Critical Control Point Decision Tree

For the production of cooked products. Process Step Receiving Meat

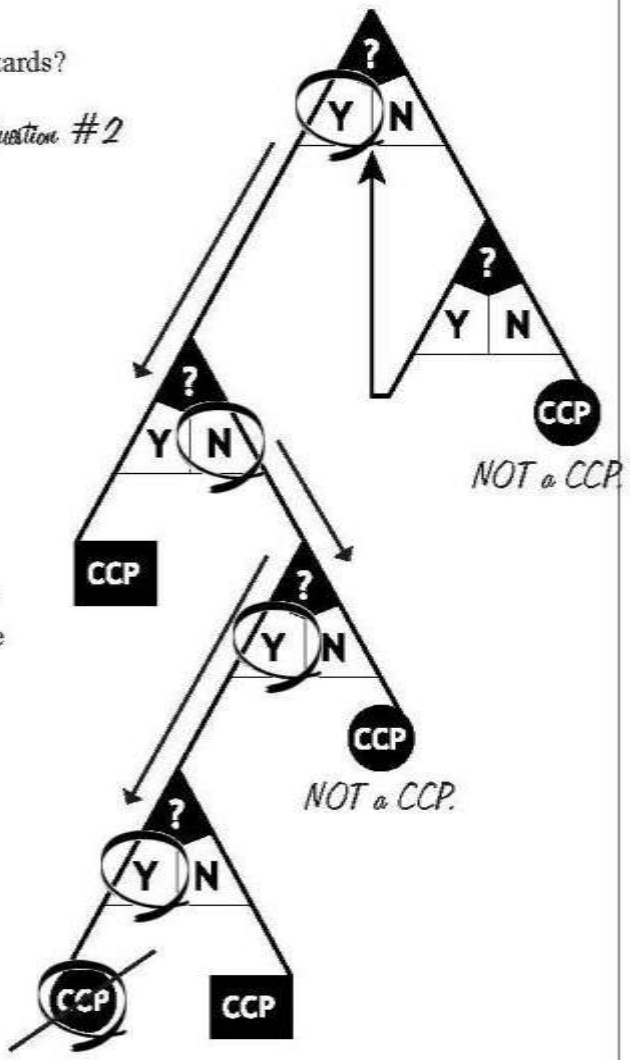
Question 1A
Do preventative measures exist for the identified hazards?
If no - go to Question 1B.
If yes - go to Question 2. Yes, go to Question #2

Question 1B
~~Is control at this step necessary for safety?~~
~~If no - not a CCP.~~
~~If yes - modify step, process or product and return to Question 1.~~

Question 2
Does this step eliminate or reduce the likely occurence of a hazard(s) to an acceptable level?
If no - go to Question 3.
If yes - CCP. No

Question 3
Could contamination with identified hazard(s) occur in excess of acceptable levels or could these increase to unacceptable levels?
If no - not a CCP.
If yes - go to Question 4.

Question 4 Yes
Will a subsequent step eliminate the identified hazards or reduce the likely occurence to an acceptable level?
If no - CCP.
If yes - not a CCP.



Results:
Yes - so it's NOT a CCP.

BIOLOGICAL	CHEMICAL	PHYSICAL
☐ CCP#_____	☐ CCP#_____	☐ CCP#_____
☒ Not a CCP	☐ Not a CCP	☐ Not a CCP

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Verified by: Mary Weston **Date** 12/12/98

The second step they looked at was cooking.

Question 1a

The Example Facility answered "Yes" here because they had identified the preventive measure of cooking (i.e. time and temperature) for this step.

Question 1b

As in the receiving example, move onto question 2.

Question 2

The Example Facility said that "Yes" cooking would eliminate the hazard at this step. They stopped here at question 2 because they reached a positive result...their CCP. Thus, there wasn't any need to go on to questions 3 and 4.

[After finding all the CCP's in your process, the HACCP team needs to organize them. At the bottom of the CCP Decision Tree Form the Example Facility named the cooking CCP "CCP#01B". The "01" tells them what number the CCP is, and the "B" tells them it is a biological food safety hazard.]

Critical Control Point Decision Tree

For the production of cooked products. Process Step Cooking

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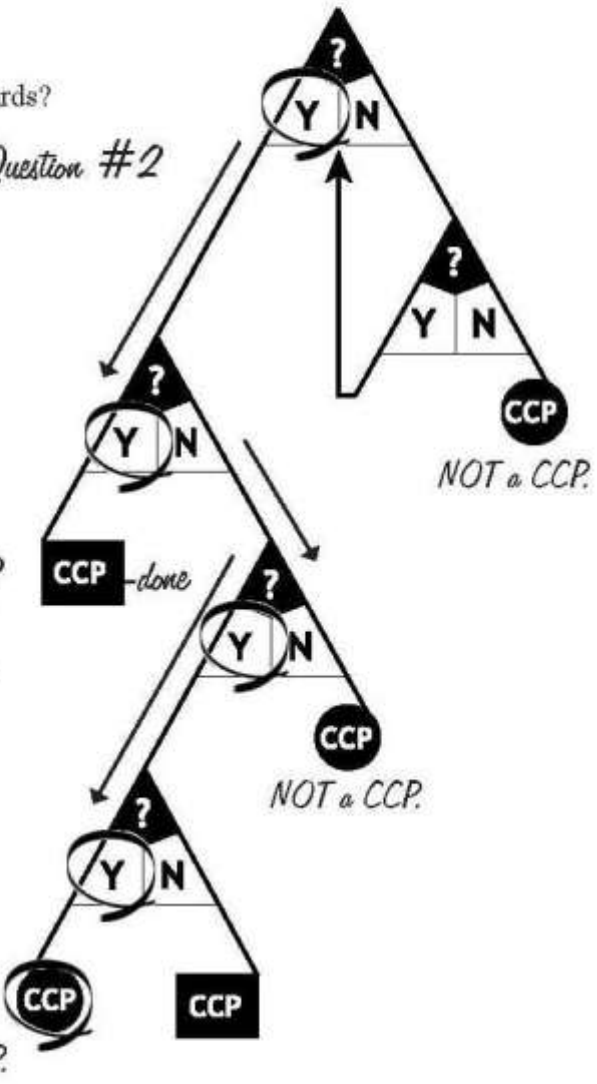
Question 1A
Do preventative measures exist for the identified hazards?
If no - go to Question 1B.
If yes - go to Question 2. *Yes, go to Question #2*

~~*Question 1B*~~
~~Is control at this step necessary for safety?~~
~~If no - not a CCP.~~
~~If yes - modify step, process or product and return to Question 1.~~

Question 2
Does this step eliminate or reduce the likely occurence of a hazard(s) to an acceptable level?
If no - go to Question 3.
If yes - CCP. *Yes, Identified as a CCP*

Question 3
Could contamination with identified hazard(s) occur in excess of acceptable levels or could these increase to unacceptable levels?
If no - not a CCP.
If yes - go to Question 4.

Question 4
Will a subsequent step eliminate the identified hazards or reduce the likely occurence to an acceptable level?
If no - CCP.
If yes - not a CCP.



Results:

BIOLOGICAL	CHEMICAL	PHYSICAL
☒ CCP# #01B	☐ CCP#	☐ CCP#
☐ Not a CCP	☐ Not a CCP	☐ Not a CCP

Developed by: Cindy Jones **Date** 12/10/98

Verified by: Mary Weston **Date** 12/12/98

Principle 3: Establish Critical Limits for Each Critical Control Point

A critical limit is defined 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." You can think of a critical limit as a boundary of safety for a CCP. The critical limit is the numerical value that must be reached to assure that hazards have been controlled. An example would be that "all sausage products must be cooked to 155°F for 15 seconds."

Each CCP will have at least one (possibly more) preventive measures that need to be controlled to assure this prevention, elimination or reduction of food safety hazards. To be effective, each critical limit should be:

1. ***Based on proven factual information.*** A few ways that information and recommendations for appropriate limits can be obtained are: from regulatory requirements, scientific literature, and consultation with experts. If regulatory requirements exist they must be met or exceeded.

2. ***Objectives are measurable or observable, such as time and temperature.***

3. ***Appropriate and reasonable for the food product and operation.*** You should consider the type of equipment, the volume of product being produced, how the critical limit will be monitored and frequency of monitoring.

4. ***Specifics.*** When drafting your critical limits be specific in your language. Use action words, and be specific when naming people and equipment. An example could be "bake, uncovered in preheated 350°F oven to an internal temperature of 165°F for 15 seconds."

The HACCP team will find that many critical limits for your identified CCP's have already been established.

In some cases you'll need more than one critical limit to control a particular hazard. For example, the typical critical limits for cooked beef patties are time/temperature, patty thickness, and conveyor speed. It is important that you identify all the critical limits for each of your products.

Making sure each Critical Control Point has critical limits is the responsibility of each establishment. The HACCP team may want to get help from outside HACCP experts when establishing critical limits. Remember that the critical limits must be able to maintain control over the food safety hazard. Once the team has identified all the limits, enter them onto the Critical Limits form.

Here are some controls commonly used as preventative measures.

• *Time and Temp - The temperature "danger zone" for biological hazards is between 40°F and 140°F. Bacteria grows fast! They have the ability to multiply rapidly. Knowing this shows that controlling how long the product is in the danger zone (if at all) presents itself as an extremely effective critical limit.*

•*pH - The pH of a food product is the level of its acidity or alkalinity. The pH is measured on a scale of 0 to 14. The middle of the scale, pH=7.0, is considered neutral. Altering a food product's pH, such as adding an acidic substance like vinegar or soy sauce will decrease the growth rate of the bacteria.*

• *Water Activity - In addition to warm temperatures and a median pH, bacteria also need water to grow. Water activity (A_w) refers to the amount of water in a food product that is available, or free, for bacteria to use for growth and multiplication. Solutes (salts and vinegars), as well as dehydration, decrease the available water and can reduce bacterial growth.*

Working with the "Critical Limits" Form

For each CCP the Example Facility has a separate page of critical limits.

1. ***Under the "Limit" heading.*** The Example Facility noted an internal temperature of 165°F for 15 seconds as the established critical limit. They then decided that the preventive measure of cooking at 190°F oven temperature for 3 hours would satisfy the critical limit.

2. ***Under the "Source" Heading.*** The Example Facility's first source is regulatory and scientific. They decided to take the established regulatory limits and use them, but then they also sent out samples of their finished product to be scientifically analyzed. The results of the lab tests confirmed that their critical limits were enough.

   [The source is the "evidence" that backs up your critical limits. The source provides that the critical limits you cite will effectively control the food safety hazards. Sources for critical limits can be scientific, regulatory or historical. The HACCP team has to find at least one source for each of your critical limits, but you can always put more if you want.]

Documenting the Source

When determining your critical limits make sure you file your supporting documentation with your HACCP plan. This documentation will help validate that the limits have been properly established. These could be things such as letters from outside HACCP experts, or scientific reports, or lab test results. By holding onto these

supporting documents you also provide verification material when needed.

HACCP Principle 3
Critical Limits Form

Product/Process Name: Beef Jerky/Heat Treated, Shelf Stable

Process Step/CCP: Cooking CCP#01B

Critical Limits
Limit - (Time, Temp, pH, etc.)

Internal temperature: 165 degrees Fahrenheit for 15 seconds.

Preventive Measure: Oven temperature: 190 degrees Fahrenheit for 3 hours.

Source - (cite a regulation, scientific document, other resource)

Meets regulatory requirements

Laboratory tests and results

Developed by: Cindy Jones **Date** 12/14/98

Principle 4: Establish Monitoring Procedures

Monitoring involves a series of observations and/or measurements that are used to make sure a CCP is under control. The HACCP team can think of monitoring activities as the checks-and-balances for each CCP. When someone monitors, they are "checking to see" that the critical limits are being met.

What are the 3 things monitoring can do for you?

- Shows you when a deviation from a critical limit has happened. For example, an employee tests the temperature of some beef patties and discovers that the internal temperature has gone above the established critical limit of 40^{o}F. If not caught here, this would be a potentially serious health risk to consumers.

- Helps you identify trends in your process that will allow you to predict a loss of control at a CCP. For example, a facility may monitor the temperature of a cold storage area at 6 a.m., 8 a.m., and 10 a.m. Each time, the temperature is within acceptable limits, but it is steadily climbing toward the high end of the range. This information points towards a trend, and the facility should take action to prevent the temperature from exceeding the critical limits.

- Produces written records for use in future HACCP plan verification steps. Written monitoring records will prove very valuable to your operation, should a serious problem along the production line occur. The records you keep prove that your company has established and carried out effective monitoring techniques.

Monitoring procedures can be thought of as continuous or non-continuous.

- Continuous monitoring is the constant monitoring of a critical control point.
- Non-continuous monitoring is the scheduled monitoring of a critical control point.

Continuous monitoring is always preferred when feasible. Continuous monitoring at a CCP is usually done with built-in measuring equipment, such as a recording thermometer used at a cooking step. This type of monitoring is preferred because it yields a permanent record. To make sure these activities stay accurate, you need to regularly check the monitoring equipment to make sure that it is calibrated correctly.

If continuous monitoring isn't feasible for your CCP then the HACCP team will need to establish non-continuous monitoring procedures. Non-continuous doesn't mean random. The team should decide in the development phase what the monitoring schedule should be. When you use non-continuous monitoring, make sure that it's scheduled often enough to keep the food safety hazards under control. Expert advice from people with knowledge of practical statistics and statistical process control will be important in making your decisions. Types of non-continuous monitoring procedures include visual examinations, monitoring ingredient specifications, measurements of pH or water activity (Aw), taking product temperatures, etc.

Who's Responsible?

Make sure to assign a specific person to be responsible for the monitoring of a CCP. The Example Facility has a

designated shift leader/cook who is responsible for monitoring the cooking CCP. The person who actually does the monitoring must be the person who signs and dates all the records at the time of monitoring.

Monitoring will be most effective when:

- The HACCP plan clearly identifies the employee(s) responsible for monitoring.
- Employees are trained in the proper testing procedures, the established critical limits, the methods of recording monitoring results, and the actions to be taken when critical limits are exceeded.
- Employee(s) understand the purpose and importance of monitoring.

The last step in establishing your monitoring procedures is to develop the Monitoring Log(s) where the monitoring person will record the date for each CCP. Due to the variety of monitoring procedures, the HACCP team may need to developed different logs to record the monitoring data at different CCP's. When your HACCP system is up and running, you will use these logs to track the day-to-day HACCP activities. Sample logs are provided in the Appendix.

Working with the "Monitoring Procedures" Form

The form that is shown as an example on the next page is to be used as a tool in the development of your HACCP plan. The information on this form is the "Who, What, When and How" of monitoring.

For the Example Facility:

- The Who is the cook on duty.
- The What is the temperature of the oven.
- The When is non-continuously - every 60 minutes, (+ 5 minutes), and
- The How is with the oven temperature gauge.

The Example Store felt this type of non-continuous monitoring would be effective because of the consistent heat environment of the oven. Their logic was that if the temperature taken at the beginning and end of the cooking cycle was the same, it could reasonably be assumed that it was okay for the whole cooking cycle.

Remembering your Monitoring

The key to effective and reliable monitoring is to keep it simple and build it into the employees' normal routines. When establishing a time for the actual monitoring procedure, allow some flexibility. For example, if you say you will monitor a CCP at 10 a.m. and the person is not there at exactly 10 a.m., you could be opening yourself up for problems. It is suggested that you specify a period of time during which monitoring will occur. For example, write your time as "10a.m. +/-- 10 minutes"or "between the time period of 10 a.m. and 10:15 a.m."

HACCP Principle 4
Monitoring Procedures Form

Product/Process Name: Beef Jerky/Heat Treated, Shelf Stable

Process Step/CCP: Cooking CCP #01B

Monitoring Procedures - (Who, What, When, How)

The cook on duty records the oven temperature at intervals of 60 minutes, (±5 minutes) starting when a "lot" is placed in the oven and ending when the "lot" is removed from oven. Each oven is monitored individually using an oven temperature gauge.

Developed by: Cindy Jones **Date** 12/10/98