

**NEW TRENDS IN THE APPLICATION OF HACCP
IN THE CATERING INDUSTRY:
HACCP FOR CONTINUOUS OPERATIONAL IMPROVEMENT**

TABLE OF CONTENTS

- Current use of HACCP in the retail / catering industry.
- The use of HACCP for catering industry self-control and process innovation.
- Developing a retail HACCP-based self-control / process innovation program.
 1. The chef is the kitchen process hazard controller
 2. Description of the system and products
 3. Retail / catering HACCP description
 4. The food system processes
 5. Process step hazard analysis and control plan
 6. Menu items group HACCP
 7. Chicken Cacciatore HACCP plan
 8. Quality-assured HACCP recipe procedures – Chicken Cacciatore
 9. Chicken Cacciatore QA recipe flow
 10. Process HACCP – (Company) HACCP-based policy, procedure, and standard
 11. HACCP
 12. Active Managerial Control-HACCP
 13. Retail operation food safety HACCP self-assessment
 14. Employee food HACCP mastery training form
 15. HACCP team monthly meeting report
 16. Corrective action report
 17. Unit hazard-control system development, operation, verification
 18. AMC-HACCP summary

NEW TRENDS IN THE APPLICATION OF HACCP IN THE CATERING INDUSTRY: HACCP FOR CONTINUOUS OPERATIONAL IMPROVEMENT

Current use of HACCP in the retail / catering industry

Up to now, HACCP has been used mostly by retail regulatory officials as an additional inspection tool. They have used HACCP to add an analysis of the food handling practices to the traditional floors, walls, and ceilings inspection. However, often, the hazards are not based on risk, and critical limits for the processes are not based on science, but rather, are historical conservative estimates in regulatory codes or based on political decisions. In addition, regulators have no responsibility for process innovation such as chilled, minimally processed, and sous vide foods. Therefore, the retail operator cannot improve processes, because there is no operator innovation process.

Also, regulatory HACCP is designed around the idea that the inspector and inspection process control the hazards and assure safety. The measure of a successful program is the number of inspections a year. However, the inspectors are only in the facility for a few hours a year and rarely during busy times, weekends, or catering events. Therefore, they never have a chance to see most food being processed to meet critical limits and process target values. The only person who can assure that each meal is safe every day is the cook. The cook is the hazard controller (Figure 1). The regulator can only verify that the cook is capable of hazard control.

The use of HACCP for catering industry innovation and self-control

If retail operators want new processes and want to assure the safety of every meal, operators must develop and validate safe recipes / processes on their own. They can use university food science departments and consultants as process authorities, as do food processors. They or their chefs can learn how to determine if an ingredient is hazardous, if a hazard is significant, and what the thresholds for the hazards are. This analysis is guided by HACCP risk assessment.

Not every operator wants to do process innovation and self-control. Retail HACCP should not be mandated, but should be voluntary. Operators can choose to use government regulatory control, called, "safe harbors." If they choose HACCP, they must validate their own controls to prevent, eliminate, or reduce the hazard to an acceptable level. If they choose HACCP, they must also write a control document such as an SSOP or HACCP plan. They must also train employees. Finally, they must assess performance and improve the stability of the processes, because they are committed to self-control.

Some large foodservice chains have implemented HACCP to please the regulators, but their programs really amount to simply more record keeping of food temperatures and result in no increased safety. Record keeping for regulators is a big hurdle to HACCP, because it does not really help in preventing risk and showing due diligence. The Active Managerial Control (AMC) retail HACCP discussed in this paper requires minimum records and does result in improved employee food safety control.

Developing an AMC retail HACCP-based self-control / process innovation program

The AMC-HACCP described in this document follows closely the requirements of the National Advisory Committee on Microbiological Criteria for Foods (NACMCF).

1. NACMCF. 1998a. Hazard analysis and critical control point principles and application guidelines. *J. Food Prot.* 61(9):1246-1259.
2. NACMCF. 1998b. Principles of risk assessment for illness caused by foodborne biological agents. *J. Food Prot.* 61(8):1071-1074.

To do AMC-HACCP, the first requirement for due diligence is the management commitment statement. For example:

"It is the policy of this operation to operate so that there is complete assurance that our customers will receive the optimum nourishment, and all possible risks will be minimized to reduce chances of customers being made ill from our food, or be injured by a foreign object in our food.

"In order to achieve this operating standard, we will be guided by government regulations and our hazard analysis, critical control-based, food safety policies, procedures, and standards manual / checklist."

This is posted in the facility so that all employees know that following management's food-handling hazard and control policies, procedures, and standards is mandatory.

System description (Figure 2)

When an operator wants to implement AMC-HACCP, the first step is to write the system description, as required by NACMCF (Figure 2). This is an important document, because many restaurants have take-out food, catered food, and many forms of service for which it is difficult to maintain temperatures or personal hygiene. Unless these and all forms of food preparation and service are identified, they could be overlooked when developing and then, managing the HACCP program. Figure 2 is a form to guide the collection of the system description information.

The last item on Figure 2 mentions pictures of the outside and inside of the facility. The digital camera is a powerful tool to simplify documentation. Taking pictures of the kitchen or the environment around the facility, for instance, makes it easier to identify risk factors associated with operating the facility.

HACCP description (Figure 3)

With the general description of the system, one needs to develop the specific retail / catering HACCP description. Figure 3 shows the eight principal components of a retail food system.

1. Management
2. Personnel
3. Environment around the facility
4. Facility itself, which is built to exclude the environment from the food preparation area
5. Equipment, which has the purpose of reducing the hazards on the food to a safe level
6. Supplies, which include the food with biological, chemical, and physical hazards that enters the system to be made safe.
7. Processes and products, which include the food ingredients that come into the system, handled by employees, and are made safe by cooking, washing, etc.

8. Customers, who receive the food and consume it or take it to a different location, and who may get ill if they do not handle the food safely.

Process groups (Figure 4)

The processes of the food system fit into the two HACCP groups: prerequisite processes and food HACCP processes (Figure 4). The prerequisite processes include:

1. Management
2. Personnel
- 3, 4, 5. Environment, facilities, equipment
6. Supplies.

The NACMCF has restricted HACCP processes to only the food production processes, even though, for example, hand washing and cleaning food contact surfaces, which are prerequisites, are also hazard controls. To be compatible with the NACMCF, we have separated the system processes into 1) prerequisite and 2) food HACCP.

Process step analysis (Figure 5)

HACCP is designed to find the significant hazards in a process and develop validated controls. Figure 5 shows a basic NACMCF HACCP process step-by-step hazard analysis and control plan. It is critically important in doing the process step hazard analysis that risk be factored in. The first column shows the step information. Next is the risk assessment HACCP analysis; then, risk hazard control; monitoring step; corrective action; and verification. In HACCP, it is not the government that is supposed to assess risk. It is the manager who assesses risk. The questions that must be answered, according to the NACMCF risk document (NACMCF, 1998b), are shown on this form. In the current retail food system, the government wants no risk. However, there is no such thing as "no risk." Employees and machines are not perfect, which means, that some time, customers will become ill and die from a foodborne illness. While the number of foodborne illnesses can be reduced to a very low level, there is still some risk.

The questions in Figure 5 are critically important to establishing a viable HACCP program. If a biological, chemical, and physical hazard is not at a significant level, such as flies landing on food, but are not a hazard because of the absence of open sewage, then, flies should not be addressed as a hazard in a HACCP program.

Once the first step of analysis – determining whether or not there is a significant risk – is done, one can decide on a control and validate that the control reduces the hazard to a tolerable level. One can also define a monitoring system that truly monitors that the critical limits have been met. A serious problem today in retail food operations that the bimetallic coil thermometer is allowed for determining safe food temperatures. However, the bimetallic coil thermometer is not an accurate temperature-measuring device for thin foods. Unless one has a thin-tipped thermometer such as a thermistor or thermocouple, one cannot verify that a thin food item has been sufficiently pasteurized. Corrective action and verification follow.

Note also, in hazard analysis, if there are foods such as eggs that are going to be served raw or under-cooked, and there is a risk that the growing environment may be contaminated, one is still allowed to serve the food, provided one communicates with the consumer, saying that the food being served is raw or under-cooked, and consumers should know that there is a risk of there being pathogens on the food.

Menu items group HACCP (Figure 6)

One does not have to do a HACCP plan for each menu item individually. HACCP allows items to be grouped according to similar hazards and critical points. Figure 6, "Menu items group HACCP," shows the actual retail food process groups. Examples are shown of foods in each category, and each category has a flow line of receiving to service showing the critical control if there is one in a given process.

One test of the HACCP chef is to ask the chef, "What are you serving for lunch?" and "Which ingredients did the supplier make safe, and which ingredients do you have to make safe?" When the chef has identified these, then you ask, "How do you make those unsafe ingredients / food items safe (e.g., raw hamburger, raw fish, etc.)?"

The NACMCF HACCP plan (Figure 7)

The NACMCF way of documenting a HACCP plan is shown in Figure 7. This is a thorough document, but is not a document for the cook to use to prepare food. It is a regulatory-type document. Regulatory officials have never addressed the recipe as a hazard control document.

Quality-assured HACCP recipe procedure (Figure 8)

One does not need to write the NACMCF-format HACCP plan with numerous columns. Any recipes can be turned into a HACCP plan simply by adding certain information at the critical control steps. Figure 8 is an example of a recipe written as a "HACCP'd" recipe. First, the ingredients and quantities are listed, so that one can verify that there is not an excessive percent of an additive of any kind. At the same time, all of the ingredients are identified for allergy purposes. At the preparation steps, times and temperatures are included for each step so that one can read the recipe and determine, for instance, that 45°F or 72°F for 10 minutes is not a significant hazard. The critical control points are identified so that one can determine that what is written is an effective control for *Salmonella* in the food, for example.

Recipe flow (Figure 9)

The recipe can also be flow-diagrammed if one wants to think about the sequence in the recipe steps (Figure 9), but the same words, times, and temperatures are used so that the flow diagram can stand alone and can be used to validate that the times and temperatures of the steps are adequate to control the hazards.

Process HACCP (Figure 10)

The systems approach is shown in this generic flow chart. By writing who prepared it, the process and product output specifications, and the hazards and validation procedure at the top, and then, showing the flow chart with temperature in (Ti) temperature out (To) and time (t), water activity, and pH, one can precisely define a recipe, and a chef can explain why a recipe is safe to an inspector, auditor, or guest.

Double hand washing with a fingernail brush (Figure 11)

The prerequisite programs can also be shown as HACCP process flows. Buying supplies can be diagrammed as a series of process steps. Washing the hands can be specified as a series of process steps. A very simple way to write a procedure equivalent to the recipe for a process such as hand washing is shown in Figure 11. Digital cameras make it very easy to create flow diagrams with a picture in the left column, and description of the hazards, critical controls, and critical limits in the right column. This makes it easy for one to verify if a process is safe and to teach the process.

Active Managerial Control HACCP (Figure 12)

HACCP is a scientific process for making sure that a process produces food with acceptable levels of hazards. However, it requires management oversight and enforcement to make it happen. Active Managerial Control (AMC) provides this. AMC simply means that the manager is involved in overseeing that the chef has an effective hazard control program in the kitchen. The steps associated with this are shown in Figure 12.

Note, the primary job of the regulatory official in HACCP is not to waste time looking at a facility, but simply to verify that the hazard inventory is complete, the controls are validated by a process authority, and the cooks can demonstrate the use of the controls.

Retail operation food safety HACCP self-assessment (Figure 13)

The first step in the AMC process is for the HACCP team to develop a self-assessment form. All regulatory codes have a checklist, but Figure 13, taken from a very thorough county code, has been rearranged to coincide with the HACCP prerequisite programs and the food HACCP processes. It shows the same eight components of management, personnel, environment, facility, equipment, supplies, food processes, and customers / take-out. The AMC-HACCP team uses this form once or twice a month to measure whether all of the processes in the kitchen are under control, or if corrective action needs to be taken.

Employee food HACCP (Figure 14)

Another essential component of AMC is that everyone working in the kitchen must understand the hazards and be able to demonstrate the controls specified on the self-assessment / checklist. The training form (Figure 14) has to match the elements of the checklist. This form does require that all employees are capable of performing the requirements of the checklist.

HACCP team monthly meeting report (Figure 15)

Continuous quality improvement is also essential to Active Managerial Control. The AMC--HACCP team monthly meeting report (Figure 15) is a guide for the team to use at its one-hour, monthly (or more frequently) meeting. The team reviews the checklist, discusses problems, and decides on corrective action to improve a process in the kitchen. The manager reviews this document, which is signed by all of the AMC-HACCP team members, declaring that the processes in the kitchen are in control.

Corrective action report (Figure 16)

When there is a serious change, a corrective action report, as is used in a processing plant, is prepared to document for future reference that something was changed in the kitchen, so that, if one employee leaves and a new employee is hired, the new employee can learn why changes were made.

Unit hazard control system development (Figure 17)

The development of the overall AMC-HACCP program follows these steps.

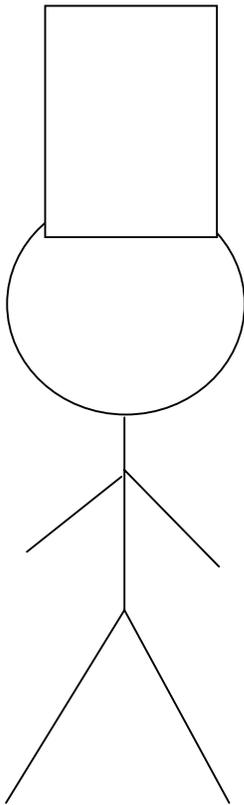
1. The owner has a concept of the facility and describes the facility.
2. The chef develops the HACCP menu and service controls.
3. The chef writes the HACCP recipes.
4. The process authority approves the recipes and procedures in the policies, procedures, and standards manual.
5. People are trained.

6. The system operates. Food is served. People note information on the checklist as to any deficiencies and operating parameters.
7. Management provides verification.
8. The AMC-HACCP team does its audit.
9. The AMC-HACCP team meets and decides on improvements.
10. The system cycles back to the next month of operation.

AMC-HACCP Summary (Figure 18)

Active Managerial Control simply adds a management control factor to the NACMCF's scientific food process control. It means that the operator and chef empower personnel, and the AMC-HACCP team uses the principles of HACCP as defined by the NACMCF and scientific research, and takes responsibility for safe food at all times during operation, as long as the food is being served. The regulatory official becomes an approval authority for new processes or lets the operator choose his/her own consultant or process authority. The operator and chef, because they have shown knowledge of how to identify the hazards, can do any safe process such as minimally processed foods or sous vide. Their facility is equivalent to a food processing plant. The operator has continuous quality improvement by virtue of the AMC-HACCP team doing inspections and corrective action. Operations are very consistent, as are all meals. The quality of the facility is excellent, because one cannot have hazard control without having process control. Eventually, there should be no need for regulatory inspection. If regulators want, they can have the AMC-HACCP operators send them copies of the monthly HACCP audit and team meeting report, just for verification that the AMC-HACCP program is effective.

THE CHEF IS THE KITCHEN PROCESS HAZARD CONTROLLER



The owner decides on the style of operations and menu concept.

The chef writes recipes, identifies the hazards, does risk analysis to find significant hazards, and specifies process performance standards and process targets (e.g., 155°F, 15 seconds).

The chef innovates new, safe (HACCP) processes.

The chef trains and controls the kitchen employees.

The chef inspects / coaches / monitors for compliance and takes corrective action.

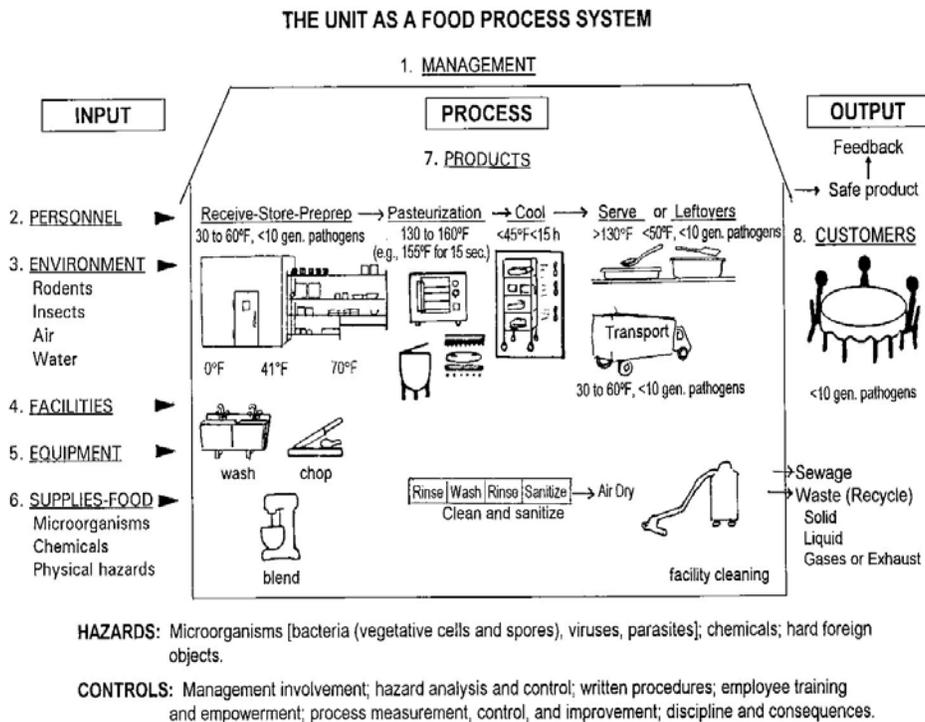
Process Hazard / Risk Analysis	Hazard Control	Monitor
Identify the biological, chemical, and physical hazards likely to cause illness or injury, and the process targets	The procedure and process standard to prevent, eliminate, or reduce the hazard to a tolerable level	What the chef does to verify and keep processes in control

DESCRIPTION OF THE SYSTEM AND PRODUCTS

Company / unit name and address																			
License / establishment number																			
Owner																			
Manager																			
Person in charge / certified food manager / HACCP team leader																			
HACCP team members and duties	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; border-bottom: 1px solid black;"><u>Member Name</u></th> <th style="text-align: left; border-bottom: 1px solid black;"><u>Duties:</u> Team</th> <th style="text-align: left; border-bottom: 1px solid black;">Operation</th> </tr> </thead> <tbody> <tr><td style="border-bottom: 1px solid black;"> </td><td style="border-bottom: 1px solid black;"> </td><td style="border-bottom: 1px solid black;"> </td></tr> <tr><td style="border-bottom: 1px solid black;"> </td><td style="border-bottom: 1px solid black;"> </td><td style="border-bottom: 1px solid black;"> </td></tr> <tr><td style="border-bottom: 1px solid black;"> </td><td style="border-bottom: 1px solid black;"> </td><td style="border-bottom: 1px solid black;"> </td></tr> <tr><td style="border-bottom: 1px solid black;"> </td><td style="border-bottom: 1px solid black;"> </td><td style="border-bottom: 1px solid black;"> </td></tr> <tr><td style="border-bottom: 1px solid black;"> </td><td style="border-bottom: 1px solid black;"> </td><td style="border-bottom: 1px solid black;"> </td></tr> </tbody> </table>	<u>Member Name</u>	<u>Duties:</u> Team	Operation															
<u>Member Name</u>	<u>Duties:</u> Team	Operation																	
HACCP facilitator																			
Hours of operation																			
Type of operation	<input type="checkbox"/> Cafeteria <input type="checkbox"/> Fast food <input type="checkbox"/> School <input type="checkbox"/> Restaurant <input type="checkbox"/> Hotel <input type="checkbox"/> Sport event <input type="checkbox"/> Vendor <input type="checkbox"/> Fair <input type="checkbox"/> Resort <input type="checkbox"/> Camping <input type="checkbox"/> Catering																		
Types of service	<input type="checkbox"/> Breakfast <input type="checkbox"/> Lunch <input type="checkbox"/> Dinner <input type="checkbox"/> Late night <input type="checkbox"/> Sit down dining service <input type="checkbox"/> Catering <input type="checkbox"/> Banquet <input type="checkbox"/> Bar <input type="checkbox"/> Cafeteria / self-service <input type="checkbox"/> Cook-it-yourself <input type="checkbox"/> Take-out																		
Which of the following processes do you use to prepare potentially hazardous food?	<table style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td style="width: 70%;">a. Cook and serve individual portions of food</td> <td style="width: 30%;">yes ___ no ___</td> </tr> <tr> <td>b. Cook large pieces of meat or whole poultry</td> <td>yes ___ no ___</td> </tr> <tr> <td>c. Cook and hold food hot for serving</td> <td>yes ___ no ___</td> </tr> <tr> <td>d. Cook and cool hot food for later use</td> <td>yes ___ no ___</td> </tr> <tr> <td>e. Cook, cool, cold hold, then reheat food</td> <td>yes ___ no ___</td> </tr> <tr> <td>f. Fix cold foods (salads, sandwiches, or desserts)</td> <td>yes ___ no ___</td> </tr> <tr> <td>g. Serve food that contains raw eggs or fish</td> <td>yes ___ no ___</td> </tr> </tbody> </table>	a. Cook and serve individual portions of food	yes ___ no ___	b. Cook large pieces of meat or whole poultry	yes ___ no ___	c. Cook and hold food hot for serving	yes ___ no ___	d. Cook and cool hot food for later use	yes ___ no ___	e. Cook, cool, cold hold, then reheat food	yes ___ no ___	f. Fix cold foods (salads, sandwiches, or desserts)	yes ___ no ___	g. Serve food that contains raw eggs or fish	yes ___ no ___				
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f. Fix cold foods (salads, sandwiches, or desserts)	yes ___ no ___																		
g. Serve food that contains raw eggs or fish	yes ___ no ___																		
Number of meals served daily	breakfast ___ lunch ___ dinner ___																		
Population to which food is mainly served	<input type="checkbox"/> General population <input type="checkbox"/> Infants and children <input type="checkbox"/> The elderly <input type="checkbox"/> Individuals who are ill																		
Specialty departments at this facility	<input type="checkbox"/> Bakery <input type="checkbox"/> Deli <input type="checkbox"/> Meat <input type="checkbox"/> Produce <input type="checkbox"/> Seafood <input type="checkbox"/> Soup / salad bar <input type="checkbox"/> Other (specify) _____																		
Foods given to charitable organizations																			
Manufacturing operations regulatory control																			
Description (picture) of outside and inside of facility																			

RETAIL / CATERING HACCP DESCRIPTION

HACCP is a catering and food store process design procedure that allows the chef to optimize control of existing processes and invent new processes that meet food safety process performance standards. There are eight system operational components.



References:

- NACMCF. 1998. Hazard analysis and critical control point principles and application guidelines. J. Food Prot. 61(9):1246-1259.
- NACMCF. 1998. Principles of risk assessment for illness caused by foodborne biological agents. J. Food Prot. 61(8):1071-1074.

THE FOOD SYSTEM PROCESSES

PREREQUISITE PROCESSES

- 1. Management**
 - Hazard inventory and validated controls (checklist / policy manual)
 - Owner control of compliance
 - Kitchen HACCP team self-inspection, problem removal, and CQI
- 2. Personnel**
 - Employee hazard control training to mastery
 - Coaching for zero defects / deviations
 - Personal hygiene and fingertip washing, 6 log *Shigella*
- 3, 4, 5. Environment, facilities, and equipment**
 - Safe water
 - Sewage control, food waste and non-food waste control
 - Construction of plumbing
 - Construction of floors, walls, ceilings
 - Construction to exclude insects and rodents
 - Facility and equipment cleaning and maintenance
 - Food contact surface cleaning and sanitizing
 - Temperature calibration of equipment operation
- 6. Supplies**
 - Supplier provides intervention strategy for food served raw or under-cooked, *Salmonella*, etc. <1 / 100 g
 - Receiving: defective / substandard containers rejected; mold removed
 - Allergy-causing ingredients identified
 - Storage: no cross-contamination
 - Chemical control
 - Physical hazard control

7. FOOD HACCP PROCESSES

- Pre-prep**
 - Cook identifies supplier-made-safe ingredients (oysters, mushrooms, eggs, sprouts, fully cooked, etc.) and those that he/she makes safe (raw fruits and vegetables, icings, meat and poultry, beverages, hot and cold hors d'oeuvres)
- Preparation**
 - Raw fruits and vegetables, wash, 2 log *Shigella*
 - Salad dressing, marinades, pH <4.1, *Salmonella*
 - Thick food, >2 inches, oven, bakery, roast, 5 log *Salmonella*
 - Thin food, <2 inches, grill / fry, 5 log *Salmonella*
 - Kettle, microwave, steam, soup, etc., 5 log *Salmonella*
 - Cold / hot combinations, safe ingredients
- Transport, hold, serve, catering**
 - Vegetative cell and spore control, temperature >130°F
- Leftovers**
 - Cool to 40°F for <3 log increase in *Clostridium perfringens* or *Bacillus cereus*
- 8. Consumer (take out)**
 - Hot or cold handling of food, <40°F / >130°F, that will grow pathogens or <3 generations of *C. perfringens* / *B. cereus*

PROCESS STEP HAZARD ANALYSIS AND CONTROL PLAN

STEP					
CCP Step Description	Risk Assessment / Hazard Analysis	Risk / Hazard Control	Monitoring	Corrective Action	Verification
STEP					

1. Risk assessment / hazard analysis

- a. Hazard identification
 - *1) Name of the biological, chemical, and physical hazard _____
 - 2) Source of the hazard _____
 - 3) Epidemiological evidence of consumer illness / injury _____
- b. Exposure assessment
 - *1) The amount / size of hazard in the food with a probability >95 _____
 - 2) The frequency of the hazard in the food _____
 - 3) The hazard controls and probability of failure and producing a defective item _____
- c. Dose response
 - 1) The probability of a person consuming the hazard _____
 - 2) The percent of people who will become ill for above amount _____
 - 3) The percent of people who will become ill _____
- d. Severity / consequences

The maximum severity (cost to rehabilitate) of the illness in 95% of the cases _____
- e. Risk management

Is the risk significant? Y / N If NO, go to the next step. If YES, reduce the risk to an acceptable level in the hazard control step

OR tell the consumer (consumer communication) that the food may be hazardous (e.g., raw oysters) and let him/her decide if he/she wants to accept the risk

2. Risk (hazard) control (to a tolerable level)

- a. The critical limit or FSO (Food Safety Objective) or process objective for the hazard is _____
- b. Develop a control to prevent / eliminate / reduce the hazard to a tolerable level of _____
- c. The variability of the control is _____, so the target value for the control is _____ for ≤ 0.05 probability of failure
- d. The validation of the process control is _____
- e) Is management control adequate? If NO, improve:
 - 1) Management involvement
 - 2) Hazard identification
 - 3) Effectiveness of existing policies, procedures, and standards
 - 4) Employee training and coaching
 - 5) Monitoring and continuous improvement

3. Monitoring / sampling plan

- a. Who _____ will measure what _____ how _____ and when _____ to keep process variation within CL 95% of the time
- b. Record the data on _____

4. Corrective action

- a. If _____ occurs: who _____ will do what _____ how and to what extent _____ to bring the process back into control?
- b. How will we know that the problem is eliminated?
- c. How will we verify that the process is back in control?
- d. What measures will we take to prevent recurrence?

5. Verification

Management (name) _____ will verify that the process is in control every _____ and record it on the _____

MENU ITEMS GROUP HACCP

Supplier Makes Safe

Raised safe, no treatment
Raw, not shelf stable

Receive, store
41°F

Fresh oysters, beef
Sprouts, berries, nuts, mushroom, fresh herbs, spices, parsley

→ Chop —————→ Garnish, combine
Sort —————→ Serve

Supplier made safe
Not shelf stable

Receive, store
0°F-thaw, 41°F

Pasteurized, washed, sterilized
Pasteurized meat, fish, fruits, vegetables, juice; Washed fruits and vegetables, dairy, eggs, cheese

→ Cut / chop / slice → Wash —————→ Plate / combine, 41°F
Heat 150°F —————→ Serve, 150°F

Supplier made safe
Shelf stable

Receive, store
70°F

pH, a_w, additives
Condiments, cake, pie, bread, dry cereal

—————→ Plate / combine
Serve, 70°F

Cook Makes Safe

Raw, wash makes safe

Receive, store
41°F

Wash dirt and manure off of fruits and vegetables
Celery, cabbage, lettuce

→ **CCP** Double wash, chemical dip? Dry, —————→ Plate / combine
41°F? —————→ Serve, 41°F

low-pH, acid makes safe

Ingredients

low pH <4.1, salad dressings, marinades, acid beverages
(Use a container made of acid-safe materials)

→ **CCP** Mix, pH <4.1, 70°F —————→ Plate / combine
Hold 2 days or pasteurize if raw eggs —————→ Serve 70°F

Oven (low / high humidity);
smoked, thick food >2"

Raw meat, fish,
poultry, 41°F

Pasteurize; cook makes safe
Roasts, casseroles, smoked meats

→ **CCP** Cook / pasteurize → Slice, cut —————→ Plate, 150°F
>150°F, >1 minute —————→ **CCP** Cool —————→ Serve, 41°F

Grill, griddle, fry,
pH >4.6, <2 inches

Raw ingredients,
41°F

Raw meat, fish, poultry
Batters (pancakes, waffles), eggs

—————→ **CCP** Cook to >150°F —————→ Plate, 150°F
Batter / bread —————→ **CCP** Cool —————→ Serve, 41°F

Kettle; microwave; steam,
boil

Meat, fish, poultry
Water, rice, lentils
Fruit, vegetables, 41°F

Soups (hot / cold), sauces (hot / cold), gravy, glaze, aspics, candy

→ **CCP** Cook to >150°F —————→ Plate, 150°F
—————→ **CCP** Cool —————→ Serve, 41°F

Bakery (bake, fry)

Ingredients
70°F and 41°F,
pH, a_w

Bread (fermented, flat), cake, pastry

→ Combine / mix ingredients;
70°F, ferment → **CCP** Cook / —————→ Slice, —————→ Plate, 150°F
pasteurize —————→ cut —————→ Cool —————→ Serve, 41°F

Cold / hot combination

Anything from above; meat, starch,
vegetables, sauce, 41°F

Salads, casseroles, sandwiches (hot or cold)

→ Combine (ingredients —————→ Cold —————→ Serve, 41°F
have been pasteurized) —————→ Heat —————→ Plate, 150°F

CHICKEN CACCIATORE HACCP PLAN

Process Steps and Controls: GMPs and prerequisites are in place	B, C, P, Potential Hazards and Risk Analysis	Control Critical Limit (CL) for each Hazard Control	Monitoring & Record; (What, How, Frequency, Who)	Corrective Action & Record	Verification & Record (Procedures and Frequency)
Preparation 1. Prepare sauce. Get chopped onions, mushrooms, green peppers, minced garlic. Sauté in oil. Add crushed tomatoes, juice, wine and seasoning. Bring to a simmer. Ti 40°F To 205°F t 20 min.	B: Not significant. C: None. P: None.	Supplies are obtained from reputable sources; sauce has low pH and is heated sufficiently to destroy vegetative pathogens.			
1a. Hold sauce in bain marie. Ti 205°F To 165°F t 20 min.	B: Not significant. C: None. P: None.	No pathogenic microbial growth in sauce at >130°F.			
2. Get chicken quarters from refrigerator. Remove rib bones. Ti 40°F To 45°F t 10 min.	B: Not significant. C: None P: Not significant.	Vegetative pathogens and spores are controlled by low temperature. Inspect to assure that all bones are removed			
3. CCP Place quarters, one layer deep in shallow roasting pan. Bake (brown) in convection oven at 350°F. Ti 45°F To >160°F t 30 min.	B: Vegetative pathogens and spores C: None P: None	Cooking temperature >160°F assures a >7D salmonellae kill.	Assigned worker takes one temperature of center of food in each lot and records on production sheet for each lot.	If temperature is not >160°F, continue to cook.	Supervisor initials the production log each shift.
4. Remove pan(s) of chicken from oven. Ti >160°F T145°F t 15 min.	B: Not significant. C: None. P: None.	Temperature >130°F controls spores and kills vegetative cells.			
4a. CCP Pour off liquid from pans of chicken. Chill. Refrigerate liquid. (Save for chicken stock). Ti >150°F To 40°F t <4 hr.	B: Pathogenic spores C: None P: None	Cooling chicken stock to 40°F within 4 hours limits spore outgrowth.	Use clean, sanitized container and refrigerator that is validated for safe cooling	If refrigeration goes off, move stock to a working refrigerator. If cooling is >15 hr. to 45°F, throw it out.	Supervisor initials the production log each shift.
5. Cover chicken quarters with sauce held in bain marie (Step 1a.). Ti >145°F To 145°F t <10 min.	B: Not significant C: None. P: None.	Temperature >130°F controls spores and kills vegetative cells.			
6. Bake at 300°F in convection oven until chicken reaches a temperature of 175°F. Ti >145°F To 175°F t <45 min.	B: Not significant. C: None. P: None.	Temperature >130°F controls spores and kills vegetative cells.			
7. Check. Is the temperature >175°F? If not, continue to cook.	B: Not significant. C: None. P: None.	Temperature >130°F controls spores and kills vegetative cells.			
8. Cover and transfer to 150°F hot holding unit. Ti >175°F To 170°F t 5 min.	B: Not significant. C: None. P: None.	Temperature >130°F controls spores and kills vegetative cells.			
Hold/Serve 9. Hold. Serve 1/4 chicken and 3 oz. sauce. Use within <2 hr. Ti 170°F To 150°F t <120 min.	B: Not significant. C: None. P: None.	Temperature >130°F controls spores and kills vegetative cells.			
Leftovers 10. CCP Cool to <45°F within 15 hr., ≤2 inches deep Ti 150°F To 45°F t <15 hr.	B: Pathogenic spores. C: None P: None	Cooling from 130°F to ≤45°F <15 hr. assures safety (Juneja et al, 1994). The presence of pathogenic microorganisms from cross contamination products is controlled by GMPs and SSOPs.	Assigned worker makes sure containers are the authorized sizes to cool to ≤45°F in < 15 hr. This is recorded on production sheet for each lot.	If refrigerator goes off, transfer to a functioning refrigeration unit. If containers are the wrong size, get the correct size.	The production schedule will be initiated by a supervisor once a shift, prior to transfer to refrigerator. The supervisor will initial that the CCP has been met.

B, C, P = Biological, Chemical, and Physical

CCP = Critical Control Point

Approved (QC) _____ Date _____

Approved (Process Authority) _____ Date _____

QUALITY-ASSURED HACCP RECIPE PROCEDURES

Recipe Name: **Chicken Cacciatore** Portion size (vol./wt.): **1/4 (6 oz.) chicken + 3 oz. sauce** Preparation time: 2 hours
 Production style: **Combination** Number of portions: **100** Prepared by: **S. P.**
 Written by: **O. P. S.** Date: 10/95 Final yield (AS): **100** Supervisor:
 SA/QA by: **J. Bell** Date: 12/95 Final yield:

Gp. #	Ingred. #	Ingredients and Specifications	Edible Portion (EP) (weight or volume)		EP Weight %	As served (weight)
I	1	Onions, chopped (1/2" x 1")	3.0 lb	1,360.00 g	13.26	22.0 lb
	2	Mushrooms, cut (1/2", caps & stems)	3.0 lb	1,360.00 g	13.26	
	3	Peppers, green, cut (1/2" x 1")	2.0 lb	907.2 g	8.84	
	4	Garlic, chopped	6 Tbsp.	85.05 g	0.53	
	5	Tomatoes, canned, crushed (2 - #10 cans)	13.25 lb	6,010.00 g	58.58	
	6	Oil, vegetable	1/4 cup	54.00 g	0.53	
	7	Wine, Marsala or Madeira	2 cups	472.00 g	4.60	
	8	Oregano, crushed	2 tsp.	3.00 g	0.03	
	9	Salt	1 tsp.	5.50 g	0.05	
	10	Pepper	1 tsp.	2.10 g	0.02	
		Total	22.6 lb	10,258.85 g	100.00	
		Approx. gallons	2.5 gal.			
II	11	Chickens, whole (25 - 2¼ to 2½ lb.)	62 lb			40.0 lb

Preparation

- Prepare sauce.** Get chopped onions, mushrooms, green peppers and garlic (40°F) from refrigerator. Sauté the vegetables in vegetable oil for about 10 minutes. Add crushed tomatoes with juice, wine, and seasonings (72°F). Bring sauce to a simmering temperature (205°F, 10 min.). Hold sauce in bain marie (165°F, 20 min.).
- Prepare chicken.** Get chicken quarters (40°F) from meat and poultry refrigerated storage area. Remove rib bones. (45°F, 10 min.)
- CCP** Place quarters, one layer deep in shallow roasting pans. Brown chicken by baking it in a convection oven at 350°F for 30 min. (>160°F)
- Remove pans of chicken from oven (145°F, 15 min.). **CCP** Pour off excess liquid. Chill liquid. Save for chicken stock. (40°F, <4 hours).
- Cover the chicken quarters with sauce (145°F, <10 min.).
- Return the pans of chicken and sauce to convection ovens at 300°F and continue baking until all parts of the chicken reach a temperature of 175°F (about 45 minutes).
- Check** temperature of chicken. If temperature is not 175°F, continue baking.
- Cover chicken, transfer to 150°F hot holding unit and serve within <2 hours.

Hold/Serve

- Hold / serve chicken >150°F, <2 hours. For each portion, use either 1/4 quarter white or dark meat. Chicken should be accompanied by 3 ounces of sauce (about 3 tablespoons) (>140°F).

Leftovers

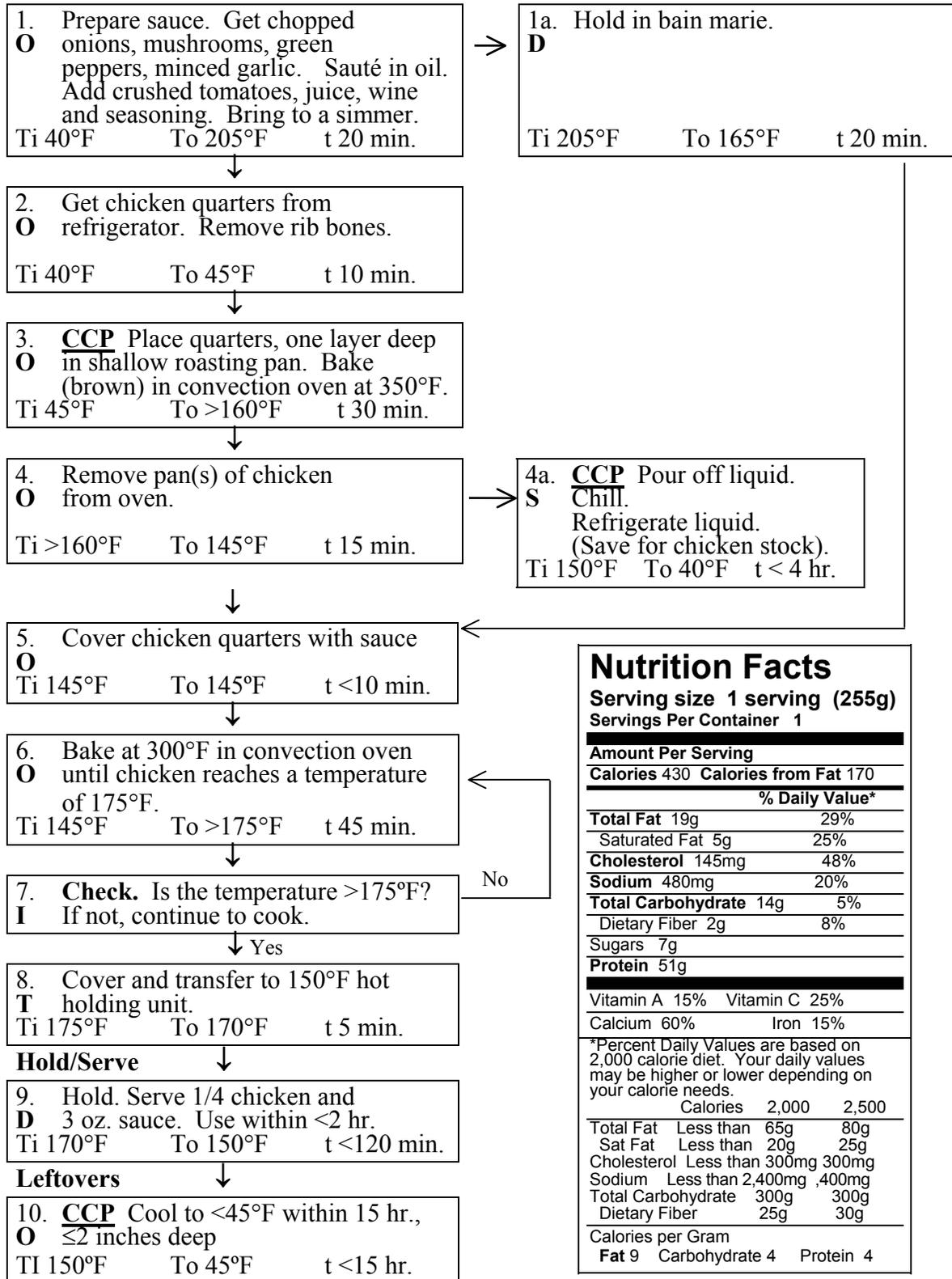
- CCP** Cool to <45°F in <15 hours, <2 inches deep.

Ingredients that could produce possible allergic reactions: Tomatoes, wine

Process step #	Start food ctr. temp., °F	Thickest food dimension (in.)	Container size HxWxL (in.)	Cover Yes/No	Temp. on/around food	End food ctr. temp., °F	Process step time, hr./min.
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CHICKEN CACCIATORE QA RECIPE FLOW

Preparation



Nutrition Facts	
Serving size 1 serving (255g)	
Servings Per Container 1	
Amount Per Serving	
Calories 430 Calories from Fat 170	
% Daily Value*	
Total Fat	19g 29%
Saturated Fat	5g 25%
Cholesterol	145mg 48%
Sodium	480mg 20%
Total Carbohydrate	14g 5%
Dietary Fiber	2g 8%
Sugars	7g
Protein 51g	
Vitamin A	15%
Vitamin C	25%
Calcium	60%
Iron	15%
*Percent Daily Values are based on 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.	
	Calories 2,000 2,500
Total Fat	Less than 65g 80g
Sat Fat	Less than 20g 25g
Cholesterol	Less than 300mg 300mg
Sodium	Less than 2,400mg 400mg
Total Carbohydrate	300g 300g
Dietary Fiber	25g 30g
Calories per Gram	
Fat	9
Carbohydrate	4
Protein	4

Ingredients: Chicken, tomatoes, onion, mushrooms, green peppers, Marsala wine, garlic, vegetable oil, salt, oregano, pepper

(PROCESS HACCP TITLE)

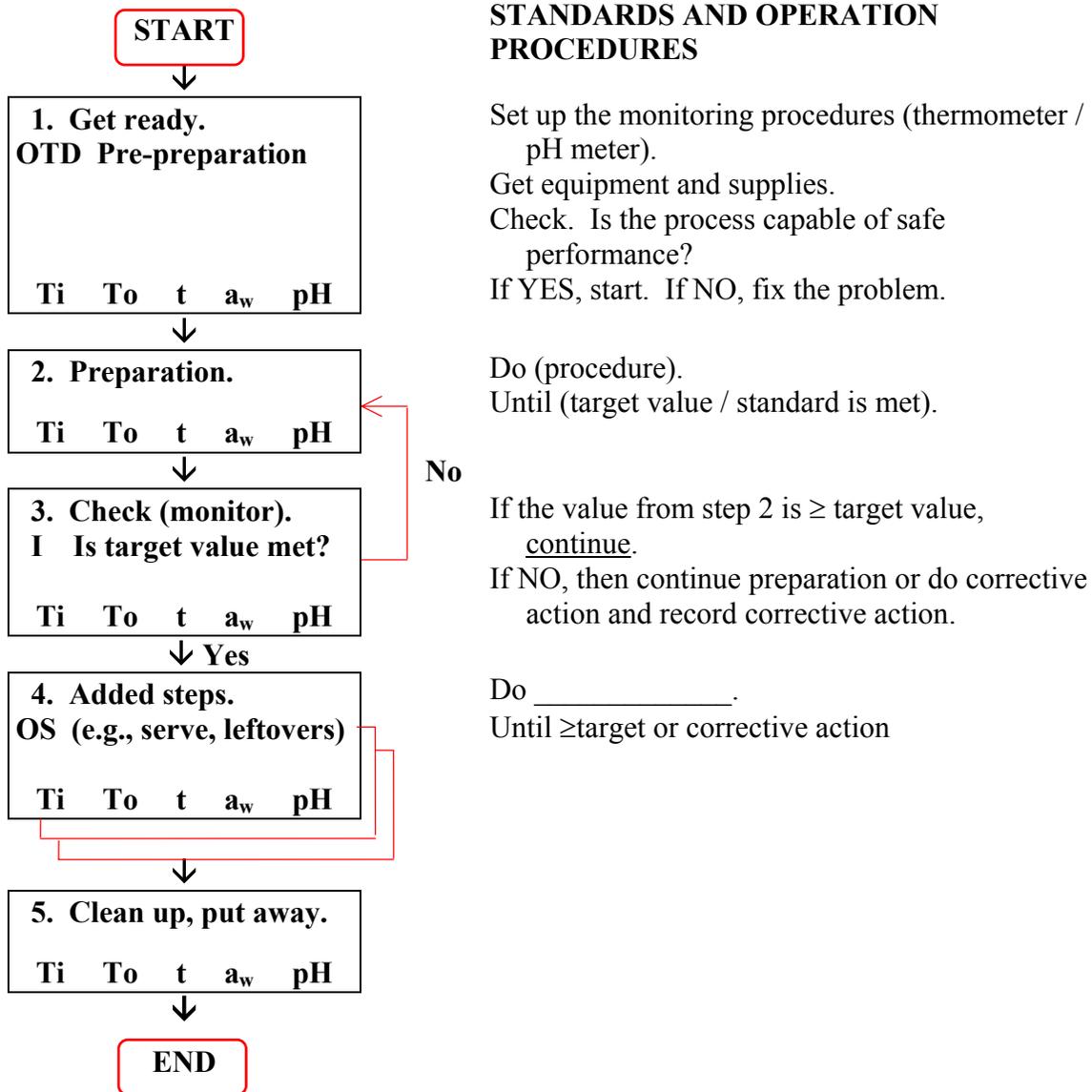
(Company) HACCP-Based Policy, Procedure, and Standard

Prepared by: (Process Authority)

Process and product output specification: (What is this process designed to do? e.g., reduce *Salmonella* 5 log)

Hazards: (microbiological, chemical physical, expected input level; FSO / safe critical limit; process performance standard; process control target value)

Validation procedure:



DOUBLE HAND WASHING WITH A FINGERNAIL BRUSH HACCP

Dept.: _____ Person responsible: _____ Effective date: _____

Process: To double wash fingertips and hands to reduce by 10^{-6} pathogens from feces and vomit on fingertips and underneath fingernails and to single wash to reduce 10^{-3} pathogens from food when preparing food in the kitchen.

The Hazard: When an employee arrives from home, or after using the toilet, the employee must be assumed to have $\leq 10^6$ pathogens on his or her fingertips and underneath fingernails. This concentration must be reduced to ≤ 10 to assure that the transfer of pathogens to the food that the employee handles is at a safe level. When working in the kitchen, an employee might touch contaminated food such as raw poultry and then, must reduce pathogens by 10^{-2} to reduce the pathogens to a safe level.

Standards and Operating Procedure

Get ready. Check to see that there is an adequate supply of unscented, non-antibacterial hand detergent, an Anchor Surgeon's Scrub nail brush, and disposable paper towels at the hand sink.



Wet hands. Turn on the water. Let it flow rapidly at 2 gallons per minute until warm (75 to 110°F). It is the water that removes the pathogens.

Apply detergent to the fingernail brush. Place enough detergent (1/2 teaspoon or 3 to 5 ml) to build a good lather on the fingers.



Brush and lather, particularly fingertips and fingernails. Hold the brush with the bristles up, and touch the tips of the fingers of the hand that held the toilet paper to the tips of the bristles. Gently brush the tips of the fingers, without bending the bristles, while water runs over the fingers and washes the pathogens down the drain. Continue until the brush and the fingers have no lather (about 12 seconds). This will give about a 1,000-to-1 reduction.

Lay the nail brush down with bristles up. This allows the water to run off so that the brush dries, and bacteria cannot multiply.



Second wash for additional toilet/food pathogen reduction or first wash for reduction of food pathogens to a safe level. Add 1/2 teaspoon or 3 to 5 ml of hand detergent to the palm of one hand. This wash without the nail brush reduces pathogens another 100 to 1. If it follows use of the nail brush, it gives a total of >100,000-to-1 reduction of pathogens on fingertips. When working with food, there are only moderately low levels of pathogens on fingertips, and this 100-to-1 reduction is sufficient to make the fingers safe from food pathogens.



Lather and wash hands (and arms if you will be mixing salad or dough). Massage the hands together and between the fingers. Wash the arms up to the tips of the shirt sleeves, if appropriate. Thoroughly rinse all of the lather from the fingertips, hands, and arms in flowing warm water. When the detergent and lather are gone from the skin, the pathogens are reduced to a safe level.



Dry hands using paper towel(s). Use clean, disposable paper towel(s) to thoroughly dry hands and arms. This reduces the microorganisms an estimated, additional 10 to 1 for a total double wash reduction of 10^{-6} .

ACTIVE MANAGERIAL CONTROL-HACCP

Means simply that the operator empowers the chef to use HACCP to:

- A. Identify hazards in the day-to-day operation of the food establishment;
- B. Develop and implement kitchen policies and procedures to prevent foodborne illness;
- C. Train employees to control the hazards and monitor their procedures in the tasks that they do;
- D. Take corrective action to keep processes in control;
- E. Conduct in-house self-assessments of daily operations on a periodic basis to ensure that food safety policies and procedures are followed.

Reference: Minnesota Rules 4626.2010, Subp 5.

The job of the regulatory official is to verify the HACCP team HAZARD inventory is complete, controls are validated, and cooks can demonstrate use of the controls.

RETAIL OPERATION FOOD SAFETY HACCP SELF-ASSESSMENT

Prerequisite Programs
<p>1. Management</p> <ul style="list-style-type: none"> a. Employee HACCP team: How effective is: <ul style="list-style-type: none"> 1) Self-assessment checklist 2) Training of cook to know hazards and perform controls and monitoring 3) Team meeting b. HACCP plan validated All food preparation procedures validated c. PIC during all hours of operation d. Attend food safety training
<p>2. Environment / Facilities</p> <ul style="list-style-type: none"> a. Environment around building cleaned and maintained b. Facility <ul style="list-style-type: none"> 1) Cleaned, maintained, pests controlled 2) Water, plumbing, sewage, trash controlled (no cross connections; backflow preventers / air gaps installed; water safe source; approved sewer system) 3) Insects / rodents controlled (areas clean, tidy; sealed openings) 4) Toxic items, chemicals controlled (separate storage; labeled)
<p>3. Personal Hygiene</p> <ul style="list-style-type: none"> a. Ill employee control (no work if vomiting, diarrhea; tell PIC if sick; restricted work if sneezing, coughing, runny nose; Call health department with hepatitis A, <i>Salmonella</i>, <i>Escherichia coli</i> O157:H7, etc.) b. Employees clean (uniform; no body odor, etc.) c. Double hand washing when coming into food prep area; convenient, equipped sink d. Single hand washing when in kitchen working with food; convenient, equipped sink; fingertip rinse bucket at work station e. System to verify that employees are washing hands f. Gloves; no cross-contamination (if gloves are worn, wash hands first; change between tasks / when damaged) g. Wounds and cuts on hands, arms washed, bandaged, covered with glove / fingercot
<p>4. Food Source and Receiving Storage</p> <ul style="list-style-type: none"> a. Supplies not damaged / spoiled; inspect at delivery; reject when necessary b. Approved sources; provide intervention strategies c. Food received $\leq 41^{\circ}\text{F}$ or 0°F and stored, covered raw on bottom, ready-to-eat on top

Prerequisite Programs (cont'd)
<p>5. Equipment</p> <ul style="list-style-type: none"> a. All equipment cleaned after used and maintained; all food contact surfaces are smooth, easily cleaned b. System to verify correct cleaning and sanitizing c. Thermostats calibrated d. Pre-rinse, wash, rinse, sanitize, air dried (proper water temperature; sanitizer concentration) e. No cross-contamination from raw to ready-to-eat food (storage; clean equipment between uses) f. Refrigerators hold $\leq 41^{\circ}\text{F}$; freezers $\leq 0^{\circ}\text{F}$ g. Hot hold $\geq 140^{\circ}\text{F}$

Food HACCP Processes
<ul style="list-style-type: none"> 1. Correct double washing contaminated fruits and vegetables, 2 log reduction 2. Freezing for parasite destruction 3. Cooking, $>5\text{D}$ <i>Salmonella</i> reduction (150°F, >1 minute) 4. Hot hold, transport, serve / catering $>140^{\circ}\text{F}$ or <4 hours 5. Cooling, <2 inches thick, 1 $<$ gallon System to verify and record safe cooking / cooling temperatures 6. Cold hold, transport, serve / catering $<41^{\circ}\text{F}$ or <4 hours Written plan for time control for cold food when $>41^{\circ}\text{F}$; discard >4 hours Reheat to 165°F, <2 hours before hot hold Label with date of preparation or opening, refrigerated ready-to-eat, potentially hazardous food held >24 hours 7. Catering $>140^{\circ}\text{F}$ / $<41^{\circ}\text{F}$ when served. Leftovers handled safely. 8. Take out: Customers warned to handle safely 9. Leftovers / mixing salads, $<50^{\circ}\text{F}$ Discard refrigerated ready-to-eat, potentially hazardous food >7 days if not served

COMPANY NAME

DATE

HACCP TEAM MONTHLY MEETING REPORT

HACCP Team

Initial if present
(leader)

Suggested topics

1. Verification of effective HACCP program: self-inspection, corrective action, customer comments, training, government correspondence, improvements, changes to manual
2. Education
3. Other

Topics

Follow-up

HACCP Team: The personnel in this facility are capable of preparing and serving safe food.

Management review, comments: _____

Signature: _____ Date: _____

Process authority review, comments: _____

Signature: _____ Date: _____

CORRECTIVE ACTION REPORT ⁽¹⁾

Person completing report _____ Date _____

Critical limit corrective action

Quality corrective action

- a. Description and elimination of the problem: *What was done immediately to take care of the problem? What was done with any questionable food? It must include what action was taken to put process back into control according to Corrective Action plan.*

- b. Measures to prevent distribution of adulterated product. *Example: All adulterated product was found and destroyed.*

- c. Verification that process was back in control. *Show data that the critical control point was under control after correction: Example: Take data at the CCP for a time following corrective action to PROVE that problem was fixed.*

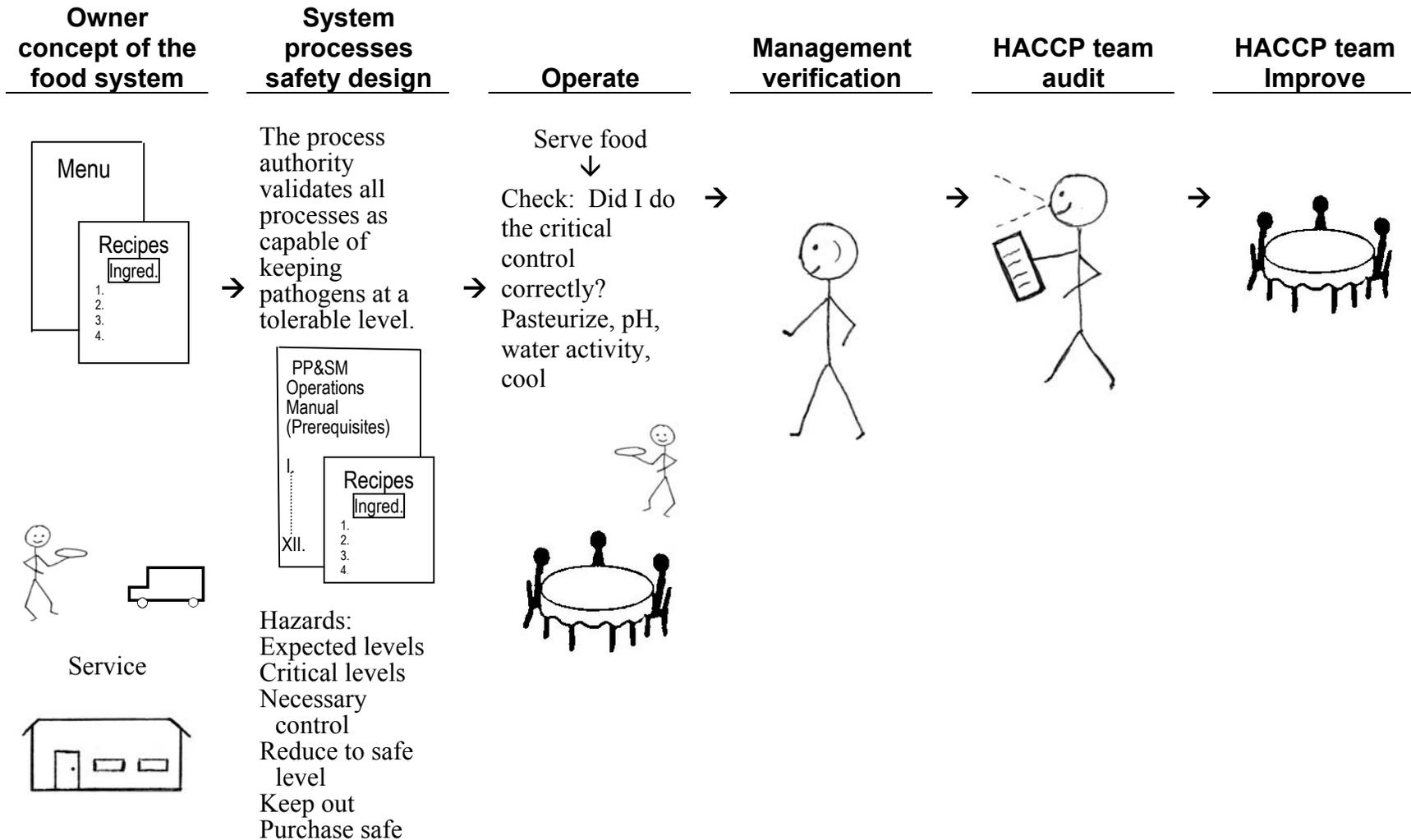
- d. List measures to prevent recurrence: *Examples: Training in use of nail brush, new thermometer, fans added to refrigerator.*

Reviewed by _____

Date _____

⁽¹⁾ Ref. USDA 9 CFR 417.3.A

UNIT HAZARD-CONTROL SYSTEM DEVELOPMENT, OPERATION, VERIFICATION



AMC-HACCP SUMMARY

- Active Managerial Control simply means that the operator / chef, through empowered employees and the HACCP team, uses HACCP and takes responsibility for safe food 24 hours a day, 365 days a year. The regulatory official becomes an approval authority for new processes or lets the operator choose his/her own consultant Process Authority.
- Operators / chefs, because they have shown knowledge of how to identify the hazards and develop and validate controls as safe, can do any safe process.
- The food operation has the capability of, and is treated like, a small food processing plant with HACCP and can use FDA and USDA processes and process performance standards.
- The operator has continuous quality improvement by virtue of the HACCP team doing inspections and corrective action reports, and having monthly meetings to improve operating policies, procedures, and standards.
- Operations are consistent. The operator has minimum food and labor waste; minimum employee turnover, because employees know exactly what is expected of them; and maximum customer satisfaction, because the food and service are consistent. Every meal served is employee monitored and safe. The owner has due diligence in case of an alleged customer illness.
- There is no need for regulatory inspection. If regulators want assurance, they can have the operator send them the monthly HACCP audit and team meeting report.