



Food Safety Technologies and HACCP Compliance



*A survey of meat slaughter and processing plants
by the USDA - Economic Research Service*

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The purpose of this survey is to report to Congress on the costs to plants of compliance to Public Regulation/HACCP, and to illustrate current production practices being employed to insure food safety.

Section I — Costs of the Pathogen Reduction/HACCP Rule and New Technologies or Procedures

Some definitions you might need:

- ? **Pathogen Reduction/HACCP Rule:** USDA regulation enacted in 1996 that required the development of and compliance with HACCP plans, and also compliance with the zero fecal matter standard, *Salmonella* standard, *E. coli* testing, and Standard Sanitation Operating Procedures (SSOPs). Some may call the Pathogen Reduction/HACCP Rule either the Megaregulation or HACCP Regulation.
- ? The phrase “changes since 1996” refers to all changes since 1996, whether they were mandated by the Pathogen Reduction/HACCP Rule or not.
- ? The phrase “over and above that required by Pathogen Reduction/HACCP Rule” means practices or tests that may be conducted more frequently or policies more rigorous than those required by the Pathogen Reduction/HACCP Rule or by FSIS.

Q1. In your opinion, since the Pathogen Reduction/HACCP Rule has been implemented, how costly has each aspect of it been to this plant? (Please circle ONE number for each.)

	No Cost To Plant ?	Slight Cost ?	Somewhat Costly ?	Very Costly ?	Don't Know ?
A. Writing, maintaining, and complying with Standard Sanitation Operating Procedures (SSOPs)	0	1	2	3	D
B. Writing, maintaining, and complying with HACCP product plans	0	1	2	3	D
C. <i>E. coli</i> and other testing	0	1	2	3	D
D. Zero fecal matter standard	0	1	2	3	D
E. <i>Salmonella</i> standard	0	1	2	3	D
F. Preshipment review requirements	0	1	2	3	D
G. Other (Please specify.)	0	1	2	3	D

Q2. In your opinion, of the components of the Pathogen Reduction/HACCP Rule identified in Q1, which ONE has been most effective for pathogen reduction up to now. (Please write ONE letter from Q1 in blank. Put *N* in the blank if you feel there has been no benefit.)

_____ component most beneficial for pathogen reduction

Q3. In your opinion, of the components of Pathogen Reduction/HACCP Rule identified in Q1, which ONE has been most costly for pathogen reduction up to now. (Please write ONE letter from Q1 in the blank below.)

_____ component most costly for pathogen reduction

Q4. How much change has this plant made to each of the following operational areas since 1996? (*Please circle ONE number for each.*)

Has plant changed?	No Change ?	Slight Change ?	Some Change ?	Great Deal of Change ?	Not Applicable ?
A. Requirements for meat suppliers or animal producers	0	1	2	3	NA
B. Raw and finished product flows	0	1	2	3	NA
C. Product rework	0	1	2	3	NA
D. The number and frequency with which operations are cleaned and sanitized	0	1	2	3	NA
E. Purchase and installation of equipment for better pathogen control	0	1	2	3	NA
F. Plant facilities for better pathogen control (such as air flows or coolers)	0	1	2	3	NA
G. Other (Specify) _____	0	1	2	3	NA

Q5. In your opinion, which one of the six operational areas in Q4 has had the greatest impact on pathogen control? (*Please write ONE letter from Q4 in the space below. Put N if there was no impact on pathogen control.*)

_____ operation area most beneficial for pathogen reduction (*Please write one letter.*)

Q6. In your opinion, which one of the six operational areas in Q4 has been most costly for pathogen control?

_____ operation area most costly for pathogen reduction

Q7. How many additional employees has this plant hired due to the Pathogen Reduction/HACCP Rule enacted in 1996? (*Answer ZERO if this plant hired no one. New employees should include additional quality control personnel as well as production workers. Each part-time worker should be counted as one-half of a worker.*)

_____ number of production workers

_____ number of lab and other nonproduction workers

Q8. In your opinion, how costly have additional labor and other operating requirements and additional capital expenditures been to this plant due to the following components of Pathogen Reduction/HACCP Rule? (Please circle ONE number for each.)

	No Cost ?	Slight Cost ?	Somewhat Costly ?	Very Costly ?	Don't Know ?
A. Writing, maintaining, and complying with Standard Sanitation Operating Procedures (SSOPs)	0	1	2	3	D
B. Writing, maintaining, and complying with HACCP product plans	0	1	2	3	D
C. Zero fecal matter standard	0	1	2	3	D
D. <i>Salmonella</i> standard	0	1	2	3	D

Q9. In your opinion, how much of a change has there been to the annual downtime of this plant due to the following components of Pathogen Reduction/HACCP Rule? (Please circle ONE number for each.)

	Reduced ?	No Change ?	Small increase (less than 8 hours) ?	Some increase (less than 24 hours) ?	Great deal of increase (more than 24 hours) ?	Don't Know ?
A. Writing, maintaining, and complying with Standard Sanitation Operating Procedures (SSOPs)	0	1	2	3	4	D
B. Writing, maintaining, and complying with HACCP product plans	0	1	2	3	4	D
C. Zero fecal matter standard	0	1	2	3	4	D
D. <i>Salmonella</i> standard	0	1	2	3	4	D

Q10. How has Pathogen Reduction/HACCP Rule affected finished product yields from incoming raw meat or animals?

- 1 Yield reduced
- 2 Yield not changed
- 3 Yield increased

Q11. Please estimate the amount this plant has spent on fixed capital expenditures for the reconfiguration of production lines and other factory modifications, and for the installation and purchase/construction of steam vacuum units, organic/antimicrobial spray washers, equipment that raises raw product surface temperature over 160 degrees, or other equipment in order to comply with Pathogen Reduction/HACCP Rule of 1996.

\$_____ fixed capital expenditures

Q12. Over and above that which was required under the Pathogen Reduction/HACCP Rule, has this plant ...
(Please circle ONE number for each.)

No ?	Yes ?	Don't Know ?
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- | | | | |
|---|---|---|---|
| A. Reconfigured production lines, improved air flow, or made other factory modifications to better control pathogens since 1996 | 1 | 2 | D |
| B. Purchased or constructed steam vacuum units, organic/antimicrobial spray washes, or other equipment to better control pathogens since 1996 | 1 | 2 | D |

Q13. Do you think capital expenditures for the factory modifications and equipment purchases and installations described in Q12 exceeded the fixed capital expenditures that this plant incurred in order to comply with the Pathogen Reduction/HACCP Rule ? *(Please circle the number of your answer.)*

- 1 No
- 2 Yes
- 3 Don't Know

Q14. Please estimate how much water, sanitizer, electricity maintenance, and other nonlabor variable costs increased per year due to Pathogen Reduction/HACCP Rule of 1996. *(Please specify amount in dollars.)*

\$ _____ nonlabor cost increase per year

Q15A. How many persons in this plant were involved in developing SSOPS, the HACCP plan, and other operating plans required by the Pathogen Reduction/HACCP Rule of 1996? *(Please give us your best estimate.)*

_____ Number of people

Q15B. How many days were spent by all individuals, in total in your plant, in developing SSOPs, the HACCP plan, and other operating plans required by the Pathogen Reduction/HACCP Rule of 1996? *(Please give us your best estimate.)*

_____ Number of days in total for all individuals

Q16. Did this plant use schematics or flow diagrams to identify critical pathogen control points before the Pathogen Reduction/HACCP Rule of 1996? *(Please circle the number of your answer.)*

- 1 No
- 2 Yes
- 3 Don't Know

Q17. Did this plant routinely review operations and make adjustments to operations for better pathogen control before the Pathogen Reduction/HACCP Rule of 1996?

- 1 No
- 2 Yes
- 3 Don't Know


Q18. Which ONE answer best describes how the shelf life of products sold by this plant has changed since 1996?

- 1 Shelf life decreased
- 2 Shelf life not changed
- 3 Shelf life increased 1-2 days
- 4 Shelf life increased by more than 2 days, but less than 7days
- 5 Shelf life increased by more than 7 days
- 6 Don't Know

Section II — Methods and Procedures

This section is about general plant operating practices.

Q19. Which ONE answer best describes the type of conveyor belts used for unpackaged, raw and finished product in this plant?

- 1 Mainly cloth-backed belts
- 2 Mainly plastic or stainless steel belts
- 3 A mixture of cloth-backed, plastic, and stainless steel belts
- 4 Don't Know
- 5 Not Applicable
- 6 Other 

Q20. If Other, please specify type of belt used. _____

Q21. Which ONE answer best describes how this plant cleans and sanitizes the unprocessed raw and finished product conveyors. *(Please circle the ONE number of your answer.)*

- 1 Conveyors are not run when cleaned.
- 2 Only unprocessed raw product conveyors are run while cleaned.
- 3 Only finished product conveyors are run while cleaned.
- 4 Both unprocessed raw product and finished product conveyors are run while cleaned.
- 5 Plant has automatic self-sanitizing conveyors.
- 6 Don't Know


Q22. For new equipment purchases, does this plant specify surfaces that minimize biofilm build-up?

- 1 No
- 2 Yes
- 3 Don't Know

Q23. Does this plant maintain positive air pressure in the final product (raw or cooked) processing areas?

- 1 No
- 2 Yes, in some of the final product areas
- 3 Yes, in all of the final product areas
- 4 Don't Know
- 5 Not Applicable

Q24. Which ONE answer best describes what this plant does with product that needs to be reworked?

- 1 Use in next and subsequent lots.
- 2 Use in next and subsequent lots, rework remaining at end of day is sold or transferred to another plant.
- 3 Hold until end of the day before using.
- 4 Sell to a further processor or transfer to another plant for cooking only.
- 5 Discard, sell, or transfer to another plant for uses other than human consumption.
- 6 Don't Know
- 7 Other 

Q25. If Other, please specify. _____

Q26. Over and above that which is required under Pathogen Reduction/HACCP Rule, does this plant test raw or cooked product with ... (Please circle ONE number for each.)

	No ?	Yes ?	Don't Know ?
A. Aerobic plate counts (APC) tests	1	2	D
B. Tests for <i>Salmonella</i> or generic <i>E. coli</i>	1	2	D
C. Tests for <i>E. coli</i> O157 or <i>Listeria</i>	1	2	D

Q27. Over and above that which is required under Pathogen Reduction/HACCP Rule, does this plant test environmental cleanliness in the production area or production equipment with ...

	No ?	Yes ?	Don't Know ?
A. Microbial swab tests	1	2	D
B. Tests for <i>Salmonella</i> or generic <i>E. coli</i>	1	2	D
C. Tests for <i>E. coli</i> O157 or <i>Listeria</i>	1	2	D

Q28. Over and above that which may be required under the Pathogen Reduction/HACCP Rule, for each type of test how has the FREQUENCY of bacterial testing changed since 1996?

	Decreased ?	No Change ?	No testing in 1996, but test now ?	Increased but not doubled ?	Doubled or more than doubled ?
A. Tests of raw or cooked product for <i>Listeria</i> , <i>E. coli</i> , <i>Salmonella</i> , or other pathogens	1	2	3	4	5
B. Generic tests or microbial swab tests of the environment	1	2	3	4	5

Q29. Assuming that irradiation is permitted, do you think this plant will irradiate SOME of its finished products within the next three years?

- 1 No
- 2 Yes
- 3 Not Applicable
- 4 Don't Know

Q30. Which ONE answer best describes the instructional training programs on safe food handling practices for new and experienced workers of this plant?

- 1 On-the-job training only
- 2 Instructional training for new workers only
- 3 Instructional training for experienced workers only
- 4 Specific instructional training for both new and experienced workers as needed
- 5 Don't Know

Q31. Does this plant offer worker incentives, such as gifts or compensation, for detecting and reporting possible sources of contamination or unsanitary conditions?

- 1 No
- 2 Yes
- 3 Don't Know

Q32. For each situation described, please tell us what production workers do if they detect feces, condensation, or other contamination on the meat, or some other unsanitary condition near the meat. *(Please circle ONE number for each.)*

	No ?	Yes ?	Don't Know ?
A. Take corrective actions on their own initiative if detected within their personal work areas.	1	2	D
B. Notify the production worker responsible for the work area if condition is detected outside their personal work areas.	1	2	D
C. Notify the supervisor for all unsanitary conditions.	1	2	D

Q33. Has this plant required growers or meat suppliers to make changes to their management practices that have had a measurable impact on reducing pathogens?

- 1 No
- 2 Yes
- 3 Not Applicable
- 4 Don't Know

Q34. Does this plant have a color-code or other system to ensure that unprocessed and finished products are not mixed and supplies and equipment are not shared between unprocessed and finished product areas?

- 1 No
- 2 Yes
- 3 Don't Know

Q35. For each type of product, what is the common practice for maintaining product temperature in the chiller? (Please circle ONE number for each.)

	At FSIS standard for temperature ?	Slightly below FSIS standard for temperature ?	5° or more below FSIS standard for temperature ?	Don't Know ?	Not Applicable ?
A. Unprocessed raw product	1	2	3	D	NA
B. Processed raw product	1	2	3	D	NA
C. Cooked product	1	2	3	D	NA

Section III — Plant Sanitation

Q36. Does this plant issue cleaned and sanitized smocks or uniforms to employees at the beginning of the shift?

- 1 No
- 2 Yes
- 3 Don't Know

Q37. Outside of direct contamination, which ONE statement best describes routine practice in this plant for sanitizing hands or gloves that contact raw or cooked product in the finished product processing area? (Please circle the ONE number of your answer.)

- 1 No routine; gloves/hands sanitized only when contaminated.
- 2 Gloves/hands sanitized one or more times per shift, but less than once per hour.
- 3 Gloves/hands sanitized one or more times per hour, but not always after handling the next carcass or unit of raw or cooked product.
- 4 Gloves are sanitized before handling the next carcass, unit of raw product, or cooked product.
- 5 Don't Know

Q38. Outside of direct contamination, which ONE statement best describes the routine practice in your plant for worker cut-up knives that contact raw or cooked product in the finished product processing area? (Please circle the ONE number of your answer.)

- 1 No routine practice; knives are sanitized only when contaminated.
- 2 Knives are sanitized one or more times per shift, but less than once per hour.
- 3 Knives sanitized one or more times per hour, but not always after each time raw or cooked product is handled.
- 4 Knives sanitized before handling the next unit of raw or cooked product.
- 5 Two knives used in rotation with each unit of raw or cooked product being processed with a freshly sanitized knife.
- 6 Don't Know

Q39. Which ONE statement best describes how often drains are sanitized? (Please circle the ONE number of your answer.)

- 1 Drains sanitized less than once per week.
- 2 Drains sanitized one or more times per week, but less than one time per day.
- 3 Drains sanitized one or more times per day, but less than one time per shift.
- 4 Drains sanitized one or more times per shift.
- 5 Don't Know

Q40. Does this plant have a mid-shift clean-up in which workers clean all product contact surfaces?

- 1 No
- 2 Yes
- 3 Don't Know

Section IV — Plant Characteristics

Q41. How many pounds of beef and pork products did this plant sell under its own name or other names last year in 2000? (Please write your answer in the blank.)

_____ pounds sold in 2000

Q42. Does this plant export products outside of the United States?

- 1 No
- 2 Yes
- 3 Don't Know

Q43. Is more than 75% of the product from this plant sold within the same state and/or the nearest adjacent states?

- 1 No
- 2 Yes
- 3 Don't Know

Q44. Do some major customers of this plant test product for pathogens or harmful bacteria or require sanitation and product handling practices that are more stringent than those demanded by FSIS?

- 1 No
- 2 Yes
- 3 Don't Know

Q45. Does this plant produce products under its own brand?

- 1 No
- 2 Yes
- 3 Don't Know

Q46. Does this plant produce cooked or otherwise further processed products?

- 1 No → **GO TO Q48**
- 2 Yes

Q47. What percentage of total annual production in 2000 was accounted for by each of the following products? (Please circle ONE number for each.)

	Items Not Produced 0% ?	Very Little 1 to 20% ?	Some 21 to 40% ?	About Half 41 to 60% ?	Most 61 to 80% ?	Almost All 81 to 99% ?	All 100% ?
A. Bologna, frankfurters, and other luncheon meats	0	1	2	3	4	5	6
B. Pepperoni or other fermented, aged dry or semi-dry products	0	1	2	3	4	5	6
C. Roast beef, oven-cooked ham, or other cooked beef or pork products	0	1	2	3	4	5	6
D. Smoked ham, bacon, or other smoked products	0	1	2	3	4	5	6
E. Other cooked or processed product	0	1	2	3	4	5	6

Q48. Does this plant produce raw products?

- 1 No → **GO TO Q66, PAGE 13**
- 2 Yes

Q49. What percentage of total annual production in 2000 was accounted for by each of the following products?
 (Please circle ONE number for each.)

	Items Not Produced 0% ?	Very Little 1 to 20% ?	Some 21 to 40% ?	About Half 41 to 60% ?	Most 61 to 80% ?	Almost All 81 to 99% ?	All 100% ?
A. Carcasses and primals	0	1	2	3	4	5	6
B. Course or fine ground beef or pork	0	1	2	3	4	5	6
C. Trim and other boneless beef or pork	0	1	2	3	4	5	6
D. Subprimal and fabricated cuts	0	1	2	3	4	5	6
E. Other raw products	0	1	2	3	4	5	6

Q50. Does this plant slaughter cattle or hogs?

- 1 No → **GO TO Q66, PAGE 13**
- 2 Yes

Q51. Does this plant require that purchased animals be removed from feed or have an empty gut prior to shipment to the plant?

- 1 No
- 2 Yes
- 3 Don't Know

Q52. Does this plant use a hot water pasteurizer or other heat treating process that raises carcass surface temperature over 160 degrees that is during a decontamination procedure but prior to carcass processing or storage?

- 1 No
- 2 Yes
- 3 Don't Know

Q53. Does this plant use a steam carcass pasteurizer, such as a *Frigoscandia*, to pasteurize carcasses?

- 1 No
- 2 Yes
- 3 Don't Know

Q54. Does this plant use organic acid sprays on carcasses?

- 1 No
- 2 Yes
- 3 Don't Know

Q55. Does this plant use steam vacuuming equipment for spot removal of fecal matter?

- 1 No
- 2 Yes
- 3 Don't Know

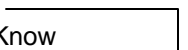
Q56. Did this plant use a hot water pasteurizer, steam vacuum units, organic/antimicrobial spray washes, or other equipment to better control pathogens prior to 1996?

- 1 No
- 2 Yes
- 3 Don't Know

Q57. Does this plant dehide cattle or hogs in a slaughtering operation?


- 1 No → **GO Q66, PAGE 13**
- 2 Yes

Q58. Which method best describes how this plant removes the hide from the carcass?

- 1 Manual hide removal with skinning knife
 - 2 Hide pulled up mechanically
 - 3 Hide pulled down mechanically
 - 4 Air dehiding
 - 5 Other
 - 6 Don't Know
- 

Q59. If Other, please specify method. _____

Q60. Which method best describes how this plant prevents the hide exterior from touching the carcass?

- 1 Worker precaution
 - 2 Reusable paper or plastic shield
 - 3 Fresh or sanitized paper or plastic shield
 - 4 All of the above
 - 5 Other
 - 6 Don't Know
- 

Q61. If Other, please specify. _____

Q62. Does this plant use an air exhaust system vacuum or other system that creates a negative air pressure around the carcass in the dehidating area?

- 1 No
- 2 Yes
- 3 Don't Know

Q63. Does this plant use a plastic bag or a similar device to prevent fecal contamination from the bung?

- 1 No
- 2 Yes
- 3 Don't Know

Q64. On the kill floor, outside of direct contamination, how often are hands or gloves that contact carcasses on the kill floor cleaned and sanitized?

- 1 Only when contaminated.
- 2 One or more times per shift, but less than once per hour.
- 3 One or more times per hour, but less than after each contact with raw product.
- 4 Before processing the next carcass.
- 5 Don't Know

Q65. How often are cut-up knives that contact carcasses on the kill floor cleaned and sanitized?

- 1 Only when contaminated.
- 2 One or more times per shift, but less than once per hour.
- 3 One or more times per hour, but less than after each carcass.
- 4 Before processing the next carcass.
- 5 Two knives are used in rotation with each carcass being processed with a freshly sanitized knife.
- 6 Don't Know

Q66. As the person completing this questionnaire, what is your job title?

_____ job title

Q67. Did you need to consult others within the plant to answer all the questions in this questionnaire?

- 1 No
- 2 Yes

Thank you for participating in this survey. The data will be used to develop trends. If you have any comments about this survey, please write them in the space below.

Please return your completed questionnaire in the enclosed envelope to:

***Social & Economic Sciences Research Center
Washington State University
PO Box 641801
Pullman, WA 99164-1801***

Thank You!