Annex

4 Food Establishment Inspection

1. INTRODUCTION

(A) Purpose

A principal goal to be achieved by a food establishment inspection is to prevent foodborne disease. Inspection is the primary tool a regulatory agency has for detecting procedures and practices which may be hazardous and taking actions to correct deficiencies. Food Code-based laws and ordinances provide inspectors scientifically based rules for food safety.

This Annex provides regulatory agencies with guidance on planning, scheduling, conducting, and evaluating inspections. It also supports programs by providing recommendations for training and equipping the inspection staff, and attempts to enhance the effectiveness of inspections by stressing the importance of communication and information exchange during regulatory visits. Inspections aid the industry by:

(1) Serving as educational sessions on specific Code requirements as they apply to an establishment and its operation;

(2) Conveying new food safety information to establishment management and providing an opportunity for management to ask questions about general food safety matters; and

(3) Providing a written report to the establishment's permit holder or person in charge so that the responsible person can bring the establishment into conformance with the Code.

FDA has issued national standards for regulatory programs that administer retail food safety programs. The guidance document, "FDA's Recommended National Retail Food Regulatory Program Standards" is discussed in Annex 2, 3.

(B) Background and Current Applications of HACCP

Inspections have been a part of food safety regulatory activities since the earliest days of public health. Traditionally, inspections have focused primarily on sanitation. Each inspection is unique in terms of the establishment's management, personnel, menu, recipes, operations, size, population served, and many other considerations.

Changes to the traditional inspection process were first suggested in the 1970's. The terms "traditional" or "routine" inspection have been used to describe periodic inspections conducted as part of an on-going regulatory scheme. A full range of approaches was tried and many were successful in managing a transition to a new inspection philosophy and format. During the 1980's, many progressive jurisdictions started employing the HACCP approach to refocus their inspections. The term "HACCP approach" inspection is used to describe an inspection using the "Hazard Analysis and Critical Control Point" concepts. Food safety is the primary focus of a HACCP approach inspection. One lesson learned was that good communication skills on the part of the person conducting an inspection are essential.

The HACCP Annex to the Code provides a full background on the origin, principles, and applications of HACCP and explains the concepts used during inspections in greater detail than found in this Annex. It should be reviewed in connection with the material found here to better prepare for performing a HACCP approach inspection. The HACCP Annex also provides an extensive list of references.

FDA has taught thousands of state and local inspectors the principles and applications of HACCP since the 1980's. The State Training Team and the FDA Regional Food Specialists have provided 2-day to week-long courses comprising the scientific principles on which HACCP is based, practical application of these principles including field exercises, and review of case studies. States and local jurisdictions have also offered many training opportunities for HACCP.

A review of state and local retail food protection agencies shows that HACCP is being applied in the following ways:

(1) *Formal Studies* - Inspector is trained in HACCP and is using the concepts to study food hazards in establishments. These studies actually follow foods from delivery to service and involve the write-up of data obtained (flow charts, cooling curves, etc.).

(2) *Routine Use* - State has personnel trained in HACCP and is using the hazard analysis concepts to more effectively discover hazards during routine inspections.

(3) *Consultation* - HACCP-trained personnel are consulting with industry and assisting them in designing and implementing internal HACCP systems and plans.

(4) *Alternative Use* - Jurisdiction used HACCP to change inspection forms or regulations.

(5) *Risk-Based* - Jurisdiction prioritized inventory of establishments and set inspection frequency using a hazard assessment.

(6) *Training* - Jurisdiction is in the active process of training inspectors in the HACCP concepts.

2. PROGRAM PLANNING

(A) Resources

The primary resource available to a jurisdiction is the number of hours to perform inspections and related administrative activities. Total hours required will vary somewhat depending on such things as the type of establishments and geographical distribution.

As a suggested target, it is recommended that approximately 8 to 10 hours be allocated per establishment per year. This includes time for inspection, follow-up inspections, complaint investigations, and administrative work, such as plan review, enforcement documentation preparation, hearings, and court actions. The suggested time is based on a typical mix of establishments and average travel times. Simpler food operations in establishments or smaller areas will mean that fewer hours are needed, whereas more complex operations and larger areas will add additional time requirements.

Other factors which affect the use of planned resources are:

(1) *Inspection frequency for each category of establishment (refer to Section **2.** (C));*

(2) Establishment operations' variation over time; and

(3) Training provided to the inspection staff (refer to Section **3.**).

Establishment variation results from turnover of management and employees or changes in menu and procedures. Initial and continuing staff development are important activities which support quality regulatory programs and should be factored into the overall allocation of available time.

(B) Equipment

Inspectors must be properly equipped to perform the inspections in their assigned territory. Recommended equipment and supplies include:

(1) Necessary forms and administrative materials;

(2) Lab coat or equivalent protection to cover street clothes;

(3) Head cover: baseball cap, hair net, or equivalent;

(4) Alcohol swabs;

(5) Thermocouple or thermistor temperature measuring device for food and ambient air;

(6) Maximum registering thermometer or temperature-sensitive tapes for verifying hot water warewasher final rinse temperature, 73^{o}C (160^{o}F);

(7) Pressure gauge for determining in-line pressure of hot water at injection point of warewasher (15-25 psi) - (inspector should have access to a gauge);

(8) Chemical test kits for different chemical sanitizer types;

(9) Flashlight;

(10) Light meter;

(11) Measuring device for measuring distances;

(12) Time/temperature data logger (optional);

(13) pH meter (optional);

(14) Water activity meter (optional);

(15) Camera (optional); and

(16) Electronic Inspection System (recommended).

If the establishment is performing complex operations, the inspector must also have pH meters, water activity (a_w) meters, and time-temperature data loggers.

Programs require a fully equipped kit for investigating foodborne illness complaints. Kits should include necessary forms, sterile collection utensils and sample containers, indelible marking pens, labels, sealing tape, and an insulated sample shipping case. Sterile containers are also needed for collection of appropriate specimens from victims. Current recommendations from the laboratory for maintaining food samples and patient specimens should be maintained with the kit.

Personal computers are very useful for managing inspection and program data both in the office and the field. If equipped with modems, they also enable the program to keep current with the latest in food safety technical information through the FDA CFSAN Home Page (http://www.cfsan.fda.gov) Internet service. Computer software packages are also useful for modeling the growth of pathogenic bacteria, calculating refrigeration requirements, and investigating foodborne illness reports.

(C) Risk Categorization of Food Establishments

(Refer to Subpart 8-401, Food Code)

Studies have shown that the types of food served, the preparation steps these foods require, the volume of food, the population served, and previous compliance history can have a bearing on the opportunity for the occurrence of foodborne illness.

The rational allocation of inspection resources to target the highest risk establishments with more inspection time and the lowest risk establishments with the least is a HACCP approach concept. Risk categorization allows establishments to be ranked by considering risk factors and creating a variable inspection frequency for each category. An example of risk categorization and frequency of inspection is shown in Table 1.

Table 1. Risk Categorization of Food Establishments

RISK TYPE	RISK TYPE CATEGORY DESCRIPTION	FREQUENCY #/YR
1	Pre-packaged nonpotentially hazardous foods only. Limited preparation of nonpotentially hazardous foods only.	1
2	Limited menu (1 or 2 main items). Pre-packaged raw ingredients are cooked or prepared to order. Retail food operations exclude deli or seafood departments. Raw ingredients require minimal assembly. Most products are cooked/prepared and served immediately. Hot and cold holding of potentially hazardous foods is restricted to single meal service. Preparation processes requiring cooking, cooling, and reheating are limited to 1 or 2 potentially hazardous foods.	2
3	Extensive handling of raw ingredients. Preparation process includes the cooking, cooling, and reheating of potentially hazardous foods. A variety of processes require hot and cold holding of potentially hazardous food. Advance preparation for next day-service is limited to 2 or 3 items. Retail food operations include deli and seafood departments. Establishments doing food processing at retail.	3
4	Extensive handling of raw ingredients. Preparation processes include the cooking, cooling, and reheating of potentially hazardous foods. A variety of processes require hot and cold holding of potentially hazardous foods. Food processes include advanced preparation for next-day service. Category would also include those facilities whose primary service population is immunocompromised.	4
5	Extensive handling of raw ingredients. Food processing at the retail level, e.g., smoking and curing; reduced oxygen packaging for extended shelf-life.	4

Previous compliance history should also be considered when establishing inspection frequency. Non-conformance with critical Code items or HACCP plan requirements may move an establishment up into the next higher frequency range until a record of more consistent compliance is achieved.

There are a wide variety of ways to assign establishments to categories. The simplest method for that jurisdiction is usually the best.

Resources need to be allocated for seasonal and temporary food establishment operations. Frequently, this involves scheduling inspections on weekends and during evening hours. Some jurisdictions have also found it useful to schedule a number of inspections during the evening hours to get a more balanced view of certain food operations.

Some agencies replace one or more of their routine inspections with such alternatives as a full-scale HACCP study, or a staff training session. If a manager certified in food safety is on

duty at all times, some agencies may discontinue routine inspection. Care must be exercised in using these alternatives to maintain sufficient regulatory oversight.

(D) Types of Inspections

The Food Code specifies that access to a retail establishment for inspection is a condition of the acceptance and retention of the food establishment permit. Inspections are generally unannounced to obtain a more accurate assessment of normal operating practices and conditions. Exceptions can be made during construction and preoperational inspections where an appointment is needed to ensure that all parties are available for discussion or where work is intermittent and access to a new establishment is limited; or during follow-up inspections which may require the presence of specific personnel or management from the establishment. Full documentation should be maintained on each inspection as a part of the establishment's official agency record.

Inspections determine the food establishment's compliance with the Food Code. These inspections may be categorized by purpose such as:

(1) Preoperational Inspection
(Refer to Subpart 8-203, Food Code)

The Food Code specifies that a preoperational inspection shall be conducted to ensure that the establishment is built or remodeled in accordance with the approved plans and specifications. It is helpful to have these documents available during the inspection.

(2) Routine Inspection
(Refer to Part 8-4 and Subpart 8-403, Food Code)

Routine inspections should be scheduled on an interval based on risk. These inspections are full reviews of the food establishment operations and facilities and their impact on food safety. They include assessment of food employee and management health, practices, and knowledge of food safety; food flows, source, storage, thawing, preparation (including cooking temperatures and times) and post-preparation processes; equipment and facility construction; cleaning and sanitizing processes; water sources; sewage disposal; and vermin control.

Detailed reports are prepared at the conclusion of each inspection and presented to the person in charge. Items found not to be in compliance are categorized as critical or noncritical. Items found to be repetitive from the previous inspection are also noted. The Code section in violation is included in the report citation section.

(3) Follow-up Inspection
(Refer to Subpart 8-405, Food Code)

The Food Code specifies that the agency shall verify that critical violations have been corrected within 10 days of the initial routine inspection that detected them. Follow-up inspections should be briefer than the routine inspection, since they concentrate on the critical violations previously reported.

Corrections and continued violations should be noted on an inspection report. Continued violations should be used to initiate further compliance actions.

Time available for follow-up inspections will vary between jurisdictions. The compliance strategy is more effective if those follow-ups are mandated in a realistic fashion which takes available resources into account. It is a sign of a weak program when required 10-day follow-ups never occur or are late. It is better to consistently follow-up on the worst 5% than to schedule follow-ups on the worst 25% of the establishments and only perform a few of these. Refer to Section 13., Establishment Scoring, for further information.

(4) HACCP Inspection
(Refer to Subpart 8-403, Food Code)

Establishments operating under a variance requiring a HACCP plan need to be inspected differently. HACCP plans have critical limits which must be routinely monitored and recorded by the establishment, and monitoring and other elements of the plan must be verified by the inspector.

Copies of the firm's approved HACCP plan are useful during these inspections. Additional time may be necessary to fully assess the establishment's compliance with the HACCP plan. Verifying the maintenance of the required records is an important element of the HACCP inspection. Notation in the records of process deviations that occurred and corrective actions taken in response to those deviations should not be cited as adverse findings.

(5) Complaint Inspection
(Refer to Subpart 8-404, Food Code)

Consumer complaints received about a food establishment should be investigated in accordance with the agency's policies. Quick response is required for those related to foodborne illnesses. Speed is essential to preserve both memories of events and possible food or environmental samples. The regulatory agency's medical staff could be used to coordinate, with the complainant's physician or hospital staff, the collection of appropriate specimens.

HACCP principles can be used to supplement traditional procedures for investigation of foodborne illness complaints to help the inspector focus on possible causes and gather better data. Hazard analysis is a useful tool when evaluating implicated menus or foods. It helps focus the investigation on foods which have been epidemiologically linked with illness. Other

foods should not be completely dismissed because as more becomes known about the causes of foodborne illness, foods which may not have been historically linked to illnesses are being implicated.

The charting of food product flows and the designation of critical control points can help delineate potential problems. If a hazard seems evident, the suspect product or process can be recreated with the cooperation of the establishment and the critical limits monitored.

Other consumer complaints about food establishments should be evaluated in terms of public health significance before scheduling inspections. For example, allegations about an establishment purchasing shellfish from an illegal source should receive a higher priority than complaints about a littered parking lot.

3. STAFF TRAINING

Basic staff training is very important to staff development and should be a well-defined process. Initial training is usually provided within the local regulatory agency and more advanced training is available through a state agency's program. National training is available from FDA's State Training Team and from the Centers for Disease Control and Prevention's Distance Learning Program. These programs range from basic to advanced subject-specific seminars offered regionally, to homestudy courses including video, slide, or textbook-based programs, and finally to direct satellite broadcast seminars and courses as a part of the Public Health Training Network. An FDA regional food specialist may be requested to work with a trainee who is employed by a state or large local regulatory program, early in the trainee's career.

(A) Basic Training

The training process can be divided into three phases. The first provides an orientation to the program. This initial phase includes a review of program history, structure, and relationships to other food programs. Specific emphasis should be on the program's goals and objectives. A structured approach is beneficial to familiarize the inspector with the FDA Food Code, as well as state and local food protection codes. This phase can also include interim quizzes to assess knowledge retention and reveal areas which need further work. Development of good communication skills should also be emphasized.

The study of epidemiology of foodborne illness, including the organisms, foods, and contributing factors and case studies, is an important part of the early technical training. Basic food microbiology, including the effects of temperature, pH, water activity, and other hurdles and barriers to the survival and growth of foodborne pathogens, are appropriate subjects. Scientific journal articles in the fields of food microbiology, food technology, and HACCP should be provided. A review of access procedures to on-line databases such as the FDA CFSAN Home Page (http://www.cfsan.fda.gov) is also important.

(B) Field Training

The next phase of training moves the new inspector into the field with the training officer. On-site training should focus on specific inspection tasks such as interviewing, making observations, and measuring conditions such as temperatures and sanitizer strength. Time should be spent practicing completion of the inspection forms to conform to the regulatory agency's standard of description of the violation. If the FDA Electronic Inspection System is used by the agency, training in its use could be included in this phase.

The field orientation should also include at least one full HACCP inspection to acquaint the inspector with food operations and flows in establishments. The pre-HACCP review discussions should be guided by the new inspector and include a review of the establishment's menu, operations, and the recipes and standard operating procedures. A full food or operational cycle should be included in this HACCP training exercise, but is not normally expected to be a part of a routine HACCP-based food protection program.

The inspector should be able to demonstrate proficiency with gathering information about the process, including accurate charting of the food flows and determination of the critical control points and their critical limits. The HACCP training exercise should include defining the practical monitoring alternatives for the critical limits, reasonable record maintenance, and a review of acceptable options when critical limits are not met. All of these steps should be conducted in conjunction with the management of the establishment. Observations and measurements should be recorded in an unobtrusive manner during the entire food cycle or operation.

The trainee should prepare a comprehensive report on the HACCP field exercise and the training officer should critique the report. In assessing the success of this important part of the training program, the training officer should include a review of the thoroughness of the information gathering and the observation phases of the exercise.

Evaluation of HACCP skills such as selection of appropriate critical control points should be performed. The training officer should comment on the proficiency of the trainee's communication skills and plans should be made for working on any areas found to need improvement.

(C) Standardization and Certification

The following describes a model for applying the concept of standardizing regulatory personnel and confirming that they are standardized in the understanding, interpretation, and application of the Food Code. The first paragraph addresses the training period during which the person becomes standardized and the second paragraph addresses a formal verification process leading to certification of the standardized person. FDA is in the process of seeking comment regarding a revised, Interim Procedure for the process of certifying retail food regulatory personnel. As those Procedures are finalized, this description will be modified in future editions of the Code.

The future regulatory responsibilities of the trainee should be emphasized during the next phase of field training. This part of the orientation begins as the trainee observes the training officer making inspections, where there is extensive discussion of the inspection process. The points of violation are fully discussed and differentiated from similar conditions which are not violations. The time involved in this phase of training depends on the capabilities of the trainee to grasp and apply the important concepts of translating the words to regulatory actions including the differentiation of the relative significance of the violations. At the end of this phase, the trainee should be proficient in the application of the Food Code and state/local food protection regulations.

The next period should proceed with the reversal of roles in which the trainee determines the violations, explains the reasons, and cites the proper regulation section. The training officer should be standardized by the appropriate FDA retail food specialist. The testing phase should follow the FDA-recommended protocol for certification. Independent simultaneous inspections are made of the establishment, and violations are recorded on inspection reports. After 8 inspections, there should be agreement between the trainee and the training officer on at least 90% of the violations recorded by the training officer that relate to foodborne illness risk factors. If this is not accomplished, remedial training should be given and the certification procedure repeated.

(D) Continuing Education

The final phase of training is never finished. The standardization procedure should be repeated with the training officer on an annual basis. The agency should establish continuing education programs to keep the staff current with the changing food safety concerns and the latest information. Five regional FDA seminars are held each year by the regional food specialists to acquaint state and local agency personnel with new information concerning important changes in the interpretation and application of the Food Code.

Professional association meetings and state agency-sponsored courses also can serve to keep staff development progressing. FDA and other federal agencies offer a series of training opportunities and a lending library of training materials to assist the state and local food regulatory programs. The FDA Web Page http://www.fda.gov/ora/training/course_ora.html) regularly includes listing of these sessions and materials.

Industry-sponsored training sessions should not be overlooked as an educational resource. In addition to providing technical materials, they can foster a better understanding of the concerns of regulators and the industry. The food manager certification training and testing programs offer excellent opportunities for acquiring basic food safety knowledge. Testing inspectors in training may prove helpful in evaluating their knowledge of the material.

4. CONDUCTING THE INSPECTION

The HACCP approach inspection examines an operation as a total process by identifying "critical control points" in an attempt to prevent food safety hazards from occurring (i.e., conditions at the establishment which could lead to foodborne illness).

Individual differences in programs, personnel, establishments, and jurisdictions need to be taken into account in establishing agency procedures for assigning establishments and preparing for and executing inspections. The following discussion is provided as a guideline for developing those procedures.

(A) Assignment

There is no single best way to assign inspections. Regulatory agencies frequently use geographical location, trying to balance hours required to inspect the total number of establishments within each territory. Many times other environmental health functions are also performed in addition to the food protection program, and these functions are accounted for in the work planning. Often agencies periodically rotate areas among inspectors or redivide the areas based on changes in the establishment inspection inventory.

Other agencies may choose to specifically or categorically assign establishments to the inspectors. Institutional-type food operations may be in the inventory of one inspector while those establishments doing food processing at retail under HACCP plans may be under another's. Specialization sometimes has advantages with the more complex types of inspections.

Under certain circumstances, some agencies find it more efficient to maintain all plan review, preoperational, and remodeling inspections under an inspector who specializes in those functions. Others may have all follow-up and other compliance inspections performed by one group of inspectors.

(B) Preparing for the Inspection

The establishment file should be reviewed before the inspection is conducted. This is particularly important if the last inspection was conducted by a different inspector. Notation of previous violations should be made to ensure that these violations will be reviewed.

Inspections of establishments operating under variances and HACCP plans should include a review of specifics of the plan. Pertinent parts of the plan and the establishment's monitoring procedure may need to be copied and taken on the inspection to confirm that the plan is being followed.

The regulatory agencies using the FDA Electronic Inspection System's Field Module will automatically have the previous inspections and the HACCP plan elements loaded onto the notebook computer for reference in the field. Previous violations or HACCP plans may be retrieved during the inspection.

(C) Entering the Establishment

(Refer to Subpart 8-402, Food Code)

Inspectors should enter the establishment during the hours of operation or at other reasonable times. The inspector must provide the permit holder or person in charge with a notice of the purpose of, and intent to conduct, the inspection. According to agency policy, this may be a verbal or a written notice at the time of inspection.

Procedures outlined in the Food Code and in the agency procedures should be followed if access to conduct an inspection is denied. Refusal should be documented on the inspection report and an administrative or judicial inspection order obtained.

(D) Introductions

The tone of the inspection is often set during the first few minutes of the inspection. The professional but personable approach is the balance which should be maintained. Genuine interest in the establishment and the staff translates into good relations which may be helpful in conveying the agency's goal of promoting public health.

Near the outset, particularly if the visit is a follow-up inspection, questions should be directed to corrections made since the last inspection. This is also the time to explain the nature of the visit, such as an investigation of a complaint or a follow-up.

A preliminary walk-through may be beneficial in acquainting the inspector with the layout and facilities.

(E) Menu/Operations Review

The inspection should start with discussions of the menu and food preparation operations being performed in the establishment. It may be more helpful to involve the chef or departmental supervisor in discussions than rely on the memory of the permit holder. Even though the inspector may be knowledgeable about an operation or establishment, conditions change. A few minutes spent early in the inspection may reveal some faulty assumptions or items of public health significance.

Questions should be phrased to elicit the actual process rather than the answer the establishment employee thinks the inspector wants to hear. For example, "What happens to the gumbo next?" may work better than "Please tell me how you rapidly cool that 50 gallons of gumbo." Brief notes taken at this point, with later verification, keep the process of information gathering moving forward.

Full food flow cycles should be reviewed even though only a portion of them will be taking place during the inspection.

(F) Set the Example

The inspector can begin teaching food safety by the example set when entering the food areas of the establishment. Clothing, including shoes, should be clean. Some jurisdictions provide laboratory coats to their staff to set a more professional image. The inspector should also wear a proper hair restraint to comply with the jurisdiction's requirements for food employees.

Handwashing is the important first step when entering a food area. Not only is a good example set by the inspector but a more accurate assessment of the adequacy of the handwashing facility can be determined. The handwashing procedures of accompanying management can also be observed at this time while discussions are continued about its importance.

(G) Initial Observations

A few minutes should be spent getting the larger view of the operation from a corner of the food area. After the layout and general areas of concern have been determined, the inspector should start on a route through the facility which will include the points determined to be significant during the pre-inspection discussions.

(H) Focus During the Inspection

The primary focus of the inspection should be the food employees and the food. The inspector should observe the sources, storage practices, preparation steps, and post-preparation operations as foodborne illness is primarily attributed to these areas of an operation. The specifics of conditions which are violations should be noted during the inspection.

Information regarding known risks associated with certain food preparation practices and menu items should guide the allocation of time and focus during the inspection. Concentration should be on the complex food processes which involve multiple ingredients being assembled or mixed, cooking of potentially hazardous food, foods which are prepared and held for several hours before service, foods which must be cooled, and steps involving reheating. Foods that have been more frequently implicated in foodborne illness should receive higher priority. Foods prepared in large volumes are definite indicators of a process which should be checked. Foods requiring manual assembly prior to service should also be closely watched during inspections.

(I) Questions About the Establishment's Operations

General questions about food flow and operations are covered in the opening discussions with the permit holder or person in charge. Specific questions about particular parts of the operation are best addressed to the employee performing the operation. Some establishments may have a strict policy about individual employees talking to regulatory

personnel which needs to be respected and accommodated. Questions should be asked in an open-ended format and in a nonthreatening manner.

(J) Inspectional Observations
(Refer to Subpart 8-403, Food Code)

Accurate measurements of conditions in the establishment are integral to a thorough inspection. The Food Code or the establishment's accepted HACCP plan provides the critical limits for operations being conducted. Some of the critical limits to be measured may include food product temperatures, pH, water activity (a_w), food additive concentrations, and sanitizer concentrations. The following sections of this Annex provide discussion on specific measurement considerations.

(1) Food Product Temperature Measurements
(Refer to Subpart 2-103, Food Code)

Food cooking temperatures and times and holding temperatures should be routinely monitored by the food establishment management and by the inspector during each inspection. The temperature measuring device and technique are essential in accurately determining the temperatures of potentially hazardous foods.

The geometric center of a product is often chosen as the point of measurement of product temperature, particularly in measuring critical limits of cooking, cooling, and cold holding processes. Hot holding critical limits may need additional measurements taken at points farthest from the heat source, e.g., near the product surface on steam tables.

Ambient temperature monitoring devices should be used as indicators of where further temperature investigations are warranted. Questionable practices such as improper product cooling methods are other indicators. Temperatures monitored between packages of food, such as cartons of milk or packages of meat, also indicate the need for further examination. However, the temperature of a potentially hazardous food itself, rather than the temperature between packages, is necessary for regulatory citations.

(a) Cooking Temperature Measurements
(Refer to Part 3-4, Food Code)

The three dimensions of bacterial load, temperature, and time need to be considered when inspecting the cooking process. Poultry and leftovers are examples of foods that require higher terminal temperatures than beef products.

Critical limits for cooking potentially hazardous foods in the Food Code include specifications that all parts of the food be heated to a certain temperature. Temperature measurement should take into account post-cooking heat rise which allows the temperature to reach equilibrium throughout the food.

The critical limit of time at the terminal temperature must also be measured during inspections. For example, a roast beef cooked at 54°C (130°F) is required to be held at this temperature for 112 minutes to ensure destruction of pathogens. Notation should be made of cooking times as well as temperature.

(b) Cooling and Holding Temperature Measurements
(Refer to Part 3-5, Food Code)

Cold and hot holding temperatures should be thoroughly checked during the inspection. This includes the temperature of potentially hazardous food during transport, e.g., hot holding carts being taken to patient areas in an institution or cold food being taken to an off-premise event by a caterer.

Product cooling temperatures and times need to be closely evaluated during inspection. Temperature profiles throughout the product may show proper temperatures at outer edges and hot spots at the core of the product. Improper cooling practices, such as tightly packing hot pans together, shrouding rolling racks, or closing the doors on rolling cabinets are factors that warrant further temperature and time investigation.

The time dimension is also important in citing holding temperatures. For example, a casserole which was cooked before noon and measured at 43°C (110°F) at 4:30 PM is far more hazardous than a hamburger properly cooked at 3:30 PM being found at 43°C (110°F) at 4:30 PM. The violation citation should note time when citing the casserole temperatures.

(c) Methods for Temperature Measurements

The temperature measurement is only as accurate as the device used. Regular calibration of the device is an important practice and a provision of the Food Code. Thermometers should have calibration instructions from the manufacturer and suggested calibration intervals. The regulatory agency should maintain a log identifying each piece of its inspection equipment that requires calibration. It is also helpful for the agency to have a person assigned the duty of monitoring calibration maintenance cycles. Certificates of calibration may be useful in legal proceedings when the accuracy of instrumentation is questioned.

Modern thermometers which measure temperature electrically, rather than the older bimetal types which rely on thermal expansion of two different metals, are recommended. In these instruments, a sensor is used to detect the temperature and the signal is amplified and processed electronically. This device generally yields a faster response and provides greater overall accuracy because it does not drift out of calibration and is less likely to give variable readings.

A number of different sensor technologies are available, most of which are satisfactory for the temperature range needed in food temperatures. However, there are considerations other than temperature range which should be taken into account when selecting the best and most appropriate device for the specific application.

Refer to item **8. TEMPERATURE MEASURING DEVICES,** which summarizes the different types of temperature measurement equipment, and item **9. CALIBRATION PROCEDURES**, which discusses procedures that could be used.

(d) Cleaning and Sanitizing the Temperature Probe

Before internal food temperatures are taken, the probe must be cleaned and sanitized. When taking a series of temperatures, it is particularly important to thoroughly clean and sanitize the probe between uses to prevent cross contamination. Boiling water, sanitizers, or alcohol swabs can be used to destroy any remaining pathogens on the probe before it is used.

(e) Monitoring Procedures for Temperature Measurements
(Refer to Subpart 4-502, Food Code)

Some of the most important critical limits in a food operation involve the temperatures and times at which pathogen growth is limited or pathogens are destroyed. Establishments should monitor critical control points at a frequency which ensures that they are under control. Inspections should verify that monitoring is occurring by involving the person in charge of these activities during the regulatory inspection. The presence of required thermometers and their proper use can be assessed.

Comparisons should also be made between a calibrated instrument from the inspecting agency and those used by the establishment. Notation of deviations should be made on the inspection report.

(2) pH Measurements

The pH measurement becomes important in determining if a food is potentially hazardous. The determination can be done in a regulatory agency's laboratory or can be assessed in the field with a portable pH meter. The closer the food approaches the critical pH limit of 4.6, the more precise the measurement should be. If pH adjustment is being used by the food establishment as a part of its HACCP plan for protecting certain food products, regular monitoring of pH should be a requirement. The agency should carefully verify that the instrumentation is suitable, calibration procedures are regularly and properly performed, and sampling procedure and analysis meet scientific standards. The establishment HACCP plan should show the above procedures and the HACCP records should include the results from the calibration and sample measurements. Refer to item **9. CALIBRATION PROCEDURES** for a discussion on the calibration of equipment.

When measuring the pH of a food, the measurement must be representative of the whole. Care must be exercised in the selection of collection containers and procedures to eliminate their influence on the sample's pH. It is recommended that multiple samples of the food product be checked to increase the reliability of the measurement.

The pH measurement checks the hydrogen ion concentration of the food. A pH measurement instrument consists of a meter and a suitable electrode probe. The probe may

be of a flat type which can directly measure the pH of the sample or a regular pH probe used in laboratories. The latter may be used if the food is made into a slurry with recently boiled and cooled distilled water with a pH of 7.0. Boiling removes any CO_2 residual in the water. Care must be taken to maintain the electrode in a clean condition. It should be thoroughly rinsed with distilled water between measurements. Oils from foods can frequently contaminate the sensitive electrodes and cause erroneous measurements. If oily foods are checked, extra cleaning is required.

(3) Water Activity Measurements

Water activity (a_w) is another factor in determining if a food is considered potentially hazardous under the Food Code. The relative humidity of the food influences the ability of bacteria to grow and multiply. Water activity is the ratio of water vapor pressure in a food to the vapor pressure of pure water at the same temperature. Most potentially hazardous foods have an a_w of >0.95 with all pathogenic bacterial growth stopped at an a_w of 0.85.

A laboratory or a field water activity meter may be used to determine the food sample's a_w. Because the measurement is somewhat temperature-dependent, temperature control cabinets are usually used in the laboratory. The time it takes for a final reading to be achieved varies. Older models often take up to several hours after the sample is placed in a sealed sample cavity. Newer models can give a reading within minutes. Multiple samples of the same food product will provide more reliable information on the actual value of the a_w. Refer to item 9. for a discussion on the calibration of equipment.

(4) Food Additives Concentrations
(Refer to Subpart 3-302, Food Code)

If food additives such as sodium nitrite are added as a part of a food processing operation at retail, the regulatory agency should be prepared to analyze food product samples to verify that the additive is being added at the appropriate concentration. Samples usually are collected and returned to a laboratory for the analysis. Recognized methods for sample collection and testing such as those published in the most recent edition of the Association of Official Analytical Chemists (AOAC) Official Methods of Analysis should be used.

Portable analysis systems are sometimes available to conduct the measurement in the field. These systems should be cross checked with the acceptable laboratory methods to verify their accuracy before regulatory reliance is placed on them. They should be maintained with proper field calibration and the replacement of reagents as required in the manufacturer's instructions.

Food establishments using additives as a part of their accepted HACCP plan should regularly monitor the resulting levels. The sampling plan should be readily maintained in the processing area and the results logged in the appropriate records being available by the establishment.

(5) Warewashing Process Evaluation
(Refer to Subpart 4-501, Food Code)

Because proper cleaning of food-contact surfaces is an important safeguard of public health, the wash, rinse, and sanitizing processes must be verified to ensure that they meet Food Code provisions. This is more effective than attempting to recover organisms from food-contact surfaces.

Mechanical warewashers are required to have data plates which indicate acceptable parameters for temperatures and cycle times for that model of machine. The operational parameters, in conjunction with the Food Code provisions, should be used as the basis for the machine's evaluation.

(a) Wash/Rinse/Heat Sanitization Measurement

The devices used for measuring food product temperatures can also be used for determining the critical limits of washing, rinsing, and sanitizing. Manual operations are easier to assess, but this should not deter the inspector from verifying mechanical warewashers.

Both the three-compartment sink and many mechanical warewashers have vats for wash and sometimes rinse water that can be checked with a probe-type thermometer and compared to the installed thermometer readings. The machine must be briefly turned off before these measurements are taken. Hot water sanitizing warewashers require indirect measurement of the sanitizing rinse temperature. This can be done by exposing a securely tied remote probe of a thermocouple or the sensor of a well-shielded maximum registering thermometer to the spray. The temperature should be noted after the sanitizing rinse phase of the cycle is triggered. A temperature exceeding 71^{o}C (160^{o}F) in the spray pattern verifies that the temperature in the manifold is at least 82^{o}C (180^{o}F).

Maximum registering temperature indicators can also be attached to a clean utensil and sent through the machine's cycle. The effect of the wash and rinse temperatures on the indicator need to be considered. If these temperatures approach 71^{o}C (160^{o}F), they may trigger the response of the maximum registering temperature indicator so that the sanitizing rinse can not be accurately determined. The heating elements in these compartments may need to be turned off temporarily in order to verify the sanitizing rinse temperature.

(b) Sanitizer Concentration

The chemical sanitizer concentrations in both manual and mechanical warewashing operations need to be monitored. The Food Code specifies that the establishment shall have a device to measure the sanitizer concentration for the type of sanitizer being used. This device may be used during the inspection, but the inspector should have an independent means of verifying concentrations.

Sanitizer test kits commonly use colorimetric comparisons of a color chart to a strip of treated paper which is immersed in the sanitizing solution. The chart provides approximate solution

strength in mg/L (ppm) for the various colors shown. The kits are sanitizer-specific; therefore it is important to use the one designed for the sanitizer in question.

The sensitivity of the test strips may be affected by age, heat, and humidity. Manufacturer's instructions should be followed with regard to their proper storage, use, and replacement. It is helpful to conspicuously date these sanitizer kits when they are received or opened to ensure that they are replaced when expired.

Test kits require various procedures for immersion into sanitizer solutions and subsequent readings. Some types require a quick immersion; others require holding in the solution for a period of time. The time required for color comparison also varies.

Mechanical warewashing machines using a chemical sanitizing cycle may require slightly different verification that the proper concentration has been applied. When supplied, manufacturer's instructions for measurement should be followed. A reliable indication can be found in the residual sanitizer on the utensil surface.

(c) Pressure Measurements

The hot water sanitizing rinse pressure of mechanical warewashing machines is an important factor. The Food Code specifies that the water supply line shall have a 6.4 mm (1/4 inch) Iron Pipe Size (IPS) valve installed immediately upstream from the automatic sanitizing rinse control valve. To measure the line pressure, it is prudent to request that establishment personnel connect the pressure gauge.

Use of a standard gauge made for measuring the pressure of liquids is recommended. It should read in a range of 100 to 350 kilopascals (15 psi to 50 psi) to accommodate the minimum required pressure and 100% overage of the maximum acceptable pressure. This high upper limit helps protect the proper functioning of the gauge in cases in which extremely high pressure is encountered.

(d) Time Measurements

Time, as well as temperature and concentration, is significant in the evaluation of warewashing operations. A watch with a second readout or hand is needed to make sure that immersion times or cycle segments meet Food Code provisions.

The conveyor speed for mechanical warewashing machines is important in achieving an adequate wash, rinse, and sanitizing cycle. The machine's data plate is required to state the maximum speed for the conveyor. The actual speed is usually adjustable and should be measured during the inspection. This may be done by measuring the length of the machine and dividing this figure by the time that a utensil takes to travel this distance.

(6) Light Distribution
(Refer to Subpart 6-303, Food Code)

Portable light meters reading in the desired range are necessary to measure the level of illumination in food areas of an establishment. The instrument should be routinely calibrated against a standard. Care should be taken that the meter is correctly used by avoiding shadows and reflecting surfaces which will bias measurements.

Measurements should be taken systematically to be representative of the actual light levels. These measurements should be taken 76 cm (30 inches) above the floor. Although it is an impractical and unnecessary method of measurement for the purposes of most inspections, the most accurate measurement of illumination in a given area involves dividing the area into 0.6 m (2 foot) squares and taking readings in each of these squares, recording the readings, and averaging them.

(7) Insect and Rodent Infestation
(Refer to Subpart 6-501, Food Code)

Physical evidence of insect and rodent infestation is usually easy to discover. Live and dead vermin, droppings, nesting, gnawings, grease marks on the walls, and other signs are often readily apparent. A bright flashlight, a magnifying lens, and an ultraviolet light to detect rodent urine stains can be used to reveal these infestations.

5. INSPECTION DOCUMENTATION

Accurate notes of the inspector's observations and recordings are essential. These can be as informal as the inspector's "scratch notes" and may contain liberal use of abbreviations. These notes are usually maintained in the inspector's daily log and are not usually provided as a part of the inspection report. Such notes may serve to refresh the inspector's memory should the violations noted in the inspection report result in administrative or judicial proceedings.

(A) HACCP Inspection Data Form

The HACCP Inspection Data form contained in Annex 7 is one suggested format for recording the observations and measurements collected during an inspection. It consists of an administrative section, a food flow section, a section for recording temperatures which are spot-checked, and categorical sections to record other data. Refer to item **10. HACCP INSPECTION DATA FORM** for a discussion on the use of the form.

(B) Corrections During Inspection
(Refer to Subpart 8-405, Food Code)

Many items found during the inspection can be corrected immediately, if the permit holder or person in charge is accompanying the inspector. Such responsiveness should be

encouraged, particularly for critical violations, because immediate actions best protect public health.

Detailed notes should be kept on the HACCP Inspection Data form for these violations and corrections. Immediate correction does not negate the original violation, but should be recognized as a part of the documentation of the inspection. Violations and corrections should be noted on the official inspection report.

Information on the original occurrence of the violation becomes significant if it recurs. During subsequent inspections, recurrence becomes a repeat violation which has additional compliance consequences.

6. INSPECTION REPORT

(Refer to Subpart 8-403, Food Code)

(A) Purpose

The inspection report is the official agency document regarding compliance of the food establishment with agency requirements.

The goal of the report is to clearly, concisely, and fairly present the compliance status of the establishment and to convey compliance information to the permit holder or person in charge at the conclusion of the inspection. Such a report should be completed for routine, follow-up, and investigative inspections.

The inspection report should be kept in the food establishment's files for subsequent compliance actions and review before the next inspection. Individual inspection reports are to be made available for public inspection in accordance with the agency's Freedom of Information policies, while every precaution is taken to protect trade secrets. *(Refer to Subpart 8-202, Food Code)*

(B) Preparation/Completion of the Inspection Report

The inspection report can be prepared by using either the:

(1) Food Establishment Inspection Report (refer to item 11 for discussion and to Annex 7 for the form); or

(2) FDA Electronic Inspection System (refer to item 12 for discussion).

The inspection report is usually completed at the end of the inspection by reviewing the field notes recorded on the HACCP Inspection Data form (refer to Annex 7). This transfer of information usually provides a more legible and complete report than one completed while each violation is being observed.

Not every item recorded on the HACCP Inspection Data form will be included in the inspection report. The HACCP Inspection Data form may contain some information such as documentation of acceptable holding temperatures that are not necessary for the final report. Inspection findings are recorded on the Food Establishment Inspection Report form to detail the violations found in the establishment. FDA's studies of programs which have the most effective compliance programs found a relationship between the completeness of data provided and the success of the compliance program. The form is designed to maximize the opportunity for capturing relevant information about the violations found at the time of the inspection.

(C) Establishment Scoring

(Refer to Subpart 8-403, Food Code)

Establishment scoring provides an indication of how well an establishment is complying with the food safety rules of the agency. It is also a method for designating those establishments which require follow-up inspections or other forms of regulatory sanctions when they fall too far from the accepted levels. These establishments represent a potential public health problem for the community. The specific purpose of the follow-up inspection is to determine if critical violations detected during the initial inspection have been corrected. It may also be the basis for further compliance actions if the remedial actions by the permit holder are not effective.

Some agencies use a system of compliance tools as provided in Chapter 8 of the Food Code to protect public health. The inspection score may serve as the basis for triggering these penalties. Violations which are classified as imminent health hazards in the Food Code warrant immediate actions such as a permit suspension.

Compliance with the provisions of the Code is the basis for retaining the food establishment's permit. The establishment should be in jeopardy of losing its permit if it has a history of noncompliance at a level predetermined by the jurisdiction or if the number of critical items violated warrants a regulatory action based on the jurisdiction's enforcement protocol (refer to item **13. ESTABLISHMENT SCORING**). A history of noncompliance at a level set by the jurisdiction or a single inspection's score of critical items in the highest category of noncompliance would signal the need for strong regulatory response to protect public health. Item **13. ESTABLISHMENT SCORING** provides information on critical and noncritical violation scores.

(D) Closing Conference

The closing conference requires a high level of effective communication. During the conference, the inspector clearly and firmly conveys the compliance status of the establishment. The public health reasons for citing the violations and preventing future occurrences are covered. Acceptable alternatives and time frames for compliance are established during this conference.

The person in charge at the time of the inspection should be the principal establishment representative at the closing conference. It may be beneficial to include other members of the supervisory team in the presentation of findings and subsequent discussions. Ideally, this conference should be held in a quiet location conducive to concentration on the findings and discussion. The length is dependent on a number of factors, but should be kept as brief as possible.

(E) Report Review

The written report is the focus of the closing conference, since it is the record of findings. The listing of the results with the critical violations listed first helps focus the closing conference on the violations which could directly lead to foodborne illness. The notations of repeated violations highlight the areas which may lead to further compliance actions. The organization of violations in the report by operational areas within the establishment often clarifies the information for the review.

The written report includes a notice to correct the identified violations. The permit holder or person in charge must be requested to acknowledge receipt of the report with the required signature. Appropriate procedures are specified in the Code should a signature be refused. Discussion of the results promotes public health compliance in the establishment by giving the permit holder or person in charge an opportunity to ask questions and provide additional information about the establishment's operation. The inspector needs to be well versed in the Food Code and its public health reasons, and have knowledge of the industry in order to competently discuss the concerns of the establishment.

Discussions should focus on the critical violations found during the inspection. The time allocated during the closing conference should be on a risk-to-public-health basis. Noncritical items found to be in violation of the Food Code and actions needed to bring them into compliance should be addressed, but their discussion should not overshadow the significance of the critical violations.

Pamphlets or other educational materials may be useful in reinforcing an understanding of the public health issues involved. Questions which need further research and follow-up response may arise during the inspection, so notes should be taken and follow-up information provided.

Disputes of facts should be resolved in a courteous and professional manner. The permit holder or person in charge should be informed of the responsibilities and rights under the Food Code and of the agency's administrative and judicial procedures.

(F) Compliance Plans

(Refer to Subparts 8-405 and 8-406, Food Code)

The closing conference must include a detailed discussion of the establishment's plans for correcting violations found during the inspection. The violation facts and the alternatives

available for compliance should be emphasized but no recommendations should be made about a particular product or service.

Corrections observed during the inspection must be noted, and reinforcing such responsiveness with encouraging remarks may be to everyone's benefit. However, these violations did occur and therefore they do count as an item of noncompliance.

The compliance plan should address changes in establishment procedures which will prevent the recurrence of noted violations. The best alternatives for compliance usually come from the permit holder or person in charge. One jurisdiction terms this the "table top HACCP" phase of the inspection. The violative process or condition is diagramed and alternatives for correction are explored. For example, the best solution for cooling the gumbo may be to avoid the need for cooling at all by making daily batches.

The establishment's compliance plans should be formally documented on the inspection report form. Follow-up letters may be necessary to elicit fulfillment of these agreements.

(G) Notice of Corrections Completed

(Refer to Subpart 8-405, Food Code)

Timely follow-ups are mandated under the Food Code. These follow-ups verify that the critical items cited during the original inspection have been corrected or determine the course for further compliance actions.

Some jurisdictions use procedures which require establishments to return a notice to the agency that violations cited during the inspection have been corrected. These may be form letters or postcards that are preprinted with the agency's mailing address. Such notifications may be helpful, but they do not substitute for an official follow-up inspection. Consistent follow-up on violations is the agency's commitment to public health protection and equitable enforcement.

7. ADMINISTRATIVE PROCEDURES BY THE STATE/LOCAL AUTHORITIES

Administrative organization is a key to effective program management. It must encompass the proper office procedures for establishing administrative files and maintaining the inspection reports and other data pertinent to the establishment.

A comprehensive and detailed record maintenance system supports the program and tracks potential compliance actions. The records maintained usually include documents including ledgers regarding plan review submissions and approvals; permits; inspections; training; complaints; foodborne illness investigations; laboratory sample analyses; and compliance actions, including legal proceedings.

Computerization of the administrative and inspection procedures of the agency has been developing at a rapid rate across the country. The FDA Electronic Inspection System provides a comprehensive basis for the inspection and complaint investigation procedures. Other software may be integrated with it to maintain other aspects of agency records.

(A) Files

The following documents should be included in the active files: records related to initial plan review, permit application and issuance, inspection reports, complaints, investigations, management training and certification, correspondence, and compliance actions. Variance requests including complete HACCP plans and agency actions on the request must be maintained in the establishment's file.

Files must be retained in accordance with the agency's policies, but for those agencies without an established policy, 3 or 4 years in the active file should be sufficient. Closed establishments should be purged from active files, but the files should not be discarded, since these establishments often reopen under different management. The old records may be helpful in advising new, or prospective new, owners about the establishment. Documents related to administrative matters should be kept in an orderly manner to assist in program management. This includes local and state procedures, correspondence and policies, FDA recommendations, references, and source listings such as the Interstate Milk Shippers List and Interstate Certified Shellfish Shippers List.

(B) Follow-up Letters

As an intermediate measure between follow-up inspections and administrative hearings, regulatory agencies often send letters concerning inspection results to the establishments which have continuing problems. These letters to the permit holder specify instances in which deviations from the Food Code were identified during the previous inspection. Letters can cover single establishments or several establishments under the control of the permit holder. Such letters may further strengthen an agency's position in subsequent compliance proceedings.

Follow-up letters can be easily compiled and generated by the FDA Electronic Inspection System. The establishment's records can be quickly reviewed for significant non-compliance. Descriptions of specific violations can be prepared for export to a computer file in word processing software. These data can be quickly merged with the permit holder's name and address and a letter produced. Statewide chain reports can be generated in a similar manner to bring corporate compliance problems to the attention of top management.

(C) Management Reports

Agency managers should constantly review program performance to ensure that it is sufficient for the public health needs of the community. The timeliness of the program's accomplishment of initial, follow-up, and complaint inspections should be reviewed. Violation statistics should be examined for inconsistencies in the inspections. Statistics on the

performance of various sectors of the industry can better focus inspection and educational efforts. Recent foodborne illness data from the community or state should be used to target program resources.

Computerized systems, such as the FDA Electronic Inspection System, should be used for record keeping and reporting to expedite the generation of management reports. These reports keep agency management informed of program performance. Community and political support for food protection programs are engendered through routine and special focus reports on program activities.

(D) Quality Assurance Programs

Continuous program improvement efforts maintain program priorities focused on protecting public health. Regular assessments of the program and individual elements of the program's status determine the direction of program movement.

One of the basics of quality assurance is the design of meaningful and measurable goals. A few well-chosen indicators such as the reduction of overdue follow-ups is desirable. Too many goals make the monitoring system too complex.

Program management is also responsible for ensuring quality inspections through a quality improvement program. Some jurisdictions have members of a quality team or supervisors who monitor a small percentage of inspections through an announced program of reinspection soon after the initial inspection is completed. Conditions will vary somewhat, but general trends can be determined.

From the information gathered, continuing staff education efforts can be directed to needed areas, or program policies can be clarified. Inconsistencies between inspections and application of the rules are a constant complaint of the industry that can be reduced through on-going quality improvement programs.

Retail food protection program evaluations are available from the state-level food regulatory agencies. FDA program evaluations of general program or particular program elements may be requested through the FDA regional retail food specialist and are recommended every 3 years. The program elements are evaluated according to FDA-suggested protocol. A statistically significant random selection of establishments is inspected by FDA-certified inspection or evaluation officers to determine the sanitation level in the state program's jurisdiction. State programs have comparable evaluation services for local programs.

8. TEMPERATURE MEASURING DEVICES

(A) Sensor-Type Temperature Measuring Devices

(1) Bimetal Bayonet Style

A bimetal bayonet style thermometer with a dial face scale with a range of -18 to 105°C (0 to 220°F) may be used for certain applications in food temperature measurement. The scale must be in 1°C (2°F) increments. The dial face should be a minimum of about 1 inch in diameter and is usually available in larger sizes. The stem length should be a minimum of 127 mm (5 inches) and may need to be much longer to measure thicker foods.

Specific measurement instructions from the manufacturer of the instrument should be followed. The temperature measured is an approximate average of the temperature between the immersion point, which is approximately 2 inches up the stem, and the stem tip.
The bimetal bayonet style thermometer can accurately measure the temperature of relatively thick or deep foods such as beef roasts and stock pots. However, this instrument does not accurately measure the temperature of food less than 2 inches thick. The thermistor and the thermocouple discussed below do not have these limitations. The recent foodborne illness outbreaks associated with inadequate cooking of eggs and hamburger patties have shown that it is very important to be able to accurately determine the temperatures associated with these products as well.

(2) Thermistor

This device uses the temperature sensitivity of a semiconductor junction as the sensor. Advantages are high output and fast response at a very low cost. Disadvantages include nonlinearity and a limited upper temperature range, typically 300°C (572°F). The accuracy and response time of a thermistor lend themselves very well to food temperature measurement.

(3) Thermocouple

This device relies on the voltage generated by the junction of two dissimilar metals. The voltage output is proportional to the temperature of the junction. The advantages are a relatively rugged construction and a wide temperature range. Disadvantages include higher cost, lower sensitivity, and non-linear output, which requires a built-in reference. This technology has been used in food preparation for a number of years and has performed very well.

(4) Infrared Thermometers

The infrared thermometer quickly registers surface temperatures which facilitates general food safety system surveillance by allowing the scanning of numerous food temperatures over a short period of time. It operates much like a radar gun and requires the user only to aim at the target food, pull the trigger, and read the displayed temperature. ***This type of***

thermometer is intended only for measuring surface temperatures of food products and should not be used to measure and verify critical internal temperatures such as cooking temperatures.

Infrared thermometers are usually constructed of a high-strength, solvent-resistant plastic and measure invisible infrared energy being emitted from a target object. All objects emit infrared energy. The hotter the object is, the more active its molecules are and the more infrared energy it emits. An infrared thermometer houses optics that collect the radiant infrared energy from the object and focus it onto a detector. The detector converts the energy into an electrical signal which is amplified and displayed as a temperature reading.

(B) Performance - Thermocouples, Thermistors, and Infrared Thermometers

The major applicable sensor types for thermocouples and thermistors have an appropriate temperature range for food product measurement. In addition, response time is more than adequate (<1 second) for all the sensors. A bare sensor, however, is not recommended for food use because of fragility and difficulty of cleaning.

Sensors used for food temperature measurement should be encased in a metal sheath. Unfortunately, the disadvantage of a sheath is that it increases response time. As the thickness and length of the probe increase, response time increases dramatically. A food probe with a maximum diameter of 4 mm (0.150 inch) is the best compromise.

Smaller diameters show similar response times for a wide variety of probe materials, including stainless steel. A usable response time for food measurement should be less than 6 seconds TC (time constant). Probes thicker than 4 mm (0.150 inch) show a response TC of 8 to 10 seconds and should be used only for hot grease and surface measurements.

The TC of any sensor is defined as the time required for that sensor to respond to 63.2% of its total output signal when subject to steep change, for example, rapid immersion into a stirred hot oil bath. The step changes can be either an increase or a decrease in the parameter being measured. Five constants are required for a sensor to reach 99% of its total change.

A second factor in response time is placement of the sensor within the probe. The actual sensor element should be placed no more than 1 mm (0.04 inch) ($\pm$10%) from the tip of the sheath. If the sensor is not firmly against the end of the probe, response time increases dramatically. As an example, if the sensor is placed 1 mm (0.5 inch) from the tip, the response time can be as high as 20 seconds.

The sensor should be held in place by thermally conductive epoxy with a thermal coefficient of at least 7.0. Standard epoxies can act as a heat barrier and should be used in stationary applications only where temperature is relatively constant over a long period of time.

Most types of electrical-based thermometers are capable of effectively measuring the internal temperature of thin foods. Depending on construction, basically all are capable of at least $\pm 0.5^{o}C$ ($\pm 2^{o}F$) accuracy over the required temperature range. The limiting factor for effective temperature measurement is the physical characteristics of the probe that is inserted into the food. Thick metal walls and improper placement of the sensor can lead to erroneous readings. The bimetal bayonet-style thermometer may be suitable for measuring internal temperatures of thick foods.

As stated earlier, infrared thermometers do not measure internal temperature, but register surface temperature only, from a variety of distances based on their field of view. Typical applications are at a salad bar where surface temperatures will likely be higher than internal product temperatures or a hot buffet line where surface temperatures will likely be cooler than internal product temperatures. ***Because it only measures surface temperatures, use of an infrared thermometer should be followed by a closer analysis using an internal temperature measuring device that measures internal food temperature, such as a thermocouple, if problems are suspected.***

(C) Dataloggers

Dataloggers are devices which record temperature over time. The measurements may be stored on a circular chart, printed out, or stored electronically for later reporting or downloading to a computer. These devices are primarily used for ambient or product-specific cold holding or cooling, but may also be used for cooking or smoking operations, hot holding, or special applications such as CIP systems.

Some dataloggers allow multiple sensors to simultaneously report data to the recorder. The frequency of recording may be adjustable from continuous to once every 24 hours depending on the application. Portable dataloggers can be useful in HACCP verification work.

The instrument may be either an analog or digital type. The remote sensing probes are subject to the same parameters discussed in connection with other temperature measuring devices. Proper calibration procedures should also be followed.

The records generated from these devices should indicate date, time, and source of reading and should be signed by the individual responsible for the device at that time.

(D) Time/Temperature Integrators/Indicators

Time/Temperature Indicators or Integrators (TTI) are simple label-like devices that continuously monitor cumulative time and temperature of food products. Some of these devices are threshold-sensitive or change in appearance when a certain threshold for temperature or time is reached. The appearance changes only if the threshold has been breached.

Other devices will record the full history of the temperature and time profile. Some are coupled with bar code-like readers which download information to computers. These devices

and the computer software are calibrated to mimic actual changes in the product over the range of temperatures and times encountered.

TTIs are not widely used now, but industry and public health officials agree that there are widespread potential benefits. Applications would include Reduced Oxygen Packaging (ROP) products such as sous vide or vacuum-packaged foods and some fresh products which are temperature-sensitive, such as milk and seafood.

9. CALIBRATION PROCEDURES

(A) Calibration of Sensor Thermometers

(Refer to Subpart 4-502, Food Code)

Thermometers used for regulatory inspections should be calibrated initially, and then regularly thereafter, to ensure that accuracy of measurement is maintained. This calibration should be in the range of normal regulatory concern, 5°C (41°F) to 74°C (165°F). Calibrations should include both the instrument and any interchangeable probes used with that instrument. Each piece should be separately identified in the calibration records with serial numbers or agency equipment numbers.

The thermometer should be calibrated against a thermometer which has been certified by the National Institute of Standards and Technology (NIST). Standard laboratory calibration protocol such as American Public Health Association (APHA) Standards for the Examination of Dairy Products should be followed. Proper calibration documentation is essential.

A wet ice and boiling water procedure may be used for field checks of the thermometer and sensor. The ice should be broken into very small pieces, packed into an insulated container, and stirred with cold water into a very thick slurry. The sensor should be placed at the very center of the container to a depth of at least 50 mm (2 inches) and should be frequently agitated. The temperature should be noted when the temperature has stabilized after 3 minutes and should be $\pm$0.5°C from 0°C when calibrating a Celsius thermometer or $\pm$2°F from 32°F when calibrating a Fahrenheit thermometer.

The field check for higher temperatures may be conducted with boiling water. Consideration should be given to altitude above sea level in using this method. A 25 cm (>10 inch) deep container of water should be brought to a rolling boil on a stove or other source of constant heat. The probe should be carefully inserted in the boiling water until the sensor is located in the approximate center of the container with at least 76 mm (3 inches) of water below it. The temperature should be noted when the temperature has stabilized after 3 minutes and should be $\pm$0.5°C from 100°C when calibrating a Celsius thermometer or $\pm$2°F from 212°F when calibrating a Fahrenheit thermometer.

Adjustments to some of the instruments are possible to bring them back into calibration. Others should be returned to the manufacturer since field adjustments are not possible. Some instruments are not adjustable and should be replaced.

(B) Calibration of pH Meters

The manufacturer's calibration instructions should be followed for both laboratory and portable pH meters. The calibration procedure must take into consideration the expected pH range of food. This factor is extremely important if a pH of 4.6 is used as a critical limit. A 2-point calibration using standard buffers of 4.0 and 7.0 is most common for working with potentially hazardous foods. Calibrations are usually performed immediately before the pH of the food samples is measured. Compensation for the temperature of the sample is required if the pH meter does not automatically address this variable.

(C) Calibration of Water Activity Equipment

The manufacturer's calibration instructions should be followed for both laboratory and portable a_w instruments. The expected food moisture should be taken into consideration during the calibration procedure. The critical limit of 0.85 is the crucial point at which the instrument should be calibrated if the question is whether or not the food is potentially hazardous.

10. HACCP INSPECTION DATA FORM

(A) Purpose

(Refer to Subpart 8-403, Food Code)

The HACCP Inspection Data form in Annex 7 is one suggested format for recording the observations and measurements collected during an inspection. It consists of an administrative section, a food flow section, a section for recording other temperatures which are spot-checked, and categorical sections to record other data.

(B) Form Completion

(1) Administrative Section

This section contains the minimum information to link the form to the particular establishment. It identifies the date and time of the inspection. This information may be important later to substantiate findings in relation to a particular food preparation process.

(2) Food Flow Section

This section allows for space for the inspector to record detailed information about as many as four food items identified as having the most potential for presenting problems. Additional sheets can be used if more than four foods are tracked. The foods are listed horizontally across the top, and steps from source to reheating are included down the left side of the form.

Under each food listed, space is provided for recording information observed such as times and temperatures for each of the steps. A shaded column is provided for each of the foods to identify the critical limit, if any, for each of the steps. As an example, if the baking of chickens is being observed, the internal temperature and cooking time would be noted in the observation (unshaded) column, e.g., indicating that the food was baked to a temperature of 63 - 86°C (145 - 187°F) for 2 minutes. The critical limits column at this step would specify 74°C (165°F) for 15 seconds unless the establishment is preparing chickens under a variance regarding time and temperature, in which case the time and temperature conditions of the variance would be listed in this column.

The entire preparation and service cycle may not occur during the inspection. It should be clearly delineated on the form at which point the observations began and ended. The additional parts of the process can be discussed with the permit holder or person in charge to determine any potential problem areas where critical limits may not have been met.

(3) Food Temperature Recording

This section allows for the recording of food temperatures which are not being tracked above. The index letters indicating the food steps above can be used in conjunction with the recording of these measurements. Both acceptable and violative temperatures may be recorded here, but only the violative temperatures are later cited on the inspection report.

(4) Other Data

This section is located on the back of the form and can be used to record observations and measurements related to other areas of the operation. These include the following areas: management/personnel; other food; equipment, utensils, and linens; water, plumbing, and waste; physical facilities; and poisonous or toxic materials. Notes can be recorded under each of these categories. Additional forms can be used for the same establishment, if needed.

11. FOOD ESTABLISHMENT INSPECTION REPORT

(A) Introduction

(Refer to Subpart 8-403, Food Code)

When using the manual method of preparing the Food Establishment Inspection Report, enter the data on the report form (refer to Annex 7 for the form) in the appropriate field. Use continuation pages to give a full description of the conditions found in the establishment.

(B) Administrative Data

Enter the administrative data to clearly identify the food establishment and update the information when necessary. Use abbreviations where they do not interfere with reliable identification of the establishment.

Use the Inspection Type (**Insp. Type**) when recording the reason for the inspection. Use the Time blank for recording the time the establishment inspection takes or the time of day the inspection was made. Each agency should develop models for standardizing the way this form is completed.

(C) Debiting Methodology

It is critical to standardize the inspection process within the agency. Standardization using state-level and federal-level standardization procedures and certified inspection personnel is important for a program. The standardization procedure is explained in more detail in the staff training section.

The following process delineates the specifics of what constitutes a violation of the Food Code. It limits the possible shades of gray but does not totally eliminate them.

Items are marked as violations on the inspection report when they clearly exist in the food establishment. A violation represents a deviation from a Food Code provision. Slight violations, such as one dirty utensil among thousands of clean ones, does not indicate that the establishment is significantly deviating from the requirement to use clean utensils.

Each violation of a Food Code provision is reported as a separate item on the inspection report. This does not mean, however, that each instance should be considered a distinctly separate reportable violation. Some discretion is warranted when preparing the inspection report, but this discretion should have a firm basis within the standardization process.

For example, a cooler with mechanical problems may result in a dozen or more potentially hazardous food items being at a violative temperature. It may categorically be considered a malfunctioning refrigeration device under § 4-301.11, Cooling, Heating, and Holding Capacities, because repairs are needed to bring the unit into compliance. The food temperature violation is also cited only one time under ¶ 3-501.16(A)(2), Potentially Hazardous Food, Hot and Cold Holding. Additionally, if the time the food is out of temperature warrants, each of the violative foods should be discarded by the permit holder or person in charge and disposition noted on the report.

Alternatively, the unit may be properly functioning, but improper cooling practices were used, resulting in the high temperatures being found in the potentially hazardous food. This would be a violation of ¶ 3-501.15(A), Cooling Methods, and ¶ 3-501.16(A), Potentially Hazardous Food, Hot and Cold Holding.

If 12 separate coolers were found with items out of temperature as the result of 12 separate instances of improper practices by employees, each instance should be individually cited as a critical violation. The details included in each citation should clearly delineate the conditions found in each instance.

Failure to clean floors is another example which can be easily visualized. A large meat cutting room may have numerous separate areas requiring cleaning. If there is a build-up of old food debris and other filth on the floor of the room in five separate areas, then one violation would exist. However, if the cleaning problem existed in this room, the produce area, bakery, and two restrooms, one violation of ¶ 6-501.12(A) is cited with each of the incidences listed.

(D) Violation Data

Record inspectional findings on the report form to detail the violations found during the inspection of the establishment. As mentioned elsewhere in this Annex, FDA's studies of programs which have the most effective compliance programs found a relationship between the completeness of data provided and the success of the compliance program. The form is designed to maximize the opportunity for capturing relevant information about the violations found at the time of the inspection. Use as many of the rows of the Violation Description section as are needed to describe the violation.

Indicate critical violations in the first column, **Category,** using an **X**. Always list the critical violations first for emphasis. Leave a blank line between individual violations cited.

Note repeat violations with an **X** in the second column, **Repeat**. Repeat items are those that were in violation on the last inspection. Indicating in this column when the original violation occurred may also be helpful.

Record specific Food Code section references in the third column, **Code References**. The Inspectional Guide (refer to Annex 7) may be used to quickly find the appropriate Code section numbers. The Code reference provides information about the legal basis for the noted violation and helps the person in charge to find the actual Code requirement. It is important to standardize inspectors in accurately citing the Code. Succinctly provide the specifics of the observed violation in the fourth column, **Violation Description/Remarks/ Corrections**. Record any explanations or other data, including the fact that a correction was made during the inspection. Use as many lines as necessary to explain the details of the violation. Legibility is important.

12. FDA ELECTRONIC INSPECTION SYSTEM

(A) Introduction

(Refer to Subpart 8-403, Food Code)

The FDA Electronic Inspection System (FDA EIS) is a powerful tool for regulatory agencies to use in managing important program data. It can provide the regulated establishments with a comprehensive, legible, and understandable report of the agency's evaluation of the establishment.

The FDA EIS software is being provided to state and local regulatory agencies as a part of the Food and Drug Administration's mandate under the Public Health Service Act to assist

these agencies in their important roles of protection of the consumer's food, seafood, and milk supplies. Federal agencies are receiving this support under the Economy Act. A complete package is available at a nominal cost from National Technical Information Service.

FDA EIS may be used to integrate data management between existing agency database management systems and the food protection program. It can also consolidate inspection data collection and reporting between different levels of food protection programs within a state.

There are two components to the integrated FDA EIS software package, the *Office System* and the *Field System*.

(B) Office System

Features of the EIS that expedite and enhance office-based functions include:

(1) *Flexibility* - Agencies can customize definitions to match the way their programs currently operate.

(2) *Easy to Use* - FDA EIS is menu-driven to allow quick implementation of powerful program features.

(3) *Ad Hoc Reports* - Menus are used to easily format and save management reports routinely needed and to generate spontaneous, unique reports for immediate management decisions.

(4) *Complaint Management* - FDA EIS provides integrated input, ledger, assignment, and tracking for routine establishment complaints.

(5) *HACCP Support* - Program provides a risk-based inspection frequency and accommodates thousands of Hazard Analysis Critical Control Point (HACCP) plans allowing an individual establishment's plan to be incorporated into that firm's inspection.

(6) *Reports* - The *Office System* has a wide variety of reporting capabilities, including statistical analysis, graphical portrayal of management data, or incorporation into word processing applications.

(C) Field System

EIS features that support and enhance inspections include:

(1) *Previous Inspections* - Agencies can choose how many previous inspections are automatically loaded on the Field System for ready reference during the current inspection.

(2) *Automatic Repeat* - Possible repeat violations are automatically flagged for inspector concurrence, and the previous violation statement can be automatically repeated and prepared for editing.

(3) *Code Citation* - Definitive Code section citation is possible to provide for clear and defensible inspection reports.

(4) *Violation Look-Up* - Possible violations can be searched by keyword, chapter, or database for easy Code citation.

(5) *Violation Reporting* - Specific description of findings during inspection to increase management understanding of violations and aid in possible enforcement actions.

(6) *Departmental Reporting* - Findings may be allocated to specific operational areas of an establishment, in effect creating sub-reports for departmental managers which cite only violations occurring in their area of responsibility.

(7) *Realistic Results* - Violations are summarized by number of critical and noncritical items to produce establishment score.

(8) *Reference Library* - An FDA reference library including Code interpretations, Milk Shippers and Shellfish Shippers lists, and Food Recall List may be kept up to date by downloading from the FDA CFSAN Web Page at http://www.cfsan.fda.gov/list.html. FDA's *Foodborne Pathogenic Microorganisms and Natural Toxins Reference Book* (aka Bad Bug Book) is also available for inclusion. State and local SOPs and inspection manuals can be easily added by the user.

(9) *System Support and Future Enhancements* - Consistent with available resources FDA will endeavor to provide technical support and system updates and enhancements.

(D) Basic Implementation Level

The FDA EIS provides two approaches for implementation. The basic plan is achievable by those regulatory agencies with access to an IBM-compatible personal computer. The inspection data is entered in a batch process into the office computer, and the full power of the database management and reporting systems can be immediately used.

Inspection Reports can be preprinted with most of the administrative information inserted through a word processor merge file. The permit generation process can be facilitated with the FDA EIS Office System. Complaint and foodborne illness data tracking are enhanced the implementation of the basic plan.

(E) Advanced Implementation Level

Moving up the technological ramp, the full power and benefits of FDA EIS can be used when the Field System is installed on notebook computers. Inspection results are entered at the conclusion of each inspection and the report is generated within the establishment with a portable printer.

Data accuracy will be more ensured with this method. Timeliness will also be enhanced in generating the agency's management reports. The cost savings should quickly justify the purchase of the modest field computer and printer required to run the FDA EIS Field System.

13. ESTABLISHMENT SCORING

(A) Introduction

(Refer to Subpart 8-404, Food Code)

Certain Food Code violations are imminent health hazards and require immediate action or closure of the affected part of the food establishment. Sewage backing up in a food preparation area is an example of an imminent health hazard. Imminent health hazards require immediate intervention and may result in a summary suspension of the permit as specified in the Food Code.

Critical items are Food Code violations which are more likely to contribute to food contamination, illness, or environmental degradation and represent substantial public health hazards. The Food Code delineates critical items by the use of asterisks * after the tag line. All provisions within an asterisked section are critical unless they are otherwise marked by a superscripted ^{N}, which means that the item is noncritical, or a superscripted ^{S}, which means criticality is dependent upon the circumstances.

In previous codes, violations have been always considered critical or noncritical. The Food Code allows the inspector to use professional judgement regarding some of the violations to determine their seriousness based on the likelihood of food contamination, illness, or environmental degradation occurring as a result of the violation.

(B) Scoring Methods

The Food Code is based on citing violations in two categories, critical and noncritical. Each of the violations is expected to be corrected within given time frames. The number of violations is the basis for applying the compliance action provisions of the Food Code. The score, which is the number of items in violation, is significant as an indicator of the overall control of the causes of foodborne illness; however, there is no defined point at which a score translates into a significant health hazard. In fact, it is possible to have only one critical violation which has the potential for causing a foodborne illness outbreak.

Regulatory agencies which have categorized their establishments based on risk, as reviewed earlier, may choose to score their establishments by using these same categories. Others may choose to score their establishments by a simpler method which does not reflect the complexity of relative risk for foodborne illness causation.

A basic premise of the first two methods discussed below is that it is easier for simpler operations to achieve compliance with the Food Code. More complex operations have more opportunity for missing the targets. In no case should a significant level of noncompliance which will affect public health be tolerated.

Each jurisdiction has variations in conditions which need to be considered in establishing the compliance strategies which will work best for it. Some jurisdictions, even within the same state, have significantly higher or lower levels of compliance when measured with a standardized inspection. An establishment's critical violation score that requires a follow-up inspection will be much different between jurisdictions. Guidance regarding the rational allocation of the available regulatory resources is the purpose of the following discussion.

(1) Total Quality Management Method

A total quality management (TQM) methodology employs statistical process control to keep the organization's efforts focused on continuous quality improvement. By using measurable factors, such as the number of critical items in violation, an organization can continually monitor its results and make adjustments in process (follow-up inspections) to derive the most food safety benefits.

This method uses the industry norms to set the levels for precipitating the follow-up inspection. With the TQM method, regulatory resources are always focused on the establishments within a given category that require further regulatory compliance actions. (Refer to item **2. PROGRAM PLANNING**, © *Risk Categorization of Food Establishments,* for information about possible categories.) An industry norm can usually be reliably established for the jurisdiction after the first 50 inspections of establishments in that particular category. This norm is not static and will change with improvement in compliance and other influences. A regulatory agency would be well advised to conduct a semiannual or annual review of the categorical industry norms.

The TQM method uses the simple but effective statistical tool of percentile rank to judge the compliance of an establishment against the range of compliance levels of similar establishments within that category. The establishment percentile rank is expressed as the percentage of the scores, in the collection of scores, below its score.

The raw scores of critical violations are arrayed to show a frequency distribution to derive the percentile rank. Then the level established is compared with this frequency distribution. A point below the selected level of compliance is chosen as the number of critical items to initiate a follow-up inspection.

Table 2 shows an example summary of the frequency information for critical item violations for Type 4 establishments which have extensive menus and prepare large quantities of food that require many preparation steps. Portrayed are the raw scores and the frequency of occurrence of each critical violation. These calculations may be routinely done through manual computation or use of simple software packages. In this hypothetical jurisdiction and within this category, the highest 20% of violators of critical items in the Code has been established as the point at which follow-up inspections will be made. The frequency distribution is counted down from the highest number of violations to determine that for this period of time the establishments with more than eight critical violations would have follow-ups. This is three more critical violations than the average establishment in this category would have for the same period of time.

Table 2.
Example of Percentile Ranking
of Risk Type 4 Establishments

Est. = Establishment Identification
No. = No. of Critical Violations on an Initial Inspection
Sum Critical Violations = 581.00
Mean No. of Critical Violations = 5.81

Est.	No.	Est.	No.	Est.	No.	Est.	No.
1	1	26	8	51	20	76	5
2	2	27	5	52	4	77	7
3	4	28	7	53	5	78	4
4	5	29	6	54	3	79	4
5	6	30	1	55	2	80	3
6	10	31	3	56	4	81	3
7	13	32	6	57	4	82	4
8	2	33	7	58	12	83	5
9	3	34	5	59	11	84	5
10	4	35	4	60	12	85	4
11	2	36	8	61	3	86	3
12	6	37	10	62	4	87	3
13	5	38	12	63	12	88	5
14	4	39	3	64	2	89	15
15	14	40	3	65	3	90	1
16	2	41	5	66	4	91	2
17	3	42	4	67	5	92	4
18	6	43	5	68	5	93	9
19	4	44	5	69	11	94	4
20	3	45	7	70	10	95	3
21	7	46	6	71	3	96	11
22	8	47	2	72	3	97	2
23	4	48	3	73	5	98	14
24	14	49	8	74	6	99	12
25	4	50	12	75	8	100	7

No.	Freq.	%	No.	Follow-ups for highest 20% of category Freq.	%
1	3	3	9	1	1
2	9	9	10	3	3
3	17	17	11	3	3
4	19	19	12	6	6
5	15	15	13	1	1
6	7	7	14	3	3
7	6	6	15	1	1

(2) *Fixed Categorization*

In this method, a fixed number of critical violations as selected for each category of establishment. Table 3 illustrates one application of this method using this type of categorization.

Table 3. Critical Violations

Type	Critical
1	2
2	3
3	5
4	5

The number of violations used may be adjusted to accommodate current levels of resources in the agency and varying levels of compliance in the industry.

(3) *Fixed without Categorization*

The simplest method of establishing follow-up is to set a single level of compliance for all types and complexities of establishments. This figure should accommodate more realistic levels of compliance in the more complex operations, e.g., five critical violations in a full-service cafeteria would be the criterion before a follow-up inspection is triggered. This may mean that few, if any, follow-ups will be conducted in the quick service or simple retail food store operations.

As with the other methods, the number of critical items for causing follow-ups may be altered to conform to resource realities in the agency and changing levels of conformance in the industry.