

Facts



The Other White Meat.

National Pork Board



PORK SAFETY



American Meat Science Association

Author: Dr. William Benjy Mikel, University of Kentucky
Reviewer: Dr. Mindy Brashear, Texas Tech University

Meat Plant Sanitation

INTRODUCTION

The importance of food safety and sanitation as it relates to your economic survivability is paramount. It just takes a review of how a few of the industry giants have been humbled by recent product recalls to understand the necessity of proper attention to sanitation. Sanitation, although normally an afterthought or a job relegated to someone lower down the employee chain, can be the difference in not only survival but profitability. Below are some important aspects of sanitation to consider in order to sustain your profitability and reputation.

From the very beginning a commitment to sanitation is a must, beginning with construction of the facility for ease of sanitation through the development of a properly maintained plant sanitation program. Next, the proper equipment must be available to employees to ensure successful completion of their sanitation objectives. In addition, dedication of appropriate time within the work day is necessary for a functional sanitation program to succeed. Continual training is vital to educate employees in the basics of proper sanitation. Finally, employee morale in lower tier positions, as sanitation normally is classified, is vital for success. Without complete dedication to these objectives, any program, no matter how well founded, is doomed to failure.

Although the primary purpose of a sanitation program is to improve the safety of the food supply, many times it takes an unpleasant event to push the food safety program in the right direction. This may be regulatory action, or the situation may be less visible with a gradual deterioration of a once spotless plant to one where only minimal efforts are made to maintain a sanitary environment. This decline commonly occurs over an extended period of time.

While everyone knows that sanitation has a definite cost in term of time and expense, usually the opposite side of the coin, or lack of proper sanitation, has a much higher liability. Many of the food industry's most successful sanitation programs are motivated by economic reality that consumers simply will not tolerate visible contaminants in their food products. The recent public outcry over the many recalls from well-known and trusted companies has led most food processors to re-consider their dedication to sanitation and food safety.

Importance of Sanitation

Recent estimates indicate that several million individuals develop food borne illness each year (CDC, 2001).

Although many cases are not reported, according to records from the Center for Disease Control (CDC) approximately 97 percent of the cases that are reported have been traced to mishandling beyond the processing plant. While this may indicate that the processing industry is doing a good job with sanitation, there is always the potential for mishap and the need to improve on general food safety practices. This, combined with the public's

perception that meat processors are to blame for mishandling, dictates the necessity for the best sanitation program possible.

It is important for all food processing employees, regardless of their assigned duties, to realize the importance of their actions when producing food products. Their understanding of the basic concepts of sanitation and bacterial growth will be vital in the production of a safe food supply.

Bacterial Growth

The rate of bacterial growth depends on

many factors or environmental conditions in which the growth occurs. The following are important factors affecting bacterial growth:

- **Water** - Bacteria require moisture to be able to survive, grow, and reproduce.
- **Oxygen**- most bacteria are aerobic and require oxygen to grow while others are anaerobic and grow in the absence of oxygen.
- **Nutrients**- all bacteria need an energy source that will supply them with nutrients.

Continued on page 2



National Pork Board

P.O. Box 9114 • Des Moines, IA 50306 USA • 515 223 2600 • Fax 515 223 2646 • porkboard@porkboard.org



- **pH (acidity)**- most bacteria grow best at a more neutral pH such as 6.6 to 7.5 while no pathogen growth occurs at pH below 4.6.
- **Temperature**- most bacteria grow best at moderate temperatures with the danger zone being identified as between 40-140° F.

Sanitary Operations

The application of proper sanitation techniques is important in maintaining food safety. Poor sanitation practices can contribute to outbreaks of food borne illnesses. The ultimate consequences of poor sanitation may be severe in terms of loss of sales, damaged product reputation and consumer confidence, adverse publicity, and sometimes legal action. Every establishment must start with a written food safety plan that may be implemented into a documented food safety program. Essential elements of a food safety program must contain; current good manufacturing practices (cGMPs), sanitation standard operating procedures (SSOPs), and a Hazard Analysis Critical Control Point (HACCP) Program along with a tried and true recall program. In addition, other programs such as pest control, employee training and supplier certification programs complete a competent food safety program. The following sanitation guidelines are recommended for a generic slaughter/processing plant. While equipment and plant layout may vary, general methods may be drawn from these suggestions.

All portions of the operation must be thoroughly cleaned then sanitized. Cleaning is the removal of all organic

material (ie. dirt, manure, meat scraps, etc.). A facility and/or piece of equipment must be completely cleaned or it will be impossible to sanitize. All buildings, fixtures, and other physical facilities of the plant should be maintained in a sanitary condition and shall be kept in repair sufficient to prevent food from becoming adulterated within the meaning of the act. Cleaning and sanitizing of utensils and equipment shall be conducted in a manner that protects against contamination of food, food-contact surfaces, or food-packaging materials. Cleaning compounds and sanitizing agents used in cleaning and sanitizing procedures shall be free from undesirable microorganisms and shall be safe and adequate under the conditions of use.

Effective measures should be taken to exclude pests from the processing areas and to protect against the contamination of food on the premises by pests. The use of insecticides or rodenticides is permitted only under precautions and restrictions that will protect against contamination of food, food-contact surfaces, or food-packaging materials.

All food-contact surfaces, including utensils and food-contact surfaces of equipment, should be cleaned as frequently as necessary to protect against contamination of food. Where equipment and utensils are used in a continuous production operation, the utensils and food-contact surfaces of the equipment shall be cleaned and sanitized as necessary. Non-food-contact surfaces of equipment used in the operation of food plants should be cleaned as frequently as neces-

sary to protect against contamination of food.

Equipment

All plant equipment should be designed and of such material and workmanship as to be adequately cleanable, and shall be properly maintained. Each piece of equipment should be installed and maintained as to facilitate the cleaning of the equipment and adjacent space. Food-contact surfaces shall be maintained to protect food from being contaminated by any source, including unlawful indirect food additives.

Personnel

Only employees who appear healthy should be allowed to work in food contact areas. Any person who is known to have, or appears to have, an illness, open lesion, including boils, sores, or infected wounds, or any other possible source of microbial contamination by which there is a reasonable possibility of food, food-contact surfaces, or food-packaging materials becoming contaminated, should be excluded from any operations which may be expected to result in such contamination until the condition is corrected.

Plant and grounds

It is important that the exterior surroundings of the plant be kept in a sanitary manner to protect against possible contamination due to rodent infestation. Proper storage of equipment, removal of litter and waste, and cutting of weeds and grass within the immediate vicinity of the plant buildings or structures that may con-

stitute a breeding place, or harbor-
age for pests is necessary. Roads,
yards, and parking lots should be
maintained so that they do not consti-
tute a source of contamination in
areas where food is exposed.
Adequately draining areas that may
contribute contamination to food by
seepage, foot-borne filth, or provid-
ing a breeding place for pests is nec-
essary. Plants must operate systems
for waste treatment and disposal in
an adequate manner so that they do
not constitute a source of contamina-
tion in areas where food is exposed.
Unloading facilities and holding pens
for animals should be constructed of
such materials so that they do not
harbor bacteria. Concrete paddocks
with metal railings versus dirt pens
are preferred for cleaning reasons.

**Sanitation for ready-to-eat (RTE)
areas**

Sanitation in ready-to-eat areas of
meat processing plants is vital to min-
imize the possible contamination of
such products with harmful bacteria
(eg. *Listeria monocytogenes*). The use
of proper sanitation methods in these
areas is the backbone of an effective
Hazard Analysis Critical Control
Point (HACCP) program in ensuring
the safest food product possible. A
strict, and comprehensive, sanitation
program must be in place with the

necessary safeguards to avoid a
potential business-ending food borne
illness outbreak. All equipment, as
well as, the environment should be
routinely sanitized and followed by
environmental and product testing to
verify effectiveness.

**Verification of Sanitation
Activities**

Verification is the use of methods,
procedures, or tests in addition to
those used in monitoring to deter-
mine if the operation is in compliance
with the written plan (SSOPs). This
will indicate whether the sanitation
program is addressing the needs of
the plant and if it needs modification.
Supplemental tests and reviews of
records are used to determine
whether the sanitation program is
functioning as planned in an effective
and efficient method. These tests
may include environmental testing of
the equipment as well as the plant
infrastructure. Also, a review of
records and the correlation to USDA-
FSIS issued "NRs" is a useful method
to track sanitation diligence.
Verification is long term and does not
always call for immediate changes,
however, it may necessitate some
modification of the existing sanitation
program to ensure a safe finished
product.

Various types of Sanitizers

In the meat industry there are main-
ly four type of sanitizers used; Hot
water, Chlorine, Iodophors, and
Quaternary Ammonia (Quat). Each
has there own advantages and disad-
vantages and is best used under a
rotation system to avoid resistance
buildup. The recommended usage
levels and areas of application are
given in the table below. However, it
is recommended that you discuss
your specific needs with your chemi-
cal supplier or sanitation contractor.

**SLAUGHTER FLOOR / OFFAL
ROOM / HOLDING PENS**

Pre-operational Sanitation:

All floors, walls and equipment
should be visually inspected for any
contamination. If needed, the gener-
al cleaning and sanitizing procedures
are implemented. Boot dip mats
filled with hot water and bleach are
placed in front of doors.

Operational Sanitation:

Carcass dressing will be performed
under sanitary conditions and in a
manner to prevent contamination of
the carcass.

- Employees will clean hands, arms,

Sanitizer	Usage	Concentration (ppm)
Hot water or steam	Normally as a sterilizing rinse after cleaning	180° F
Hypochlorite	Usually after cleaning Can be mixed with nonionic detergent	200 (Equipment) 1000-2500(Porous Floors)
Iodophors	Combined with nonionic detergent	25
Quaternary ammonium compounds	As a sanitizing rinse Mixed with nonionic detergent	200 (Equipment) 500 (Floors & Walls)

aprons, boots and protective head gear as often as necessary during slaughter and carcass dressing.

- Employees will clean and sanitize with hot water, knives, steels, node hooks, hand saws and other equipment as often as necessary during slaughter and carcass dressing to prevent contamination of the carcass.

- The splitting saws will be sanitized between carcasses using hot water.

- Eviscerating employees will maintain clean hands, arms, clothes, aprons, boots and knives during the evisceration process. If contamination occurs, the employee is required to step away from the carcass to clean and sanitize the contaminated items.

Postoperational Sanitation:

After the end of each slaughter, all floors, walls and equipment are properly cleaned and sanitized according to general or specific procedures.

Specific cleaning and sanitizing instructions:

■ Dehairer/Scalding vat

- a. Drain tank and remove hair from tank
- b. Rinse with warm water
- c. Scrub inside of tank and paddles as necessary to remove any remaining hair and debris. Properly dispose of hair.
- d. Rinse away debris with warm water

- e. Apply chlorine bleach according to instructions
- f. Rinse and sanitize with hot water
- g. Allow to dry and then lubricate (except paddles) with mineral oil

■ Work platforms

- a. Disassemble tops from racks and remove hair and debris
- b. Rinse with warm water
- c. Scrub tops and racks to remove any blood, then rinse
- d. Apply chlorine bleach according to instructions
- e. Rinse and sanitize with hot water
- f. Allow to dry and lubricate with mineral oil

■ Hog scraping table

- a. Remove hair and debris
- b. Rinse with warm water
- c. Scrub to remove any remaining blood and debris, then rinse
- d. Apply chlorine bleach according to instructions
- e. Rinse and sanitize with hot water
- f. Allow to dry and lubricate with mineral oil

■ Head inspection truck

- a. Disassemble
- b. Rinse with warm water and scrub to remove blood
- c. Apply chlorine bleach according to instructions
- d. Rinse and sanitize with hot water
- e. Allow to dry and lubricate with mineral oil

■ Inspection table

- a. Remove stainless steel trays from table
- b. Rinse trays and table with warm water and scrub
- c. Apply chlorine bleach according to instructions
- d. Rinse and sanitize with hot water
- e. Allow table to dry and lubricate with mineral oil
- f. Put stainless steel trays back on table

■ Offal Room

- a. Inedible barrels are to be neatly organized within the offal room; do not stack the barrels
- b. There should be no offal on the floor
- c. All inedible barrels are to be denatured
- d. Empty barrels are to be cleaned and sanitized as needed

■ Holding Pens

- a. Rinse down thoroughly with hot water (hot)
- b. Inspect to make sure all debris is removed

■ Other

- a. Remove floor drain covers before hosing down the floor
- b. Follow general cleaning and sanitizing procedures for other equipment, sinks, floors, walls and doors
- c. After drying lubricate all galvanized surfaces with mineral oil and neatly organize all equipment on the slaughter floor.



PROCESSING ROOM

Preoperational Sanitation:

All floors, walls and equipment will be visually inspected for any contamination. If needed, the general cleaning and sanitizing procedures are implemented. Condensation is wiped from rails and oil is applied.

Operational Sanitation:

All fabricating and processing will be performed under sanitary conditions and in a manner to prevent contamination of any product.

- Employees will wash hands and arms with soap and hot water as soon as they enter the processing room and as often as necessary during fabrication and processing to prevent contamination of any product.
- All equipment (including knives, steels, meat hooks, hand saws, grinder, bandsaw, tenderizer, stuffer, etc...) and equipment parts will be cleaned and sanitized with hot water (140° F for cleaning and 180° F for sanitizing) as often as necessary during fabrication and processing to prevent contamination of any product. This must be done between fabricating beef and pork.
- All condensation will be wiped dry as often as necessary during all fabrication and processing to prevent contamination of any product.

Postoperational Sanitation:

After fabricating and processing, all floors, walls, and equipment (including tables) will be properly cleaned and sanitized according to specific procedures.

Specific cleaning and sanitizing instructions:

■ Bandsaw

- a. Disconnect from power supply
- b. Disassemble all parts and open safety doors
- c. Rinse grinder and all disassembled parts with warm water and scrub to remove any meat and fat debris
- d. Apply chlorine bleach according to instructions
- e. Rinse and sanitize with hot water
- f. Inspect all parts and repeat cleaning and sanitizing if necessary

■ Stuffer

- a. Disconnect from power source
- b. Disassemble all parts including horns, linking attachment, scraper, feed worms, gaskets, etc...
- c. Place plug in hole leading to vacuum pump
- d. Rinse stuffer and all disassembled parts with warm water and scrub to remove any meat and fat debris
- e. Apply chlorine bleach according to instructions
- f. Rinse and sanitize with hot water (180 F)
- g. Inspect all parts and repeat cleaning and sanitizing if necessary

- h. Dry parts (oil with mineral oil if necessary) and store in designated area in small dry storage room

■ Skinner

- a. Disconnect from power source
- b. Rinse entire skinner with warm water and scrub to remove any skin and fat debris (follow good safety habits when scrubbing the blades)
- c. Apply chlorine bleach according to instructions
- d. Rinse and sanitize with hot water
- e. Inspect and repeat cleaning and sanitizing if necessary
- f. Allow to dry and apply mineral oil to outside surface

■ Grinder

- a. Disconnect from power source
- b. Dismantle all parts including mixing paddles, ring, grinder plates and knife and feeding worm
- c. Rinse grinder and all parts with warm water and scrub to remove all meat and fat debris. Areas commonly overlooked are inside and around the neck, meat guard, inside the grinder where the paddles rub the side, inside the grinder where the feeding worm attaches and around the control buttons.
- d. Apply chlorine bleach according to instructions
- e. Rinse and sanitize with hot water
- f. Inspect and repeat cleaning and sanitizing if necessary
- g. Allow to dry (wipe excess water from inside of neck) and

lubricate inside of neck, feeding worm and grinder plates and knife

- h. Hang grinder plates and knife on pegboard in small dry storage room

■ **Injector:**

- a. Open drain.
- b. Remove and clean conveyor using warm soapy water followed by rinse with hot water. (Inspect all surfaces to insure removal of meat particles and other residues.)
- c. Remove intake and return filter apparatus, which may be cleaned in sink. (Disassemble and remove nylon screen for maximum cleaning. Reassemble for next use.)
- d. Place bridge in injector and run with soapy water to circulate cleaning solution. At start of soapy water uptake make sure return hose is out of cleaning solution until soapy solution appears in return line. While machine is running with cleaning solution, spray until from top and ends to insure removal of meat particles and other residues.
- e. After circulation of soapy water, stop machine, drain, and circulate hot water through machine. (Again, remember to remove return line from rinse water at start of circulating rinse water.)
- f. Inspect all parts and re-clean as necessary. Pay particular attention to inside of unit, filter and conveyor. Reassemble.

SMOKE ROOM

Pre-operational Sanitation:

All floors, walls and equipment are visually inspected for any contamination. If needed, the general cleaning and sanitizing procedures are implemented.

Operational Sanitation:

All further processing and smoking will be performed under sanitary conditions and in a manner to prevent contamination of any further processed meat product.

- Employees will wash hands and arms with soap and hot water as they enter the smoke room and as often as necessary during smoking to prevent product contamination.

- All equipment (including smokehouse, kettle, and sink, etc...) and equipment parts will be cleaned and sanitized with hot water as often as necessary during processing to prevent contamination of any product.

Postoperational Sanitation:

After processing, all floors, walls, and equipment (including smokehouse and racks) are properly cleaned and sanitized according to general or specific procedures.

COOLERS

Check Weekly and Perform as Needed:

- Check cleanliness and orderliness of all coolers (including cooler shelving).

- Dispose of materials no longer needed.

- If needed, clean floors, walls and shelving.

- a. remove products from cooler or protect from splash
- b. rinse floors and walls with warm/hot water
- c. apply soap and scrub any areas with strongly attached soil -- rinse away soap
- d. clean shelving which contacts products according to basic cleaning procedures
- e. squeegee water from floor into drains
- f. inspect effectiveness of cleaning

STORE ROOMS

Check Weekly and Perform as Needed:

- Straighten up and organize; pick up and discard trash.
- Clean any areas requiring it.
- Sweep floor if necessary.

LOCKER ROOM

Check Weekly and Perform as Needed:

- Pick up trash and organize.
- Sweep/mop floor as needed.



OVERALL SANITATION AUDIT CHECKLIST

CODE: A - Acceptable U - Unacceptable I - Needs Improvement

KILL FLOOR

- Knock and Bleeding Area
- Legging Area
- Head Wash, Table Area
- Chain
- Eviscerating Table
- Hide Puller Area
- Triple Machine
- Trim Area
- Lights
- Floor and drains
- Walls/Ceiling

OFFAL

- Incline Belt
- Tables
- Bubblers
- Dry Storage Area
- Lights
- Floor and drains
- Walls/ceiling

COOLERS

- Hot Boxes
- Grading Area
- Loading Dock
- Outside Pads
- Floor and drains
- Walls/ceiling

INEDIBLE ROOM

- Cookers
- Barrels
- Stripper Machines
- Tables
- Lights
- Floor and drains
- Walls/ceiling

WELFARE

- Lunchroom
- Locker room
- Restrooms and Showers
- Tables
- Lights
- Floor and drains
- Walls/Ceilings

OTHER

- Water Temperature
- Water Pressure
- Drains
- Dry Pick-up
- Equipment Condition
- Chemical Inventory
- Record Keeping
- Payroll Distribution
- Office Communication

SAFETY PROGRAM

- Orientation
- Meetings
- Safety Checklist
- Lock Out/Tag Out
- Accident Investigation
- Reporting
- Plant Evacuation
- Stop Check Program

NEW EQUIPMENT ADDED/DELETED

- Explain on back side

LIVESTOCK HANDLING FACILITIES

- Trucks
- Unloading chute
- Pens
- Alleyways

Facts

For More Information Contact:



National Pork Board
P.O. Box 9114
Des Moines, Iowa USA
515 223 2600
Fax: 515 223 2646
E-Mail: porkboard@porkboard.org
Web: <http://www.porkboard.org/>