Critical Control Points and Operational Prerequisite Programs

ISO 4
HACCP Principle 2

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

• The “Stop Sign” of the process.

• In ISO 22000, you also must identify Operational Prerequisite Programs (oPRPs) at this step of HACCP plan development.
Control Measures and Critical Control Points

• Control Measure
  – An action or activity that can be used to prevent or eliminate a food safety hazard, or reduce it to an acceptable level.

• 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.
Prerequisite Programs

• Prerequisite Program (PRP)
  – Basic conditions and activities that are necessary to maintain a hygienic environment throughout the food chain suitable for the production, handling and provision of safe end products and safe food for human consumption.
Operational Prerequisite Programs

• Operational Prerequisite Program (oPRP)
  – A prerequisite program identified by the hazard analysis as essential in order to control the likelihood of introducing food safety hazards to and/or the contamination or proliferation of food safety hazards in the product(s) or in the processing environment.
Hazard Prevention

• Points may be identified as CCPs (or oPRPs) when hazards can be **prevented**
  – For some products and processes the following may be true:
    • Introduction of hazard can be prevented by control at receiving step (e.g., supplier declaration)
    • A chemical hazard can be prevented by control at ingredient addition or blending step
Hazard Prevention

• Points may be identified as CCPs (or oPRPs) when hazards can be *prevented*
  – Pathogen growth in the finished product can be prevented by control at formulation or ingredient addition step (e.g., pH adjustment or addition of preservatives)
  – Pathogen growth can be controlled by refrigerated storage or chilling
Hazard Elimination

• Points may be identified as CCPs (or oPRPs) when hazards can be **eliminated**
  – For some products and processes the following may be true:
    • Pathogens and parasites can be killed during heat treatment or UV light treatment
    • Metal fragments can be detected by a metal detector and eliminated by removing the contaminated product
Hazard Reduction

• Points may be identified as CCPs (or oPRPs) when hazards are **reduced to acceptable levels**
  – For some products and processes the following may be true:
    • Occurrence of foreign objects can be minimized by manual sorting and automatic collectors
    • Some chemical hazards such as patulin can be reduced by processes such as culling, brushing and washing apples prior to juice extraction
HACCP Logic Sequence

1. Identify Hazards Associated With Each Step
2. Evaluate Hazards for Severity and Likelihood
3. Identify Control Measures and Control Measure Combinations for Each Identified Hazard
4. Characterize Control Measures
   - Prerequisite Programs (PRP)
   - Operational Prerequisite Programs (OPRP)
   - Critical Control Points (CCP)
Assessment of Control Measures

• Identify control measures or combination of control measures capable of preventing, eliminating or reducing these food safety hazards to acceptable levels.

• Review each of the control measures with respect to its effectiveness against the identified food safety hazards.

• Categorize control measures as to whether they are managed by Prerequisite Programs, or need to be managed through operational PRPs or the HACCP plan.
Critical Control Points

• There likely are several points in a food processing system where hazards can be controlled to some extent.

• There are likely to be only a few steps where loss of control will result in the production of a potentially unsafe food.
  – These steps are the CCPs in the HACCP Plan
Determining CCPs

• CCP Decision Trees
  – The HACCP team should use the CCP Decision Tree to evaluate each of the steps where food safety hazards can be prevented, eliminated, or reduced to acceptable levels.
  – Each step should then be categorized as either a CCP, oPRP or neither.
CCP Decision Trees – Example

Figure 6.1. NACMCF CCP Decision Tree

Important considerations when using the decision tree:
- The decision tree is used after the hazard analysis.
- The decision tree is then 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.

Q1. Do control measure(s) exist for the identified hazard?
   - YES
   - NO

   Modify step, process or product.

   Is control at this step necessary for safety?
   - YES
   - NO

   → Not a CCP

   → STOP*

Q2. Does this step eliminate or reduce the likely occurrence of a hazard to an acceptable level?
   - NO
   - YES

Q3. Could contamination with the identified hazard(s) occur in excess of acceptable level(s) or could it increase to an unacceptable level(s)?
   - YES
   - NO

   → Not a CCP

   → STOP*

Q4. Will a subsequent step eliminate the identified hazard(s) or reduce its likely occurrence to an acceptable level?
   - YES
   - NO

   → Not a CCP

   → STOP*

   → CRITICAL CONTROL POINT

*Proceed to next step in the described process
CCP / oPRP Decision Tree

Q1: Based on the likelihood of occurrence and the severity of adverse health effects, is this hazard significant?

– YES: This is a significant hazard. Go to Q2.
– NO: This is not a significant hazard.
Q2: Will subsequent steps alone or in combination (including expected use by consumer) guarantee the removal of this significant hazard, or its reduction to an acceptable level?

– YES: Identify and name subsequent step.
– NO: Go to Q3.
CCP / oPRP Decision Tree

Q3: Are control measures or practices in place at this step and do they exclude, reduce or maintain this significant hazard as necessary?

– YES: Go to Q4.

– NO: Modify the process or product and go to Q1.
CCP / oPRP Decision Tree

Q4: Is it necessary to establish critical limits for the control measure at this step?

– YES: Go to Q5.

– NO: This hazard is managed by an OPRP.
CCP / oPRP Decision Tree

Q5: Is it necessary to monitor the control measure in such a way that action can be taken immediately when there is a loss of control?

– YES: This hazard is managed by control measures at a CCP.

– NO: This hazard is managed by an OPRP.
Determining CCPs

• Do NOT use the CCP Decision Tree before completing the hazard analysis.
  – This may result in identifying CCPs that are not essential to controlling product safety

• Strictly following a CCP Decision Tree sometimes results in a decision that common sense says is incorrect.
  – Use decision trees with caution.
Multiple CCPs and Hazards

• A single hazard may require control by multiple CCPs
  – Example: Acidification and thermal processing of fruit purees to control Clostridium botulinum growth and toxin formation.

• Multiple hazards may be controlled by a single CCP
  – Example: Vegetative pathogenic bacteria and parasites in apple juice can be controlled by the same thermal process.
CCPs are Product- and Process-Specific

• CCPs may change with differences in:
  – Facility layout
  – Formulation
  – Process flow
  – Equipment
  – Ingredient selection
  – Sanitation and other prerequisite programs
PREREQUISITE PROGRAMS

OPERATIONAL PREREQUISITE PROGRAMS

CRITICAL CONTROL POINTS
Prerequisite Programs

- The generic controls in any type of food operation.
- Applied in all types of food operations so as to maintain a hygienic environment to reduce the food safety risk.
- They are in operation at all times.
- They are the foundation of HACCP.
- They can have an effect on end product safety if not included in the food safety management system.
- They are NOT specific to one step in the process and DO NOT CONTROL a specific hazard.
Operational Prerequisite Programs

- oPRP are **specific** to a food operation and are determined after doing the hazard analysis.
- oPRP are **essential** because the hazard analysis has shown that they are **necessary** to control specific food safety hazards.
- oPRP may not target a specific source of the hazard.
- oPRPs are used to **reduce the likelihood** that products and/or processing environment will be exposed to hazards or will be contaminated and that hazards will proliferate.
Critical Control Points

• Points of absolute control.

• Steps in the food process which must be under control to produce a safe product.

• CCPs are an intervention used when the hazard has a high probability of existing and the risk level to the consumer is high.
What Differentiates an OPRP from a PRP?

- **PRPs** are horizontal
- **PRPs** may contribute to reduction of the hazard but may not be essential for control
- **OPRPs** apply to a specific identified hazard
- **OPRPs** apply to a specific product or process
- **OPRPs** are essential to reduce the level of the hazard
- Example: General cleaning and sanitation (PRP) versus cleaning of a particular point in the line to prevent allergen cross-contamination (OPRP)
What Differentiates an **OPRP** from a **CCP**?

- **CCPs** are process steps where control measures are applied that have “absolute” control over the hazard.

- **OPRPs** are control measures essential for the control of the hazard, but do not have “absolute” control over the hazard.

- **OPRPs** may work in combination with other control measures to prevent, eliminate, reduce or maintain a hazard to an acceptable level.
  - Their failure does not automatically imply that a product is hazardous.
Designating CCPs and oPRPs

• Methods for identifying or designating CCPs (and oPRPs) in HACCP plans can vary:
  – Sequential numbering
    • CCP #1, CCP #2, CCP #3
  – Sequentially within hazard category
    • CCP P1, CCP B1, CCP C1
  – By process step name
    • Oven, Packaging, Chill
Number of CCPs in a Plan

• Depends on the product and process.

• Too few CCPs may not allow for adequate control of food safety hazards.

• Too many CCPs may over burden the HACCP plan.
  – It is more common for establishments to designate too many CCPs than too few.
  – If everything is significant, then NOTHING is significant.
HACCP Plan Reassessment

• Remember that HACCP plans are “living” documents that can be modified, and should be re-assessed when there are changes to the process.

• CCPs can be changed at any time as the HACCP plan evolves.
QUESTIONS?
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