure internal temp. of chicken.
		Chain speed < 4 feet per minute.	Time	Belt speed tachometer on drive shaft	Continual recording of speed	Fryer operator checks and initials recorder chart	Hold product if belt speed > 4 feet per minute and evaluate.	Fryer operator log, recorder chart, QA calibration records, verification records	Q.A. will calibrate tachometer every 2 weeks. Daily record review and initial. Operator measures belt speed once per shift according to SOP.

For illustrative purposes only.

Reassess Your HACCP Program

- **When to reassess your HACCP program?**
  - At least annually
  - When potential new hazard has been identified
  - Changes to process, raw materials or source, ingredients, equipment, formulation, packaging, etc.

EAGLE Certification Group
SERVICE • INTEGRITY • VALUE

Thank You!

For more information, please contact

800.795.3641

info@eaglecertificationgroup.com

roger.roeth@eaglecertificationgroup.com