Project: Technical assistance to improve implementation of food safety standards and disease crisis preparedness

Training course: Prerequisite programs (GMP) and HACCP
HACCP- general

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Date: ……..
Place: Nicosia, Cyprus

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HAZARD ANALYSIS AND CRITICAL CONTROL POINT (HACCP)

WHAT IS IT ????

DEFINITIONS

- control /verb/: undertaking of all necessary actions to ensure and maintain compliance with the criteria established in the HACCP plan
- control measures: any action or activity that can be used to prevent or eliminate a food safety hazard or to reduce it to an acceptable level
- corrective actions: any action to be taken when the results of monitoring at the CCP indicate a loss of control
- CCP: a step in the manufacturing process at which control is applied and is essential to prevent or eliminate a food safety hazard or reduce it to an acceptable level

DEFINITIONS

- critical limit (CL) : a criterion which separates acceptable from unacceptable level of safety
- deviation: failure to meet a critical limit CL
- HACCP : a system that identifies, evaluates, and controls hazards which are significant for food safety
- HACCP plan: a document prepared in accordance with the principles of HACCP to ensure control of significant hazards for food safety
- flow diagram: a systematic representation of the sequence of steps or operations used in the production or manufacture of particular products
- hazard : a biological, chemical or physical agent , or condition of, food with the potential to harm the consumer's health

DEFINITIONS

- hazard analysis : the process of collecting evaluating information on hazards, related to a particular food product aiming at deciding which of them are significant and should be considered in the HACCP plan.
- monitoring: the act of conducting of preliminary sequence planned observations or measurements to assess whether a CCP is under control, to be made an exact record aiming at its future check -use
- step: a point, procedure, operation or stage in the food chain, starting from the production of raw materials to the final consumption of the product.
- risk: a function of the probability of an adverse health effect and the severity of that effect, consequential to a hazard in food.

HACCP: 5 Preliminary steps

1. **Assemble** the HACCP team (bring together your HACCP resources)

- Review **existing** food safety **pre-requisite** programs.

- Meet the requirements for (Sanitation) Standard Operating Procedures SSOP & Good Manufacturing Practices (GMP s).

2. **Describe** the product & method of distribution

3. Identify the **intended use** & **consumers** of the product

4. **Develop** a process flow diagram

5. **Verify** the diagram on site

ASSEMBLE THE HACCP TEAM

- The HACCP Team Includes
  - Coordinator
  - Outside Experts
  - Ad Hoc Groups
- Should be multidisciplinary

MEMBERS OF THE HACCP TEAM

- Management
- Quality Control/Assurance
- Sanitation
- Maintenance/Engineering
- Line Supervisors/Personnel
- Product Development/Sales

EVALUATE CURRENT PROGRAMS

- **Prerequisite Programs- GMPs, SOPs**
- **Quality Control Programs**
- **Training Programs**
- **Compliance with Regulations**
- **Sanitation Standard Operating Procedures (SSOP)**

HACCP PLANS

- Must Be **Specific** For Both Product and Process
- Differences Due To
  - Suppliers
  - Ingredients
  - Formulations
  - Processing Equipment
  - Facilities
  - Preparation Procedures

HACCP PLAN DEVELOPMENT

- Describe the Food and Its Intended Use
- Develop a Product Description
  - Process/Product Type Name
  - Important Product Characteristics
  - Packaging and Shelf Life
  - Where It Will Be Sold
  - Labeling Instructions
  - Special Distribution Control

FORM #1
PRODUCT DESCRIPTION

1. Process/Product Type Name	
2. Important Product Characteristics (A_w, pH, Preservatives, etc.)	
3. How It Is To Be Used	
4. Packaging	
5. Shelf Life	
6. Where It Will Be Sold	
7. Labeling Instructions	
8. Special Distribution Control	

❖Develop a Flow Diagram

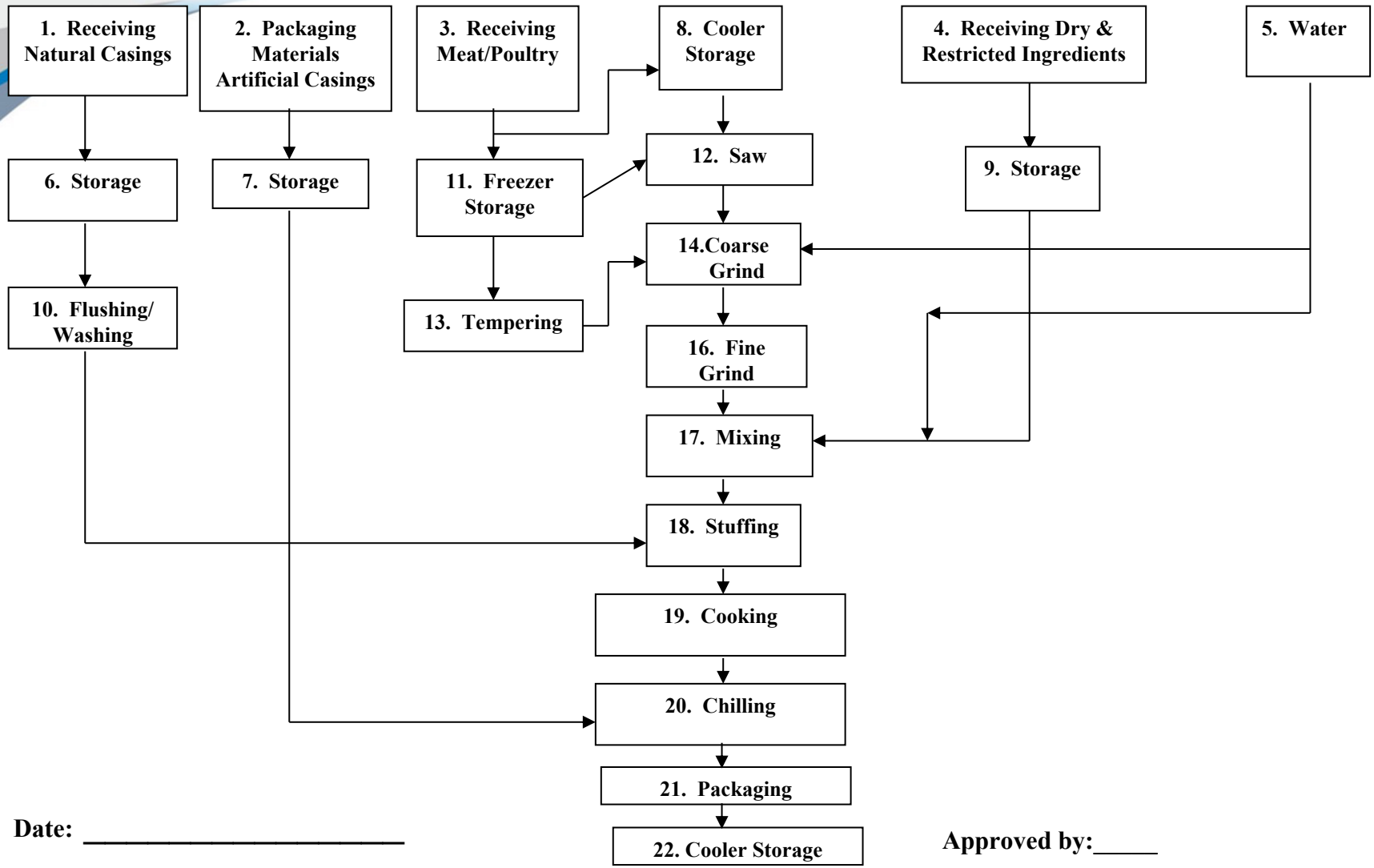
The Flow Diagram Must:

- Be developed for each product/process
- Include all Processes from Raw Materials to Packaging and Distribution
- Must include Rework and Returned product (if applicable) (define)

HACCP PLAN DEVELOPMENT

- **Verify the Flow**
  - On-site Verification
  - Keep it Current

Process Category/Product Name: Fully Cooked, Not Shelf Stable



Date: _____

Approved by:_____

HACCP Principles

The HACCP system consists of 7 principles:

1. **Hazard Identification and Assessment**
2. **Critical Control Point Identification**
3. **Establishing Critical Limits**
4. **Monitoring Procedures**
5. **Corrective Actions**
6. **Verification Procedures**
7. **Record Keeping Practices**

HACCP PRINCIPLE 1

CONDUCT A HAZARD ANALYSIS

HACCP PRINCIPLE 1

- Develop a **List of Hazards** that are Reasonably Likely to Cause Injury or Illness

- Identify Appropriate **Control Measures**

HACCP PRINCIPLE 1

- Hazards are defined as biological, chemical or physical agents that are reasonably likely to cause injury or illness in the absence of its control.

HACCP PRINCIPLE 1

- When conducting a hazard analysis **SAFETY** concerns **MUST** be differentiated from **QUALITY** concerns

HACCP PRINCIPLE 1

- When Conducting a Hazard Analysis Consider:
  - Ingredients and raw materials
  - Each Step in the Process
  - Product storage and distribution
  - Final preparation and use by the consumer

HACCP PRINCIPLE 1

- A Hazard Analysis and Identification of Control Measures Accomplish Three Things:
  - Hazards and control measures are **identified**
  - May identify needed **modifications** to the process
  - Provides a basis for **determining** the CCPs

HACCP PRINCIPLE 1

- Hazard Analysis is a Two Stage Process:
  - Hazard **Identification**
  - Hazard **Evaluation**

HACCP PRINCIPLE 1

- **Hazard Identification**
  - Brainstorming Session
  - Review ingredients, process steps, storage/distribution and use
  - Develop a list of potential hazards which may be introduced, increased or controlled at each step

HACCP PRINCIPLE 1

- **Hazard Evaluation**
  - Determines Which Potential Hazards Must Be **Addressed** in the HACCP Plan
  - Based on the Hazard's **Severity** and its **Likely Occurrence**

HACCP PRINCIPLE 1

- **Severity** - The **seriousness** of the consequences of exposure to the hazard

- The likely occurrence is **based** on experience, epidemiological data, technical literature, etc.

	Seriousness/severity/ of harmful - C			
Likelihood of occurrence of the hazard - B	**K = B x C**	**Small (C = 1)**	**Medium (C = 2)**	**Large (C = 3)**
	Small (B = 0,1)	**K = 0,1** -	**K = 0,2** -	**K = 0,3** -
	Medium (B = 0,2)	**K = 0,2** -	**K = 0,4** -	**K = 0,6** +
	Large (B = 0,3)	**K = 0,3** -	**K = 0,6** +	**K = 0,9** +

If the coefficient is K > 0, 6 the hazard is significant.

Hazard analysis risk assessment matrix

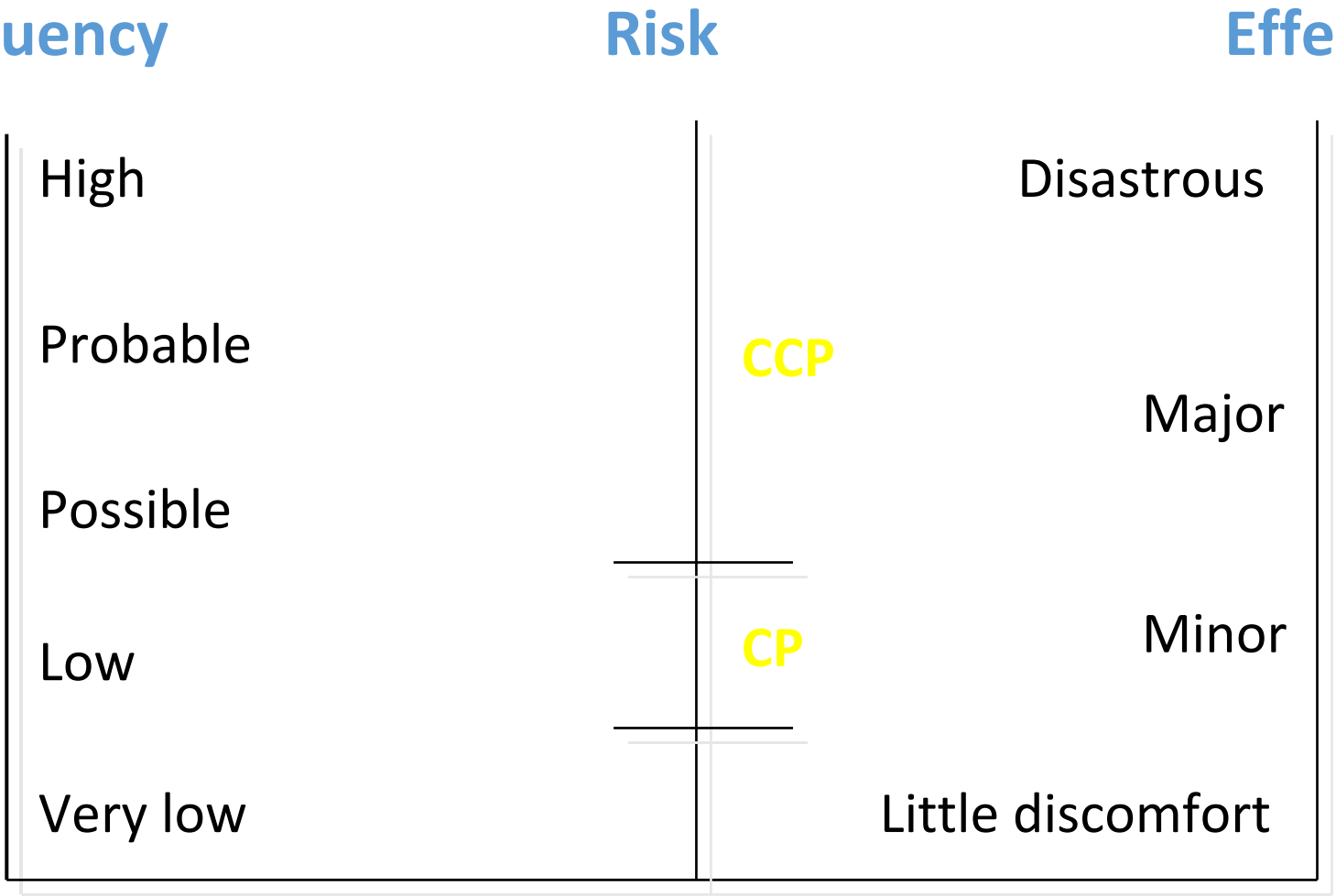
Severity of hazard		**Probability of occurrence**		
		Low (hardly)	Medium (sometimes)	High (regularly)
		10^1	10^2	10^3
Low	10^1	10^2	10^3	10^4
Medium	10^2	10^3	10^4	10^5 CCP?
High	10^3	10^4	10^5 CCP?	10^6 CCP?

Hazard analysis risk assessment matrix

Ranking (scale 1 – 16)

Severity of Hazard		Probability			
		Hardly	Some-times	Present	Regularly
		1	2	3	4
Low	1	1	2	3	4
Average	2	2	4	6	8
High	3	3	6	9	12
Veryhigh	4	4	8	12	16

CCP frequency-effect diagram



Determination of probability of occurrence :		Determination of seriousness of hazard :	
SMALL	< 1 less than once a year	S	***Noticeable but is not harmful to human health** ***Compliance from only 1 consumer**
MEDIUM	1-3 times a year	M	***Damage to teeth or visit a doctor or Several infected** ***Many complaints of customers**
LARGE	> More than 3 times a year	L	***Big injury of health or died** ***Many seriously ill people**

HACCP PRINCIPLE 1

- Hazards identified in one facility may not be significant in another operation due to differences in equipment, preparation procedures, ingredients, etc.

HACCP PRINCIPLE 1

- Hazards associated with each step **must be listed** along with any measures to control the hazards
- **Control Measure** is used because not all hazards can be prevented or eliminated
- More than **one** Control Measure may be required for a specific hazard.
- **Control Measure** - Any action or activity that can be used to prevent, eliminate or reduce a significant hazard.

FORM #2
HAZARD ANALYSIS AND PREVENTIVE MEASURES

Process Step	Potential Hazards Introduced, Controlled or Enhanced at this Step	Hazard Severity (Small - S, Middle - M, Large - L)	Occur possibility (Small - S,Middle - M, Large - L)	Is the hazard significant? Y/N	What Control Measures Can Be Applied To Prevent, Eliminate, or Reduce to Acceptable Levels
1 2	B: C: P: B: C: P:				

HACCP PRINCIPLE 2

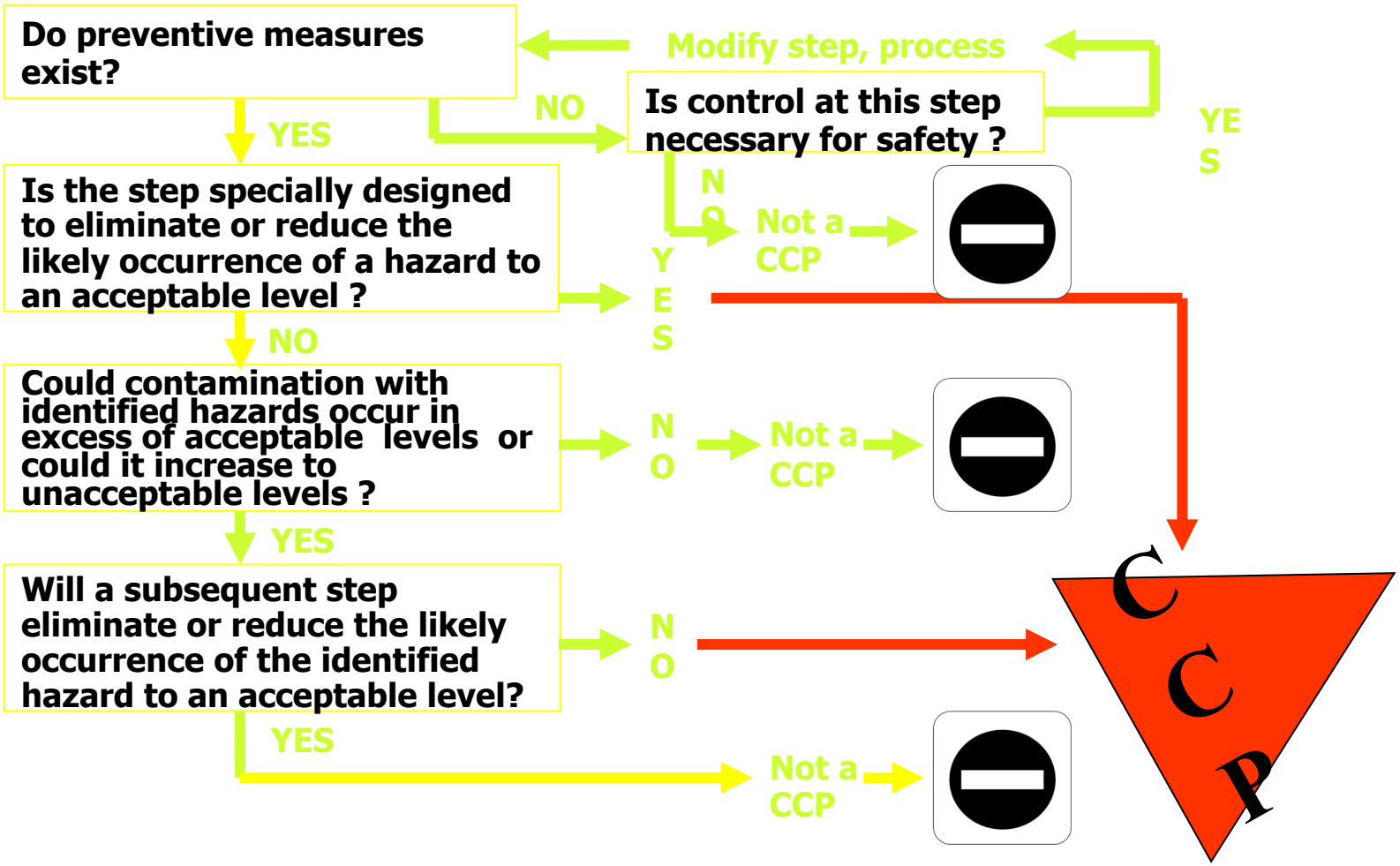
Determine Critical Control Points (CCPs)

HACCP PRINCIPLE 2

- **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**.

  OR
  - A point in the production process at which, if you **loose control**, it is likely that a '**significant**' health risk will occur

Decision tree to identify CCPs



HACCP PRINCIPLE 3

- Establish Critical Limits

HACCP PRINCIPLE 3

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

HACCP PRINCIPLE 3

- Each CCP must have a critical limit in order to determine if the CCP is IN or OUT of control.
- A CCP may have one or more critical limits
- A critical limit is used to distinguish between safe and unsafe operations at a CCP "Boundaries of Safety"

HACCP PRINCIPLE 3

- **Critical Limits are established based on:**
  - Evidence of existence of a direct health hazard
  - Evidence that a direct health hazard could develop, or
  - Indications that a product was not produced under conditions ensuring safety

    (i.e., metal detector kick-outs)

HACCP PRINCIPLE 3

Critical Limits should:

- Indicate control of a CCP
- Be simple, specific, and clear
- Be based on scientifically determined parameters
- Be quantifiable but can be sensory
- Be validated

HACCP PRINCIPLE 3

Examples of Critical Limits Include:

- Time/Temperature
- Chlorine Level
- pH
- Sensitivity

HACCP PRINCIPLE 4

Establish Monitoring Procedures

HACCP PRINCIPLE 4

Monitoring is defined as:

Conducting a planned sequence of observations or measurements to assess whether a CCP is under control and producing an accurate record for future use in verification

HACCP PRINCIPLE 4

Monitoring serves three main purposes:

- Assesses control
- Determines trends
- Provides written documentation

HACCP PRINCIPLE 4

Important Monitoring Questions

- What is monitored?
- Who monitors (by title)?
- How is monitoring performed?
- When? Frequency of monitoring

HACCP PRINCIPLE 4

Employees should be trained in procedures to follow when there is a trend towards loss of control

All monitoring records must be dated and initialed or signed by the person doing the monitoring

Monitoring procedures need to be rapid, on-line and “real time”

Microbiological tests are seldom effective for monitoring

HACCP plan- Form 4

Critical limits and monitoring system for each CCP

Product: Red meat **Date: XX Version №: X**

Establishment: Slaughterhouse

"Top" **Prepared by : HACCP Team**

Process Step	Critical limits	Monitoring system			
		Who	What	How	When
11.Evisceration CCP 1 B	Zero tolerance- it is not allowed contamination with intestinal content.	Operator	Contamination of the carcasses	Visually	Apply Monitoring of every carcass

Date:---------- Signed:---------

HACCP PRINCIPLE 5

- Establish Corrective Actions

HACCP PRINCIPLE 5

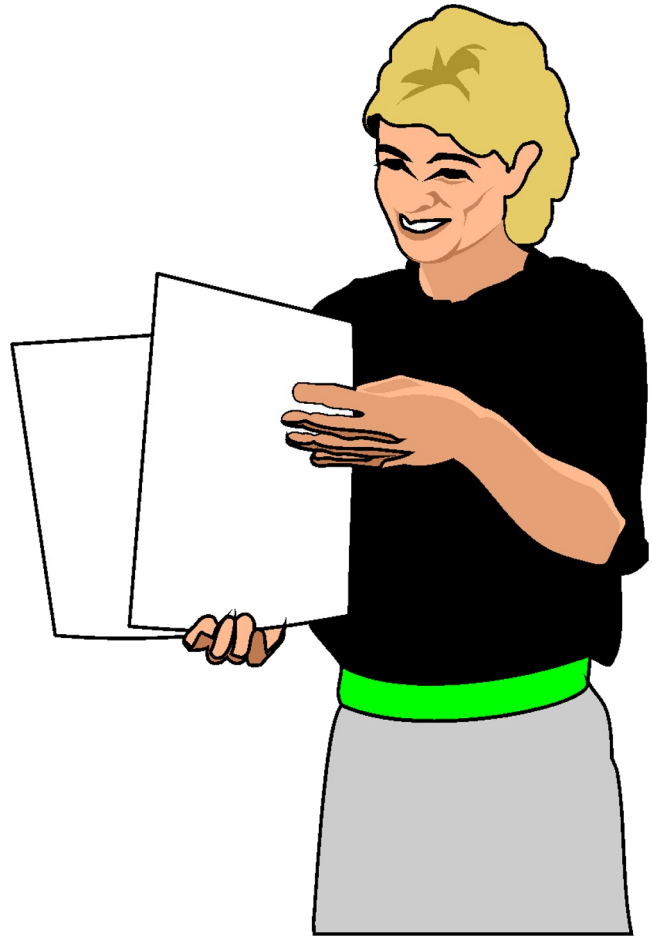
- Corrective action must be developed for each CCP to remedy the deviation and assure product safety.
- Corrective actions “FIX” the deviation and maintain compliance with the HACCP plan

HACCP PRINCIPLE 5

- **Corrective actions must include:**
  - Who is responsible for implementing the corrective actions
  - Determining the cause of the deviation
  - Bringing the process back under control
  - Preventing a recurrence of the deviation
  - Determining the disposition of affected product

HACCP PRINCIPLE 5

- Monitoring of a critical limit should identify trends toward out-of-compliance **so that actions** may be taken before a deviation occurs to avoid holding or rejecting product.



HACCP PRINCIPLE 5

- Employees need to be **trained** on when and what corrective actions are to be taken when a deviation occurs
- The first action taken by the employee is to **get control** or **HOLD** affected product

FORM 5

- All Corrective Actions Must Be Recorded

Corrective actions Product: Establish:			Date:			Version №: Prepared by HACCP Team
Process Step	**Critical limits**	**Who is responsible for the CA?**	**Formulation of measure for identification and elimination of cause of**	**Formulation of measure for realization of repeated control of CCP**	**Formulation and determination of measures for prevention of repetition**	**Formulation of measure for prevention of unsafe product to reach the market**

HACCP PRINCIPLE 6

Establish Procedures for Verification that the HACCP System is Working Correctly

HACCP PRINCIPLE 6

- Verification evaluates the day-to-day compliance of the activities at each CCP

- DO WE SAY WHAT WE DO AND DO WE DO WHAT WE SAY?
- Verification is NOT the same as monitoring:
  - Different person responsible
  - Done at different frequencies
  - May be different tasks

HACCP PRINCIPLE 6

- The Three Types of Required CCP Verification Activities :
  - #1 Calibration of processing and monitoring equipment
  - #2 Review of monitoring and corrective action records
  - #3 Independent observations on the adequacy of control measures, critical limits, etc.

HACCP PRINCIPLE 6

- **For each verification task:**
  - Identify the person responsible (by title)
  - Identify the frequency
  - Identify where the results are recorded

The Most Complex HACCP Verification Activities Performed are:

Validation - Is it the right thing to do?

Reassessment -Is it STILL the right thing to do?

HACCP PRINCIPLE 6

HACCP Plan Validation Occurs During:

- The development of the HACCP Plan
- Initial implementation of the HACCP Plan

HACCP Plan Validation Is Supported By:

- Scientific data and literature
- Regulatory critical limits
- Plant test data and results

Form 6

Verification procedures Product: Date: Version № Establishment Prepared by : HACCP Team			
Process Step	CCP and verification procedures	Responsible person for verification procedures	Responsible person/s for record keeping

HACCP PRINCIPLE 7

- **Establish Effective Record Keeping Procedures**

HACCP PRINCIPLE 7

Records are kept for various reasons:

- Evidence of product safety
- Regulatory compliance
- Tracing product
- Review of procedures and processes

HACCP PRINCIPLE 7

The HACCP plan should be included as part of your plant's records.

HACCP PRINCIPLE 7

- **The HACCP Plan includes:**
  - Description of the product and its intended use
  - List of ingredients and raw materials
  - Flow diagram
  - Written hazard analysis
  - HACCP Plan Spreadsheet
    - Critical Control Points
    - Hazards Identified
    - Critical Limits
    - Monitoring System
    - Corrective Actions
    - Verification Procedures
    - Record Keeping Procedures

HACCP PRINCIPLE 7

Active HACCP Records Include:

- CCP Daily Monitoring Records
- Corrective Action Records
- Verification Records
- Calibration Records
- Other Records (e.g., sample results, etc.)

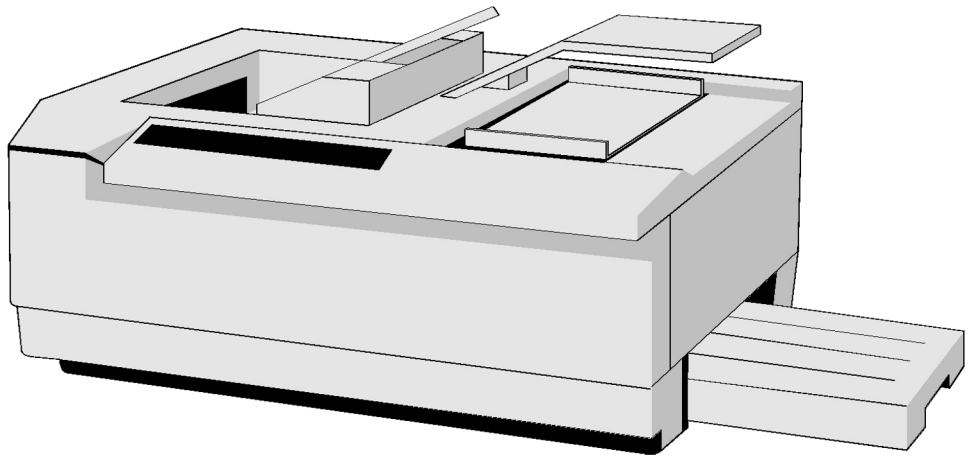
HACCP RECORD RETENTION

- One Year
  - Slaughter
  - Refrigerated products
- Two Years
  - Frozen, preserved, shelf stable
- On-site – 6 months
- Off-site after 6 months
  Retrieved in 24 hrs

ACCESS TO HACCP RECORDS

- Official inspector must have access to all HACCP records

- Copies of HACCP records, HACCP plan, supporting documentation should not be given to Inspector for their files



HACCP-based systems

- HACCP-based' systems developed with a more flexible approach
  - faithful to the seven principles of HACCP
  - not necessarily require to follow the traditional 12-step approach as outlined in the Codex guidelines.

Training objectives

- **Main objectives**

To ensure adequate knowledge for the participants regarding the food safety requirements in the EU, to enable a better understanding of the Community legislation and to enable its better implementation in practice by veterinary inspectors

- **Expectation**

Good understanding of EU food safety standards and legal texts

Implementation of Regulations 852-853/2004

Microbiological criteria in food

(according to Regulation 2073/2006

Techniques of OCs

Prerequisite programs (GMP) and HACCP

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THANK YOU FOR YOUR ATTENTION

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