



We're back!

Our experience with the HACCP Line newsletter last year taught us that there was interest among the Ohio very small meat plants in a regular, but timely, newsletter regarding HACCP and other meat processing issues. HACCP Line was discontinued in January, with the assumption that the HACCP dust would settle early in the year, and that there would no longer be a need for this information. We were wrong! As you know, there are still many HACCP issues keeping us all busy. In fact, since we didn't quite get it right the first time, FSIS has embarked on a new program, called HACCP Phase 2! Stay tuned!

It has been my intention since arriving at OSU a few years ago, to offer some form of regular communication to the meat industry of Ohio, but HACCP (in general), teaching a new class, and getting settled into a new job kept me from accomplishing that. We cut our teeth on the HACCP Line, with the tremendous assistance of our information assistant (editor) in Food Science and Technology, Michelle Spillan. It is my intention to broaden the scope of this newsletter beyond HACCP and food safety, as I know that you are interested in other technical information. I assume that you would be interested in reading about something other than HACCP for a change. Hence the name change to *On the Cutting Edge*. This title seemed appropriate to all plants, whether you only slaughter and cut fresh meat, or whether you are only chopping, or curing and cooking, everyone is trying to stay *On the Cutting Edge*.

HACCP Line was targeted toward the very small plants, but this newsletter will be distributed to all (large to very small) meat establishments in Ohio. Being a packrat myself, I assume that you won't throw away issues of this newsletter, particularly because we will refer back to old issues, where appropriate, so that we don't have to repeat old news and information. This newsletter will be intentionally short and to the point, offering you executive summaries of the latest information that we think you need to know. We will also refer to magazine articles, websites (for those having internet access), etc., for those wanting to read and learn more than we have space to cover. After this inaugural issue, we will also offer to send you this newsletter by the Internet (to save OSU some postage and a few trees, plus to help justify your internet costs!). It is intended that this newsletter be a monthly venture, but with the future of this fall season be-

ing so uncertain, I make no promises of monthly issues. As Michelle can attest, it is difficult to keep everyone on a monthly schedule. I would welcome comments from you, the readers, on topics, newsletter format, and any other issues that don't get personal! Your comments may get printed in future issues!

As Jackie Gleason would say, "Away we go ..."

—Lynn Knipe

Your Comments?

Please feel free to comment on the content of this newsletter by writing, calling, faxing or e-mailing to:

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Note: For those interested in receiving this newsletter by e-mail, please send that message to:

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COOKING & CHILLING OF READY-TO-EAT (RTE) MEATS

By Lynn Knipe

In the production of ready-to-eat meat products, FSIS is concerned with both proper cooking and proper chilling of these products. Ready-to-eat products include all products that are labeled as such, as well as those that consumers would assume were fully cooked based upon appearance, such as hot dogs.

Cooking of meat products is rather straightforward, and FSIS is expecting that plants have validated that their cooking process is effective in destroying the equivalent of one million (a 7-log reduction) Salmonella organisms. Currently, compliance guidelines for meeting lethality performance standards have only been determined for Salmonella (Appendix A¹) for cooked beef, roast beef and cooked corned beef. However, there are rumors that new performance standards for lethality of *L. monocytogenes* will soon be published by FSIS for all cooked products. Being the only FSIS guidelines available, processors are advised to use the time temperature guidelines in Appendix A for all fully cooked products.

Final Internal Temperature	Time
140°F	12 minutes
145°F	4 minutes
148°F	115 seconds
155°F	23 seconds
158°F	0 seconds (instantaneous)

Table 1 shows a partial list of internal product temperatures and times that product must be held at each temperature to obtain a 7-log reduction of Salmonella. If your final internal temperature for an RTE product is less than 158°F, then you will need to hold that product for the minimum time that corresponds with the final internal temperature.

A popular endpoint cooking target for fully cooked hams has traditionally been 148°F. Based upon temperatures and times listed in Table 1 (above), if you were only cooking to an internal temperature of 148°F, you would need to show that the internal portion of all products were held at a temperature of 148°F for at least 115 seconds. If you have a recording chart on your smokehouse, you could also easily determine if the internal temperature was maintained for the times required in Appendix A.

For critical limits of a HACCP plan, you would need to identify which time-temperature combination you are using during the cooking process. You could list more than one time-temperature combination in your critical limits, but you would need to choose which one you plan to meet at the start of each cooking process.

Another way to validate the lethality of your cooking process is through using the AMI Process Lethality Model², which can be accessed through the Internet (<http://www.meatami.org>). With this process you would enter product and cooking information into the spreadsheet at the AMI website, and the spreadsheet will determine the F-value for your process.

Exceptions to the Appendix A guidelines are products in which minimum final internal temperatures are regulated (including cooked cured and uncured poultry). These required temperatures are found in Table 2.

Table 2. Final Internal Temperature Regulations

Product	Final Internal Temperature
Cooked Uncured Poultry	160°F
Cooked Cured Poultry	155°F

Chilling of Cooked Meat Products

While the cooking process will destroy most pathogens, a heat treatment sufficient to fully cook a meat product is also known to cause spores (e.g., *Clostridium perfringens*, *Clostridium botulinum*, etc.) to change from dormant spore state to active pathogenic cell. If the time required to chill cooked products through the pathogen danger zone (130°F to 40°F) is too long, the pathogens that have been activated from the spores could grow and reproduce to a sufficient level to cause a food-borne illness. Clostridia is known to grow fastest between 130°F and 80°F, therefore the time required to chill through this 50-degree temperature range is of greatest concern. For these reasons, USDA FSIS is concerned with the chilling rate of cooked meat products.

The current Appendix B³ indicates that the maximum internal temperature of all cooked products should not remain between 130°F and 80°F for more than 1 1/2 hours and between 80°F and 40°F for more than 5 hours, for a total chill time of 6 1/2 hours.

For meat products containing sodium nitrite, a slower cooling process is permitted, which means that cooked products must chill from 130°F to 80°F in 5 hours, and from 80°F to 40°F in 10 hours, for a total chill time of 15 hours.

These cooling guidelines are expected to be used as critical limits, unless you can show that an alternative procedure will produce an equally safe product. Deviations from these guidelines would result in unacceptable risk to consumers. When a cooling deviation does occur, the product may often be salvageable if results from *Clostridium perfringens* sampling and/or computer modeling show that the product is safe for consumption.

References:

¹ Appendix A to Compliance Guidelines for Meeting Lethality performance Standards for Certain Meat and Poultry Products, USDA FSIS, June 22, 1999, Web: <http://www.fsis.usda.gov/oa/fr/95033f%2Da.htm>

² AMI Lethality Model, American Meat Institute, Washington, DC.

³ Appendix B, Compliance Guidelines for Cooling Heat-Treated Meat and Poultry Products, USDA FSIS, June 22, 1999, Website: <http://www.fsis.usda.gov/oa/fr/95033f%2Da.htm>

■ For more information on the cooking process, see Bob Hanson's Technical Report at: www.alkar.com/processes/techindex.htm

■ For more information on optimizing your chilling process, see Dave Norby's Technical Report at: www.alkar.com/processes/techindex.htm

Cooking & Chilling, continued next page

■ Thermal Processing Short Course

For more information on cooking and chilling of fully cooked meat products, you are encouraged to attend Thermal Processing of Ready-to-Eat Meat Products, a short course presented by OSU Meats Extension. The course will be held February 26-28, 2001, in the Agricultural Administration Auditorium, at The Ohio State University. This course was organized by Lynn Knipe; Bob Rust, Professor Emeritus, Iowa State University; and Erwin Waters, Erwin Waters Consultants; and is presented by 14 different experts from across the country. Registration fee for Ohio companies (only) is \$400; regular registration fee is \$600. For more information on this short course contact: Lynn Knipe (614) 292-4877 or knipe.1@osu.edu

MEAT INDUSTRY CALENDAR

October 12-14, 2000

AMI Annual Convention & Innovation Showcase

Las Vegas Hilton, Las Vegas, NV

Contact: Jacky Sher (703) 841-2400

Website: http://www.meatami.org/meet_home.htm

November 1-2, 2000

Implementing Listeria Intervention and Control Workshop

The Westin Hotel, Cincinnati, OH

Contact: Amy Peck (703) 841-2400

Website: http://www.meatami.org/meet_home.htm

November 1-3, 2000

U.S. Meat Export Federation's Strategic Planning and Marketing Conference

Hyatt Regency, San Antonio, TX

USMEF Contact: Jackie Boubin, (303) 623-MEAT X230

Website: <http://www.usmef.org>

December 7-8, 2000

Advanced HACCP

Kellogg Ctr., Michigan State University, East Lansing MI

Contact: Lilliana Hincapie, Food Processing Institute (202) 393-0890

Website: <http://www.fpi-food.org/registration.html>

February 21-22, 2001

OSU Food and Dairy Industry Conference

Wyndham Hotel, Dublin, OH

Contact: Valente Alvarez (614) 292-7765, alvarez.23@osu.edu; or Lynn Knipe (614) 292-4877, knipe.1@osu.edu

February 26-28, 2001

Thermal Processing of Ready-to-Eat Meat Products

Ag Admin. Auditorium, The Ohio State University
Columbus, OH

Contact: Lynn Knipe (614) 292-4877 or knipe.1@osu.edu

SSOPs Revisited

The recent federal reviews of state-inspected plants in Ohio made it apparent that many meat plants have been so preoccupied with HACCP plan writing and implementation that they have lost focus on their Sanitation Standard Operating Procedures (SSOPs), which were written only four years ago. There were apparently no problems with inadequate SSOPs, but rather some problems with establishments not doing what they had said they would do in their SSOP.

Perhaps an SSOP Refresher would help. SSOPs, required in all inspected meat establishments, are to contain established procedures to be followed routinely to maintain a sanitary environment for producing safe and unadulterated food products¹.

Your SSOPs are to include:

- 1) A description of procedures to be performed to prevent direct contamination or adulteration of product(s)
- 2) Identification of individuals responsible for implementing and maintaining sanitation activities.
- 3) Frequency of each task

Your SSOPs must:

- 1) Identify and describe procedures for pre-operational sanitation:
 - Equipment disassembly, reassembly after cleaning
 - Use of acceptable cleaning chemicals and techniques
 - Proper application of sanitizers
- 2) Identify procedures for operational sanitation
 - Cleaning/sanitizing during operation
 - Employee hygiene and health
 - Raw and cooked meat product handling and storage
- 3) Be signed & dated, by someone with overall on-site authority or a higher level official of the establishment, upon initiation and when modified.
- 4) Include corrective actions, which must be initiated in the event of a deviation
- 5) Include maintenance of daily records, that demonstrate that establishment is carrying out the sanitation procedures outlined in the SSOP.

A model of an SSOP for a meat plant can be found in the FSIS Pre-HACCP SSOP Reference Guide² (available through your inspector or OSU Extension).

The existence of SSOPs is not sufficient justification for a hazard not likely to occur in the hazard analysis process of HACCP. However, evidence of SSOP records may be justification of some hazards not being likely to occur.

References:

¹ The Federal Register Vol. 61, No. 144, 7/25/96

² FSIS Pre-HACCP Sanitation Standard Operating Procedures (SSOP) Reference Guide, July 1996, USDA FSIS Human Resources Development Division (409) 260-9562.



Some unpublished data, from yours truly while at Iowa State University, showed that there were a couple of types of

intestinal bacteria found on pork carcasses that were more likely to be from the intestines of plant employees than live hogs. This was replicated many times, complete with background tests to find out what was normally in the feces of the hogs at the plants we were sampling (no, we didn't do fecal samples from workers). Pete Snyder, of the Hospitality Institute of Technology and Management, in St. Paul, Minnesota, has written and spoken volumes on the virtues of proper hand-washing for food handlers, including the use of a nailbrush. Following the example of medical doctors before surgery, nailbrushes may be needed to properly clean under fingernails. Research is also being conducted (not at OSU) to determine if toilet paper is a sufficient barrier to prevent pathogens from getting to fingers and under fingernails.

Sorry, but no experimental subjects are needed for this research, as the procedures call for lab technicians to wipe petri dishes, loaded with consistent *loads* of intestinal bacteria. I have consulted with a large meat processor in Colombia that actually had to teach employees how to use toilet paper. And you thought employee training was a challenge. No job is done until the paperwork is properly finished!

Washing hands with soap and warm water is likely to loosen and remove only visible dirt, but not result in truly clean hands. I am a firm believer in putting on disposable gloves after washing, before handling meat products. Gloved hands should also be dipped in a sanitizer after the gloves are put on and before handling meat. Additional employee training will be needed to make sure employees know to never touch anything (including equipment handles, doors knobs, wooden pallets, etc.) other than the meat itself during processing, or else the hand cleaning, gloves and sanitizing steps should be repeated.



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