

Meat Inspection in the Next Century

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My remarks today are unencumbered by any affiliation. They are observations from a scientist who has been involved in the food safety debate for many years, observations as a parent, grandparent, and a consumer. My remarks made here are done in total sympathy to all families who have lost loved ones to traffic accidents, to airplane incidences, or to the consumption of unsafe food. I want to express my sympathy to all families, because it is important that the food safety debate is placed in context with these tragic events.

The topic assigned to me was "Meat Inspection in the Next Century". This topic in reality should be "How are we going to inspect food in the next century". The meat industry is taking a very myopic view of the inspection issue by focusing on meat rather than food. The debate over inspection is truly a debate about the assurance that the nations food supply will be safe. The questions that should be asked in this debate are, (1) who is responsible, (2) how will it be done, (3) who will do it, (4) how safe should it be, (5) how much should it cost, and (6) who will pay for it? In this paper, I will try to respond to some of these questions. First, I will try to define inspection, because inspection was the subject of this assignment.

Allow me to define what inspection *is not!* It is not HACCP! Somehow for the last five years the perception has been built that inspection in the future will be HACCP. I don't know what HACCP is, but I can assure you, it is not inspection. Later in this paper, I will attempt to define HACCP from my perspective. Also, inspection is not continuous inspection presence. Inspection is not end product *microbiological testing*. Inspection is not animal anti-mortem evaluation. What is inspection? Inspection is a critical appraisal against established standards.

Let me briefly turn back the clock and look at the history of meat and poultry inspection reform. Inspection reform has an ongoing history, thus the reform debate is not new nor has it just happened in the last few years. There are some new players in the debate but there are many mem-

bers of the American Meat Science Association, including myself, who have been involved in the debate much of our professional careers. Let us briefly review the scientific basis of the nations meat and poultry inspection program. The degree of public health risk should be identified for each operation and type of operation, and the inspection program should be based on the plant's compliance history. The Food and Nutrition board in 1987 stated that FSIS should evaluate current inspection by using a risk assessment model. A second recommendation was that inspection should shift from a mode of detection to one of prevention. Unfortunately, from the glimpses we are getting of the Pathogen Reduction: HACCP Regulation this shift from detection to prevention is not taking place. Additionally, the Food and Nutrition board clearly stated that the emphasis of inspection should be prevention of human disease rather than the control of microbiological counts. FSIS attempts at modernization started in the early 1980's with the implementation of what is known in the industry as TQC (Total Quality Control) programs. I have managed twenty of these programs and I can assure you they are very effective. In 1986, discretionary inspection (DI) was introduced which basically permitted further processing operations to operate without continuous inspector presence. This attempt failed.

In 1988, FSIS developed a program known as the PBIS (Performance Based Inspection System) which had as a part of it, the ISG (Inspection System Guide). The ISG was an attempt to organize the inspection model based on data and to quantify the results of inspection. This was a valid attempt, and I think it went a long way in trying to normalize and organize the whole inspection process. Unfortunately, inspection is dealing with people and this causes inconsistencies in the process and the agency is reluctant or incapable of resolving those inconsistencies.

In 1990, the HACCP debate began in earnest. At that time, the agency proposed that HACCP was to be all encompassing including quality and food safety. Since then, there have been numerous discussions and debates, on what HACCP is and how inspection should be focused on HACCP. Unfortunately, it is my opinion, most of these have been totally irrelevant. The current direction and focus on meat inspection reform debate has been obscured by partisanship. Different constituent groups have their own unilateral agenda, whether those interests are based on science or not

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TABLE 1. Changes in Cost Benefit.

	Options \$ Millions		
	II	III	IV
Public Health Benefit	90-240	360-960	1800-3000
Increase Industry Cost	680.00	853.00	4457.00
Increased Consumer Cost	-	256.00	2972.00
Increased Government Cost	6900.00	0.00	100.00
Cost/Benefit	77.0-287.0	.27-.71	1.0-1.7

is totally irrelevant. This has caused the current reform efforts to be driven by winds of emotion, not scientific fact. Secondly, there has been much talk, little listening, and less action on reform. Thirdly, contrary to the NRC recommendation, there has been a failure to respond to science. There has been wide public agreement that what is needed is a science based inspection system. To date, there has been little to no use of science, and in fact, science has been obscured in this whole debate. Next, and what may be the most significant point, there is the lack of clear congressional intent relative to a national food safety policy. Historically, congress has never seen fit to establish a national food safety policy. In the U.S., we have numerous individual food safety programs. Lastly, due to partisan interest, industry has failed to lead on this whole issue of food inspection reform.

Recently a Texas A & M publication "Meat and Poultry inspection options", made an effort to look at the different inspection options available. This study was also looked at the benefits, risks and costs. It compared four inspection options: 1. The status quo; 2. The current systems plus microbiological end product testing; 3. HACCP plus micro based analysis where they assumed HACCP was an inspection tool; and 4. HACCP plus risk analysis from farm to table. In analyzing the data, they put some option costs together from a public health benefit, increased industry cost, increased consumer benefit and increased government cost. In Table 1 an attempt is made to summarize the cost benefit ratio and option #3 appears to have the best cost benefit ratio. Option #3 is using HACCP plus risk analysis within facilities. The difference between options 3 and 4 is #4 is a farm to table HACCP system involving the total food chain whereas #3 is a HACCP and risk analysis system used only in federal establishments. The findings of this study indicated that the most effective cost benefit would be gained from option #3.

Currently, there is a lack of a clear uniform national policy relevant to food safety. It should be made clear that this refers to food safety through the whole food distribution chain and for all foods, not just specifically meat.

Let's look at the legislative Acts relative to food safety. The Food Drug and Cosmetic Act which regulates FDA amenable products. Enumerating the different food safety inspection systems that currently existing would include: The Meat Inspection Act, The Poultry Product Inspection Act; The vol-

TABLE 2. Acceptable Risk. How Do We Measure? (Accidental Deaths)

• 45,901	Motor Vehicle
• 12,001	Fall
• 4,938	Fire
• 4,407	Drowning
• 3,612	Drug or Medication
• 1,663	Food
• 1,649	Firearms
• 1,428	Air Travel
• 903	Falling Objects
• 44	Bite-Sting
• 15	Dog Bite

National Safety Council - 1985

untary Seafood Inspection Act; Food, Drug and Cosmetic Act, in addition some states regulate their own food and meat inspection programs. The net result being that we have totally inconsistent statutes covering food safety, administered by different agencies, having totally different requirements. The result of this being total and sometimes chaotic lack of uniformity in food inspection systems. USDA poultry and meat regulations require continuous inspector presence. The marine fishery services HACCP regulation is a compliance and risk based program. There are equal to state programs, animal by animal programs, yearly programs, sometime programs, and whenever programs. All these types of programs are used to inspect food products in this country. This illustrates a tremendous lack of uniformity in food inspection and yet we are still trying to address food inspection from a species or food type standpoint.

Some of the basic issues that must be addressed in developing a national food safety policy are: 1.) it should be uniform in application and based on risk; 2.) it should be non food specific assuming equal levels of risk associated with the consumption of different species and types of foods; 3.) it should encompass the total food chain. This national food safety policy should be based on some estimate of risk and cost benefit and it must be comprehensive, clear, concise, and easy to enforce. The responsibility for formulating food safety policy belongs to "we the people", not to consumer advocacy groups, not to unions, lobbyists, trade associations, or academicians.

The US Constitution clearly states "we the people in order to form a more perfect union to promote the general welfare", "and it states that all legislative powers shall be vested in congress." In the US currently, we have groups whose reason for existence seems to be to serve as "Lifestyle Police" as they were titled in a recent USA Today article, written by Tony Snow. The article was written in response to a study published by the Center for Addiction of Substance Abuse, Columbia University and the Center for Science in the Public Interest. The headlines read "from what we eat to what we smoke or drink, these professional busy bodies can't leave well enough alone". In reading further, perhaps what is most amazing is that these advocates of diversity actually

seem to insist on absolute conformity. They want to turn the US population into *veggie munching, meat hating, teatotaling, public TV watching, power walking, youthism zombies*. The point made here is that special interest groups are not the sole beneficiaries of, nor do they have the sole responsibilities for public policy on food safety.

As Congress formulates a national food safety policy, it must consider the levels of safety that the US population wants, the costs of achieving those, and the realistic possibilities of those levels being achieved. Safety is a judgment made by society on what is acceptable risk. A food is safe if the risk is judged to be acceptable, and that judgment is to be made by “we the people”, not by special interest groups. Different subgroups of consumers make different judgments on risk acceptability and food safety is not an absolute but has varying degrees of risk. These definitions were published by Patricia Thonney in 1992.

How safe is our food? That depends on who you ask, and it depends on how it is measured. Who do you ask? If you ask most consumers their expectation will probably be absolutely risk free. If you ask a scientist, a public health official, their response may be maximum nutrition and quality with minimal risk. This is an example of two groups who are defining how risk should be evaluated. The standards for safe food are changing with rapidly evolving scientific knowledge and consumers changing acceptance of risk. The point is, safe food has no absolute, it is an emerging, evolving issue. Currently, we seem to be seeing emerging pathogens that we weren't aware of three, four, five years ago which are having a significant impact on the decisions about food safety especially with meat. Acceptable risk - how do we measure it? Table 2 shows the number of accidental deaths recorded by the National Safety Council in 1985 by various causes. There were 4,590 from motor vehicles, followed by drowning, drug causes, food causes and right at the end, we see dog bites. This shows that food does contribute to accidental deaths. However, the deaths caused by food should be considered in perspective and context compared to all the other accidental deaths and this should be considered in our risk/cost benefit analysis. What are consumers willing to pay for food which has a zero risk standard? When the economics of food safety are evaluated, the factors that should be considered are: 1.) the cost demand vs. price; 2.) the availability of food and the willingness of consumers to sacrifice variety and quality. The industry can give the consuming public products and meat products which are virtually 100% risk free. Canned products for example are relatively risk free. How many consumers would really like to have a steady diet of canned products 365 days a year for perhaps 2 meals a day? There are tradeoffs and decisions that we have to make if we want to have risk free product vs. product that fulfills our social needs and is enjoyable to eat. That is one of the problems that I see in the article that was published in the USA Today with the results of the CSPI study which criticized such foods as cinnamon buns and cheese cake because of their high fat levels. These products

were never meant to be nutritional products. Life would be pretty dull if we couldn't eat good tasting fun foods.

HACCP is not inspection. What is HACCP? HACCP is process management for the production of safe food under the intended conditions of use. The processes which produce these products are owned by the entities that add value to those food products. A regulatory agency has no business getting involved in HACCP since they do not own the process. Can a regulatory agency inspect against established standards when HACCP is used? Inspection is checking against an established standard. Previously, I have heard Michael Taylor, acting Under Secretary, speak about establishing performance standards. I have no problem with FSIS, within their regulatory mandate, establishing performance standards provided the agency sets its own measurable performance standards. Unfortunately, the agency seems to be determining performance standards based on political initiatives rather than sound science.

I would briefly like to talk about inspection systems. Recently the National Marine Fishery Service published an inspection program, which basically said the seafood industry has to implement HACCP and stated that inspection would be against the HACCP model and each plant's program. This makes perfect sense and I have no idea why the meat and poultry industry or FSIS have to reinvent the wheel trying to develop something different.

The second model I would like to talk about is a privatized model - since my retirement last year, I have started a consortium group and together we are doing third party inspection. This group is actively going into food processing establishments and inspecting the outcome of their process. The National Marine Fisheries Program is based on the plant implementation of HACCP which is exactly what should be. Secondly, they are going to have these HACCP plans verified by approved parties. The program and the inspection frequency will be based on the level of food safety risk and plant compliance history. This is exactly what was recommended by the National Academy of Science in 1987. Part of the recommendation was compliance based inspection as shown in Table 3. Each facility was to be rated based on its performance against established performance standards and an evaluation of their processes. If the facility was given a I rating they would be inspected six month intervals. The rationale was that a facility with this rating did not need continuous inspector presence. A facility rated as II would be inspected once every two months. This sounds like a very cost effective program and one where the taxpayer would be realizing cost effective inspection.

When I speak about privatized inspection, the reaction typically is, “you've got to be kidding, I can't believe your actually going to advocate privatized inspection because we can't trust you guys.” In my opinion, the concept of privatized inspection makes as much sense in today's environment as developing food safety regulations based on rhetoric and emotion instead of science. It is a concept that has and will work. There are some “models” available. Airport

TABLE 3. Compliance Based Inspection.

Facility Rating	Frequency*
I	1 Per 6 Months
II	1 Per 2 Months
III	1 Per 1 Month
IV	1 Per 2 Weeks
V	Daily

*Rate Differs for Low and Substantial Risk Products.

inspection of carryon luggage is an example of privatized inspection. Other examples include air traffic controllers, community security, private auditors employed by the military, private auditors employed to evaluate plants, for specification and regulatory compliance and private auditors employed by foreign governments. Interestingly enough, FDA and some state governments are talking about the idea of privatized inspection. It appears that the time may be right to start the debate on the use of private inspection. Privatized inspections systems already exist in the meat industry companies such as Burger King, Alliant Food Service, Sysco Food Service, Subway and Pillsbury retain private firms to assess regulatory and specification compliance. The customers have established performance standards and told their suppliers, "we want you to audit our suppliers against these established performance standards." They have pushed the paradigm and said, "we are in a new era, these are the levels of risk and safety that we are willing to take." This is happening now and is driving food safety inspection reform. A paradigm shift is happening. Inspection is a means to independently determine that an appropriately designed and controlled system exists and they are being operated under control? Students of TQM should see a lot of similarity in the concept of this type inspection. Develop and implement a process, manage and control the process, problem solve any deviations, these are a part of total quality management. This is HACCP which is TQM focused for food safety and is operated by the facility.

Sanitation inspection regulations of a food plant must be a part of an inspection system. The sanitation systems in a food plant and their inspection must include: 1.) The systems should be process driven and should be verified as complying with regulations. Verification, should consist of the review of the system development, system implementation, system verification, process management, process control, and problem solving. Sanitation systems should adhere to the principles of process management. A lot has been written about SOP's (Standard Sanitation Procedures). I do not advocate standard operating procedures for sanitation. Why? It codifies the status quo and does not allow for continuous improvement which is the industry objective. Reviewing the principles of sanitation process management, first one must identify the hazards. These include microbiological, physical and chemical hazards, and financial hazards. If the sanitation process is not under control there is a chance that you may financially fail. Next, you identify the

TABLE 4. System Review.

• Administration and Regulatory Compliance
• Facilities and Equipment
• Sanitation, Housekeeping and Hygiene
• Rodent and Pest Control
• Receiving and Control
• Process and Product Evaluation
• Packing and Labeling
• Shipping and Storage
• Retained, Returned Product and Control
• Laboratory and Quality Systems

critical sanitation points which impact the outcome whether they are economic, quality or food safety related. The sanitation process is flow charted, and quantifiable critical limits are established. I have reviewed numerous HACCP programs where developers have failed to define measurable critical limits. Once established, the critical limits at each control point are monitored and corrective actions are established for any deviations from the critical limits. When a critical limit is exceeded, corrective action must be taken and supporting documentation of that action developed. Corrective action must not be confused with taking action. To some, when preop sanitation critical limits on micro counts are exceeded, they mistake the taking of more samples as corrective action. Instead, a corrective action on the system must be taken, not on the defect. Records must be kept as a verification that the process is under control. There are seven principles of process management and they can be applied to more than just HACCP.

We at Cook and Thurber evaluate 10 systems which are shown in table 4. HACCP, as discussed today, basically is about process and product control. Some of these other systems are being vaguely addressed, not addressed at all or addressed only in generic terms. One of the best models I have seen is one which I will call the "train and the cloud model". Basically the concept includes specific product HACCP's which must be flow charted and represent the train. In addition, a series of generic programs including such things as employee hygiene and sanitation, preop sanitation, pest control and others represents the clouds that protect the integrity of the train. Some of the points within each one of these systems that should be looked at include:

1. The quality of the technical organization and their application of the food safety system. We at Cook and Thurber, use the term food safety system as it is more descriptive and more easily understood than the acronym HACCP. We evaluate management training, management commitment, product recall preparation and procedures, and regulatory compliance standards.
2. We evaluate at water sewage handling plan, plant construction and design, equipment layout and design, plant lighting and maintenance standards.
3. We also evaluate at sanitation, housekeeping, sani-

tation monitoring, operational housekeeping, personal hygiene practices and employee training.

4. We evaluate pest control and control of chemicals.
5. Receiving and control of incoming food ingredients and the inspection systems controlling these reviewed. Supplies storage of chemical compound and their control are evaluated.
6. The effectiveness of the process of product evaluation is reviewed which actually is more in the traditional thinking of product flow charting. A records review is then done to determine the efficacy and control of manufacturing processes and procedures. First, the application and effectiveness of the food safety system is evaluated and determined through a records review. Accuracy of formulation to specification and the control of that accuracy is examined. This audit process takes one day for a normal size plant: Emergency systems are reviewed and these systems are present in very few of the plants reviewed. Here, we look for the availability of a document that outlines the steps to be taken in case of a catastrophic event, i.e. tornado, flood, fire. How will the facility assure the integrity and safety of products in-process?
7. Most packaging and labeling are fairly self explanatory.
8. Product handling, shipping, finished product inspection, and product tracking and recall procedures are all checked.
9. Retained and returned product control and rework control are a must and very few HACCP programs actually address these, especially rework control.
10. Laboratory procedures, quality control of labs and procedures for calibration of instruments are looked at. Revealing questions include: "do you use a thermometer to check the end point temperature of cooked ready to eat product? If the answer is yes, then ask "how do you do it? These simple questions will reveal a tremendous amount about the food safety system and its effectiveness. Calibration procedures to check thermometers, frequency of these checks and who verifies the fact that they were accurately done are all musts in a top caliber food safety program.

All these systems are individually evaluated in a comprehensive food inspection plan using a rating scale adapted from USDA's Inspection System Guide. An overall plant rating is not given. Each process is evaluated as a stand alone system and rated based on USDA decision tree criteria.

A report form has been developed for the auditing process. The 10 systems are reviewed and sub-categories can be judged acceptable, or with minor, major, or critical deficiencies based on observations in the plant. The purpose of real time plant observations is to verify that what the plant said they have in their programs actually exists. We are not looking for a single deficiency because virtually anyone can go into any plant any time of day or night and look hard

enough and find a deficiency. The purpose of this audit and review is to assess overall process stability and to rank it as acceptable or with minor, major, or critical deficiencies. A ranking will be based on actual observations and it is a consensus decision of a team. The highest classification score is "beyond practical improvement". If all categories are classified as acceptable the plant is rated as "beyond practical improvement". A plant that has one minor deficiency is classified as "low potential for improvement". Classifications of, "moderate potential for improvement", "high opportunity for improvement" means there are some critical deficiencies which need to be fixed in the process. In these cases, numerical scores are assigned because the next time an audit is done on the same plant, it is easy to determine if improvements have been made.

Using this system provides plants a compliance risk based system which allows the frequency of auditing and inspection to be determined based on performance. The numerical rank attained by the plant will determine the frequency of auditing needed by that plant.

Summary

What will the inspection system of the future look like? Privatized with government oversight and plant evaluation of process control. Inspection will be risk and compliance based. The seafood program is targeted to be done this way. The cost of repeated non-compliance could be a user funded continuous inspection presence program.

The benefits of a privatized inspection service include cost effectiveness, a performance based system, and inspectors who have an understanding of process management and who are unencumbered by concerns of job protection.

Who is responsible for safe food? As earlier stated, it is the responsibility of Congress to promulgate statutes that are not species nor food specific. Currently, Congress has national food safety policies that are not uniform, risk based and all encompassing. Once Congress changes this, it is the responsibility of Regulators to formulate performance based standards, develop policy and arrange inspection oversight and compliance procedures. The scientific community has the responsibility to investigate and report the results of science based experimentation thereby identifying emerging food safety issues and assisting in the development of a national food safety policy. Health professionals are responsible for serving their patients interest by providing affordable, accurate diagnosis, care and support. Producers and retailers are responsible for providing a variety of safe, affordable, nutritious, high quality food products to all consumers and to provide usable consumer information. The media is responsible for reporting unbiased factual, readable information. Consumer advocacy groups should attempt to further responsible advocacy in the best interest of all consumers based on factual science not emotion, or with special interests. Consumers also must be willing to accept some responsibility for assuring the safety of the foods they consume.