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FOOD PROTECTION TRENDS

SCIENCE AND NEWS FROM THE INTERNATIONAL ASSOCIATION FOR FOOD PROTECTION

NOVEMBER 2003

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VOLUME 23, NO. 11

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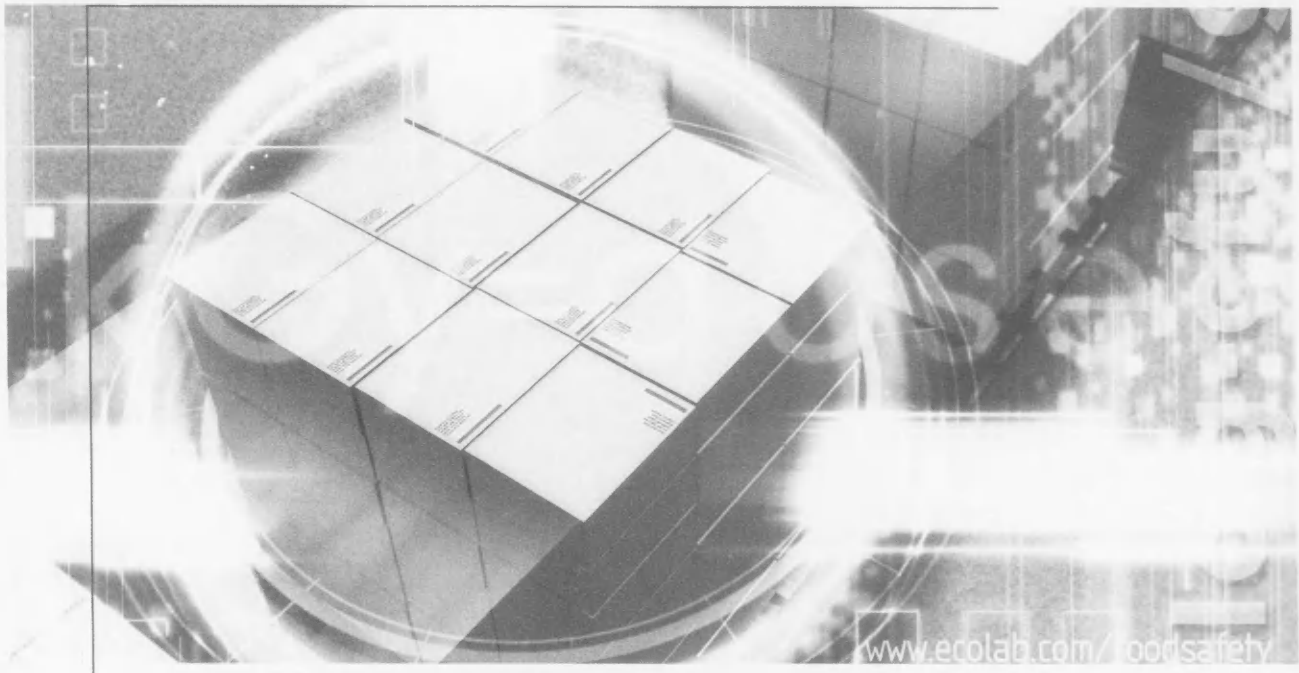

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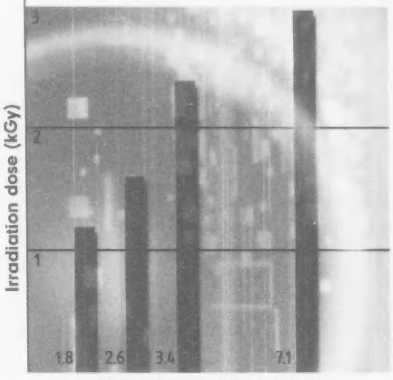

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FOOD PROTECTION TRENDS
SCIENCE AND NEWS FROM THE INTERNATIONAL ASSOCIATION FOR FOOD PROTECTION

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International Association for Food Protection

FOOD PROTECTION TRENDS

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"PRESIDENT'S" PERSPECTIVE

By PAUL HALL
PRESIDENT

"IAFP Affiliates – Lifeblood of the organization"

As President of IAFP I get to interact with a number of our Affiliates throughout the year. I recently had the pleasure of participating in the 2003 Joint Educational Conference of the Wisconsin Association for Food Protection, the Wisconsin Environmental Health Association and the Wisconsin Association of Dairy Plant Field Representatives in Fond du Lac, Wisconsin. It was great to see a number of long-time friends like Kathy Glass, P. C. Vasavada, and Sir Randy Daggs to name a few. It was also great to make new friends and acquaintances as well. I also had the pleasure of presenting long-time IAFP supporter Fritz Buss with an IAFP Certificate of Merit for his dedication and service to the Association. The astonished look of surprise on Fritz's face alone was worth the price of admission. Once again, I want to congratulate Fritz on this well-deserved honor. Overall, the WAFP Joint Educational Conference had a strong technical program and was well-attended with approximately 180 food safety professionals from across the state of Wisconsin.

I truly believe that our IAFP Affiliates are the lifeblood of the organization. Therefore, I believe it is incumbent upon IAFP to help ensure the vitality and success of all of our Affiliates. We endeavor to do that in a number of ways. One great example is our Executive Board Speaker Program where IAFP helps to cover the cost of a Board Member Speaker at Affiliate technical meetings. Other examples include publication of the Affiliate Newsletter which publicizes Affiliate activities and other items of interest to the Affiliates, sponsorship of a number of Affiliate Awards at the IAFP Annual Meeting, and sponsorship of the Affiliate Council meeting and related activities at the IAFP Annual Meeting, to name a few. The IAFP Affiliate Council is chaired by Steve Murphy, an active member of the New York Affiliate, New York State Association for Food Protection. As Chairperson of the Affiliate Council, Steve serves on the IAFP Executive Board and acts as the voice of the Affiliates at Board meetings. Lucia Collison McPhedran does a superb job as the IAFP staff member responsible for IAFP Affiliate activities. When you get a chance, please thank Lucia for all of the tireless work she does on behalf of your Affiliate and IAFP.

What's so special about our Affiliates, in my mind, is that they have the flexibility to tailor their programs to meet the needs of their specific membership. They are also able to reach food safety professionals who, for various reasons, are not currently members of IAFP. Our Affiliates provide a mechanism for educating their members about the benefits of belonging to IAFP.

The number of IAFP Affiliates continues to grow. We currently have 39 active Affiliates around the world. The United Kingdom and Portugal are the two newest Affiliates and we congratulate them as they develop their programs and membership participation. Admittedly, I am biased, but I believe that IAFP is the premier food protection organization in the world. One big reason for this preeminence is the success of our Affiliates. If you're already involved in your Affiliate, I urge you to remain active. If you're new to your Affiliate I urge you get actively involved. I also urge all Affiliate members who are also members of IAFP to encourage your Affiliate colleagues who are not

members of IAFP to consider joining our organization. The networking experience at the IAFP Annual Meeting is worth the membership price alone. Even if a prospective IAFP member cannot afford to travel to the IAFP Annual Meeting, the many other professional benefits of our Association still makes membership a great bargain. The IAFP Executive Board and Program Committee are already working to host another successful meeting in Phoenix, Arizona, August 8–11, 2004. Please join us — I know it will be a great experience! As always, I welcome your thoughts and comments at phall@kraft.com. Until next month…

WELCOME

The United Kingdom Association
for Food Protection

and

The Portugal Association
for Food Protection

IAFP'S NEWEST AFFILIATES

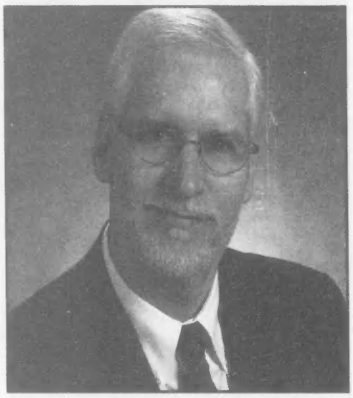
"COMMENTARY"
FROM THE EXECUTIVE DIRECTOR

This year's Annual Meeting was a colossal success and in this issue of *Food Protection Trends*, we feature the summary report on IAFP 2003. The meeting was held in New Orleans, Louisiana over the dates August 10 – 13 at the Hilton New Orleans Riverside. Our report includes pictures, session summaries, event summaries, minutes of the committee meetings and the Annual Business Meeting, and pictures and bios of the Award recipients.

We hope you were able to be with us in New Orleans and that this report will bring back memories of IAFP 2003, but if you were not able to attend, we know you will enjoy reviewing the Annual Meeting highlights. The report begins on page 888.

Beginning on page 908, session summaries that were written by Members of the IAFP Student PDG are presented. This is the second year for these summaries and we believe this endeavor adds a valuable Member service. A gigantic "Thank You" to all of the students who helped make this possible and a special thanks to Michelle Danyluk and Renee Raiden who helped coordinate this effort.

Please take a good look at the list of special contributors on page 901. These companies, along with those shown on page 906, were instrumental in providing support monies for IAFP 2003. We were fortunate to see magnificent growth in our total sponsorship this year and this enabled us to provide the settings for quality networking to occur. Thank you to each of our supporters!



By DAVID W. THARP, CAE
EXECUTIVE DIRECTOR

"We continue to be thankful for the extraordinary number of Members willing to assist us in conducting the Annual Meeting"

Each year the Annual Meeting grows but not to the point that makes it too big! This year we again set many records. We had 1,481 attendees, a five percent increase over last year; we had 108 exhibit spaces, a fifteen percent increase and we had a full 50% increase in sponsorship monies! The number of presentations increased by close to 100 over the prior year and our number of abstract submissions had increased by 33% for the second year in a row. This growth is above average and is a direct reflection on the quality of IAFP attendees and the scientific information being presented.

We continue to be thankful for the extraordinary number of Members willing to assist us in conducting the Annual Meeting. From all of the session organizers and convenors to the presenters, to the Program Committee (led this year by Lynn McMullen, Chairperson), to those serving on our committees and PDGs, everyone comes together to make sure that IAFP's Annual Meeting is a success! We also want to thank Marlene Janes and her students at Louisiana State University and Doug Marshall and his students at Mississippi State University for their help at the registration desk and their help with the social events. It was great to work with this enthusiastic group!

Once again we close a chapter in the Association's history. The 90th Annual Meeting is over and becomes a part of our history. Can you believe that there have been ninety Annual Meetings? This reminds me of another 90th

celebration. Wilbur Feagan, a long-time Association supporter and sponsor of the Black Pearl Award, recently celebrated his ninetieth birthday. I was honored to be able to attend a reception that was held for Wilbur in Springfield, Missouri and we have a couple of pictures to share with you (see below).

Thanks to Wilbur for his unwavering support over all these years and thanks to all IAFP Members for your support. It is the Members of this Association that make it great. Without active, supportive Members we would not be successful!

Happy 90th Birthday Wilbur!

ARTICLES

Food Protection Trends, Vol. 23, No. 11, Pages 870-881

6200 Aurora Ave., Suite 200W, Des Moines, IA 50322-2864

International Association for Food Protection

Prevalence of Food Safety, Quality, and Other Consumer Statements on Labels of Processed, Packaged Foods

MARY BENDER BRANDT,* CAROL J. SPEASE, GERALDINE JUNE, and ANNA-MARIE BROWN
Food and Drug Administration, Center for Food Safety and Applied Nutrition,
5100 Paint Branch Parkway, College Park, MD 20740

SUMMARY

The mission of the Center for Food Safety and Applied Nutrition (CFSAN) of the Food and Drug Administration focuses on promoting and protecting the public's health by ensuring that the nation's food supply is safe, wholesome, sanitary, and honestly labeled. CFSAN monitors the food industry's response to food labeling regulations through the Food Label and Package Survey (FLAPS). FLAPS data characterize the presence of food safety and other information for the consumer. The labels of close to one-third of the food products sold in the United States include statements about refrigeration, but the words "to maintain safety" are not present, even though FDA guidance indicates the importance of including them. Consumers are concerned that labels contain information to alert allergic individuals to the presence of food allergens, but very few food labels voluntarily bear such information. Regulations do not require food manufacturers to provide information on bioengineered ingredients, and very few manufacturers voluntarily do so. Pasteurization is used to kill pathogens that could cause illness or death, and regulations require a warning statement on the label of juice products that have not been pasteurized or otherwise processed to prevent, reduce or eliminate pathogenic microorganisms. Over half of juices have a statement that they are pasteurized. Few foods contain information to cook foods thoroughly or to use a thermometer. The food label can be used as an educational tool and will be one of the primary vehicles to provide critical information to the consumer.

A peer-reviewed article

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INTRODUCTION

The Food and Drug Administration (FDA) is responsible for protecting public health by ensuring that, among other things, foods are safe, wholesome, sanitary, and properly labeled. FDA oversees all domestic and imported food sold in interstate commerce (including shell eggs, but not meat and poultry); bottled water; and wine beverages with less than 7 percent alcohol. The agency conducts many activities through its food safety programs, including educating industry and consumers on safe food handling practices.

In 1990, the Nutrition Labeling and Education Act (NLEA) became law and mandated nutrition labeling for almost all processed foods regulated by FDA. It also called for activities to educate consumers about nutrition information on the label and about the importance of using that information in maintaining healthful dietary practices. The food label itself has been referred to as an educational tool *(1, 27)*. It contains a listing of all food ingredients, tells how many servings are in a package, and provides nutrition information, on a per-serving basis, in the Nutrition Facts label. Information such as the number of calories and the amounts of nutrients, such as fat and dietary fiber, present in a serving of the product is on the label to assist the consumer in planning healthful meals. The food label may also contain various health and nutrient content claims to describe the product. Health claims such as "Diets low in sodium may reduce the risk of high blood pressure, a disease associated with many factors" or nutrient content claims such as "low sodium" may appear on a product to help the consumer better locate foods for sodium- restricted diets. While these types of information characterize the product from a nutrition standpoint, the label is also a vehicle for providing food safety information and other product information to the consumer.

The Center for Food Safety and Applied Nutrition (CFSAN) at FDA studies product labels from the United States food supply every three years through the Food Label and Package Survey (FLAPS). FDA uses FLAPS to monitor the food industry's response to its food labeling regulations. FLAPS 2000–2001, the twelfth survey since the project series began in 1976, captures information on all aspects of the food label of processed, packaged food products, including label components such as food safety, quality, and other informational statements that assist the consumer in selecting, preparing, and storing foods. While FDA has reported on the nutrition aspects of the food label from FLAPS studies *(2)*, the agency has not previously reported on label information related to food safety and other types of consumer information.

Background information describing FDA guidance, regulations, and voluntary label statements related to food storage, product dating, allergens, processes to control pathogens, bioengineering, and food safety follows. The frequency with which related food safety, quality, and other consumer information on food labels is used is subsequently reported.

Food storage

Refrigeration has long been used to retard the deterioration of flavor, color, and texture of foods. More importantly, refrigeration can also help maintain the microbiological safety of potentially hazardous foods. Temperature abuse may result in the outgrowth of microorganisms that contaminate foods at various times in the continuum between the farm and the table: before or at the time of harvest, or during processing, handling, storage, or meal preparation. Proper refrigeration prevents or slows the growth of human pathogens and spoilage microorganisms and reduces the likelihood of foodborne illness. Consumers should note that, unlike other foodborne bacteria, *Yersinia enterocolitica* and *Listeria monocytogenes* can grow at refrigerator temperatures, so adequate cooling may be even more critical for these pathogens, which can be killed by cooking foods to safe internal temperatures. In 1997, FDA issued guidance on labeling of foods that consumers need to refrigerate to maintain safety or quality *(18)*. This guidance, which represents FDA's policy on adequate safe handling instructions for food, includes recommendations that should reduce the likelihood of temperature abuse of certain foods by consumers, as well as reduce the potential for foodborne illness and death. Unlike regulation, however, guidance is not required to be followed by industry.

The guidance recommends label statements for three groups of foods (Table 1). The first group contains potentially hazardous foods that, if subjected to temperature abuse, will support the growth of infectious or toxigenic microorganisms that may be present. Outgrowth of these microorganisms would render the food unsafe. The recommended label statement for this group of foods is: "IMPORTANT Must Be Kept Refrigerated to Maintain Safety." The second group includes those foods that are shelf-stable as a result of processing but that, once opened, are potentially hazardous unless the unused portion is refrigerated. The appropriate label statement is: "IMPORTANT Must Be Refrigerated After Opening to Maintain Safety." The third group includes those foods that do not pose a safety hazard even if temperature abused after opening but that may experience a more rapid deterioration in quality over time if not refrigerated. The suggested label statement is "Refrigerate for Quality."

Some foods bear labels with statements instructing the consumer to "refrigerate or freeze" and others include recommendations for freezing. Freezing is a critical food preservation method, because it stops mi-

TABLE 1. FDA recommended label statements for foods that need refrigeration by consumers to maintain safety or quality

Recommended Statement	Type of Food	Possible Effect of No Refrigeration
IMPORTANT Must be Kept Refrigerated to Maintain Safety	Potentially hazardous foods that, if subjected to temperature abuse, will support the growth of infectious or toxigenic microorganisms that may be present	Outgrowth of microorganisms present would render the food unsafe
IMPORTANT Must be Refrigerated After Opening to Maintain Safety	Foods that are shelf-stable as a result of processing	Once opened, the unused portion is potentially hazardous unless refrigerated
Refrigerate for Quality	Foods that do not pose a safety hazard after opening, even if temperature abused	May experience a more rapid deterioration in quality over time if not refrigerated

crobial growth, but it does not kill microorganisms. Freezing keeps food safe by causing foodborne illness microbes to enter a dormant stage.

Product dating

There is no uniform or universally accepted food product dating system in the United States *(28)*. When storage conditions have been optimal, many foods are safe to eat *(25)* and are acceptable in terms of taste, aroma and other quality characteristics for periods of time beyond the expiration date printed on a label. FDA does not require expiration dates on food products; the dates required on infant formula products are "use by" dates, and not "expiration" dates. A consumer using the infant formula product before this date is assured that the product meets nutritional and quality standards; the date does not relate to food safety.

A "use by" date is the last date a consumer is advised to use a product while it is at peak quality. On the other hand, a "sell by" date is a date on the packaging of a food product that indicates the last day the product can be sold. It guides retailer rotation of shelf stock and allows time for the product to be stored and used at home. The date is quality driven, not a food safety concern *(24)*. Many food products voluntarily include expiration, "sell by" or "use by" dates, and other products include a date only without indication of its purpose.

Allergen information

Each year the FDA receives reports of consumers who experience adverse reactions following exposure to allergenic substances in foods. Experts estimate that about 1.5 percent of adults and 6 percent of children in the United States are affected by food allergies *(29)*. The most common offending foods include milk, eggs, wheat, peanuts, tree nuts, soybeans, fish, and crustaceans, which together account for about 90% of all food allergic reactions *(14, 26, 29)*. Most consumers are aware of their specific sensitivities and rely on the ingredient statement on the food label to avoid foods to which they are allergic. However, adverse reactions can occur when an allergen-sensitive consumer consumes an allergenic substance that has not been declared on the food label or has been declared with the use of words not familiar or known to the consumer.

The Federal Food, Drug, and Cosmetic Act (the Act) and its implementing regulations require, in most cases, that the ingredient statement of labels of food fabricated from two or more ingredients declare all ingredients, by their common or usual names, in descending order of predominance by weight *(3, 13)*. Thus, consumers may obtain information about the foods they consume by reading the ingredient lists of foods. However, there are two limited exemptions from these ingredient labeling requirements. First, spices, flavorings, and colorings may be declared collectively without naming each one. Second, FDA regulations *(4)* exempt, from ingredient declaration, incidental additives such as processing aids that are present in a food at insignificant levels and that do not have a technical or functional effect in the finished food. Thus, in some cases, food labels may not provide allergic consumers with total information about all the ingredients in the foods they eat, and consumers may therefore inadvertently consume foods with substances allergenic to them.

In addition to exemptions for ingredient labeling, there are other ways in which consumers may inadvertently come in contact with aller-

genic substances. For instance, some consumers may be unaware of the allergenic nature of ingredients declared by their common or usual names in the ingredient statement. Thus, consumers may not understand that the source of the ingredients "whey" and "casein" is milk, which commonly provokes food allergy.

As part of its public health mission to keep food safe, FDA has been focusing increased attention and activity on issues relating to food allergens, especially the proper labeling of products containing food allergens and the control of food allergens in products not intended to contain food allergens. In 1996, FDA issued a Notice to Manufacturers clarifying that certain foods could not be considered incidental additives because of their allergenic potential *(17)*. In addition, FDA asked manufacturers to voluntarily declare allergenic ingredients in spices, flavoring, and colorings.

More recently, FDA issued two food allergen guidance documents. First, FDA issued the Allergen Inspection Guide, which provides field investigators and inspectors with specific guidance on inspection methods, techniques, procedures and policy relating to allergenic ingredients *(20)*. Second, FDA published a Compliance Policy Guide (CPG) on Allergens, entitled "Statement of Policy for Labeling and Preventing Cross-contact of Common Food Allergens" *(21)*. This CPG provides guidance to FDA's compliance staff, field investigators, and the regulated industry on FDA policy and regulatory action criteria for undeclared food allergens.

Processes to control pathogens

The food industry has developed various methods and technologies for use in the control of foodborne pathogens and product spoilage. These technologies include pasteurization, various packaging methods, ultraviolet processing, ozone sterilization and food irradiation.

Pasteurization is a process used to eliminate or reduce the number of target pathogens in a food (e.g., *Salmonella* Enteritidis, *Listeria monocytogenes, E. coli* O157:H7, *Clostridium botulinum*). Methods of pasteurization include flash pasteurization, in which foods are subjected to high temperatures for short periods of time to destroy harmful bacteria, and ultra-pasteurization, in which products are processed at higher temperatures to extend the shelf life. Consumers should note that foods could become contaminated even if they have been pasteurized and, in general, must be refrigerated following use.

FDA requires the pasteurization of all Grade A fluid milk and milk products distributed in interstate commerce in final package form *(5)*. FDA also requires pasteurization of dairy ingredients used in all fresh and soft ripened cheese, but allows for the use of unpasteurized dairy ingredients in hard cheeses, such as cheddar cheese, that have been ripened for at least 60 days *(6)*. The Agency's regulations for liquid, dried, or frozen egg products require they be pasteurized or otherwise processed to destroy live *Salmonella* Enteritidis *(7)*. Other foods that may be pasteurized include whole shell eggs, juices and juice beverages, fruits, vegetables, spices, fish and fishery products, shrimp, lobster, crabmeat, mollusks, and surimi. Except for pasteurized orange juice, it is not an FDA requirement that the above products bear a statement that they are "pasteurized." The standards of identity for milk, heavy cream, light cream, light whipping cream, eggnog, and half and half indicate that the name may be immediately proceeded by the term "pasteurized" *(8)*. However, if the food is "ultra-pasteurized," the term is required on the label.

In 1998, FDA revised its food labeling regulations to require that a warning statement be declared on the label of fruit and vegetable juice products that have not been pasteurized or otherwise processed to prevent the introduction of, reduce or eliminate pathogenic microorganisms that may be present *(9)*. This action was initiated in response to an increase in the number of foodborne illnesses associated with juice products over the previous years, including a 1996 *E. coli* O157:H7 outbreak associated with consumption of unpasteurized apple cider and apple juice products. The regulation states that any juice or juice beverage that is not processed to reduce harmful bacteria by 100,000-fold (i.e., attain a 5-log reduction) must bear the following warning statement on the label: "WARNING: This product has not been pasteurized and, therefore, may contain bacteria that can cause serious illness in children, the elderly, and persons with weakened immune systems." The warning label must be clearly visible on either the information panel or the principal display panel of the package label. This information is intended to allow consumers to make informed decisions on whether to purchase and consume unpasteurized juice products, thereby reducing the potential for foodborne illnesses and deaths that may result from the consumption of these products.

Irradiation of food has potential as a means of controlling pathogenic microorganisms in or on food. Current FDA regulations require the label of an irradiated food to contain the words "Treated with radiation" or "Treated by irradiation," along with the radura (), a symbol used throughout the world to represent food irradiation *(10)*. FDA concluded in 1986 that this information is necessary to prevent the misbranding of foods treated with radiation, because irradiation can produce significant changes in certain organoleptic characteristics (e.g., taste, smell) in foods, and these changes are not readily apparent to the consumer at the point of sale/purchase, in the absence of appropriate labeling.

FDA requires the addition of antimicrobial growth inhibitors or

acidifying agents to products, such as foods covered in oil, that may provide the anaerobic conditions required for production of botulism toxin *(15)*. Any food that is susceptible to outgrowth and toxin production, in which spores may survive processing, and which is not subsequently heated before consumption, can be associated with risk of botulism. Botulinum toxin has been demonstrated in a considerable variety of canned foods, such as corn, peppers, green beans, soups, beets, asparagus, mushrooms, ripe olives, spinach, tuna fish, chicken and chicken livers and liver pate, luncheon meats, ham, sausage, stuffed eggplant, lobster, and smoked and salted fish. Outbreaks of botulism in the United States and Canada were caused during the 1980s by consumption of vegetables that had been covered with oil or grease. For example, commercially processed garlic in oil caused two outbreaks, and onions covered in grease and left overnight on a grill caused a large outbreak of botulism in Illinois. The bottled chopped garlic relied solely on refrigeration to ensure safety and did not contain any additional antibotulinum additives or barriers. As a result of these incidents, FDA ordered manufacturers to stop making garlic-in-oil mixes that rely solely upon refrigeration for safety. FDA now requires that commercial mixes contain specific levels of microbial inhibitors, usually acidifying agents such as phosphoric or citric acid. The presence of these additives must be disclosed in the ingredient statement of the product label.

Bioengineering

FDA has concluded that there is no significant difference between foods produced using bioengineering, as a class, and their conventional counterparts. FDA considers bioengineered food on a case-by-case basis. In January of 2001, FDA proposed regulations that would require the mandatory submission of data and safety information for bioengineered foods and food ingredients to the Agency at least 120 days prior to the commercial distribution of these products *(22)*. Within a year after publication of the proposal, FDA had reviewed data voluntarily submitted by manufacturers for 53 different varieties of foods.

Traditional and bioengineered foods are subject to the same labeling requirements. All labeling must be truthful and not misleading. If a bioengineered food is significantly different from its conventional counterpart (e.g., if its nutritional profile changes, or if it causes allergic reactions), it must be labeled to reflect that difference. For example, genetic modifications in various varieties of soybeans and canola changed the fatty acid composition of oils extracted from those plants. Thus, oil from bioengineered canola and soybeans must bear an identity statement that reflects the differences between the conventional and modified oils. Foods containing the modified oils must list them by the new name in the ingredient statement. If a bioengineered food contains an allergen that consumers would not expect to be present based on the name of the food, the label must indicate that the allergen has been introduced into it.

Presently, FDA is not aware of any scientific data that indicate that foods developed through genetic engineering differ significantly in quality or safety from foods developed through conventional means. Therefore, FDA does not require these products to bear labels indicating that they are bioengineered. However, although the term "bioengineered" or the statement "contains bioengineered food" is not required on the label, manufacturers are free to include such statements on the label of bioengineered foods as long as they are truthful. To assist manufacturers who wish to include information on their labels regarding bioengineering, FDA issued draft guidance on the voluntary labeling of foods to indicate that they have or have not been bioengineered *(23)*. FDA said in its draft guidance that statements that indicate or imply that a food is better than another because it is not bioengineered are considered to be false and misleading and should not be used. However, FDA stated it would not object to truthful and nonmisleading label statements that indicate that a food or its ingredients was not developed using bioengineering. An example of such a statement is "This oil is made from soybeans that were not genetically engineered." FDA does not sanction terms such as "genetically modified organisms" or "GMO."

Other food safety and consumer information

Product labels often contain food safety information for the consumer to consider in the purchase and preparation of food. Some labels bear statements alerting the consumer *not* to purchase a product that has a broken seal or is damaged. Some labels contain safe handling statements to cook a product thoroughly or to follow cooking instructions for food safety and quality. Labels sometimes warn that the product may contain shell pieces, pits, seeds, or stems, or that the consumer should be careful eating small objects that may become lodged in the throat.

Over the years, people have reported to FDA adverse reactions to certain food additives, such as aspartame (a sweetener) or sulfur-based preservatives (sulfites). The Act requires that FDA ensure the safety of all substances added to foods. However, some individuals may experience adverse reactions to certain additives *(16)*. FDA requires all products containing aspartame to be labeled for phenylalanine so that individuals with the rare disease phe-

nylketonuria (PKU) will be aware of the substance's presence and can avoid or restrict it. Of all the food additives for which FDA has received adverse reaction reports, sulfur-based preservatives are those that elicit responses most similar to those involving allergens *(16)*. Sulfites are used primarily as antioxidants to prevent or reduce discoloration of light-colored fruits and vegetables, such as dried apples and potatoes, and to inhibit the growth of microorganisms in fermented foods such as wine. Though most people do not have a problem with sulfites, sulfites can lead to asthmatic attacks, rashes and abdominal upset *(30)*. FDA uses the term "allergic-type responses" to describe the range of symptoms suffered by certain individuals after eating sulfite-treated foods. To help sulfite-sensitive people avoid problems, FDA requires the declaration of sulfites in processed foods when present at levels of 10 ppm or more, and prohibits the use of sulfites on fresh produce sold or served raw to consumers.

MATERIALS AND METHODS

Survey and sampling

The Information Resources Inc. (IRI) InfoScan 1999 database served as the sampling frame from which we drew a multistage, representative sample of food brands for the FLAPS survey. The IRI database includes annual sales dollars collected from over 11,000 food stores that represent 88% of food sales. Using scanner and promotional data, IRI applies projection factors to arrive at chain, market, region, and total US level information. IRI projection factors yield an accurate extrapolation of sales from their sample stores to the total United States. The IRI database contains proprietary information and is available for purchase.

We used a multi-stage sampling plan to draw the "shopping list" for the FLAPS sample. The first stage was to define 57 product groups (e.g., milk) and assign IRI's 488 product types (e.g., refrigerated skim/low fat milk, refrigerated whole milk) into those groups. IRI grouped sales information for store brand products into one general store brand category, so we could not identify specific store brands and did not include those products in the survey. Additionally, we considered only brands sold in at least 10% of the stores in order to minimize locating products that are difficult to find across the country. Product types accounting for at least 80% of the sales in each group were retained (e.g., around 190 product types). Based upon the number of product types retained and the number of food brands identified within those types, we randomly selected additional product types from those not selected during the first stage of sampling (e.g., 40 additional product types selected) (See Appendix A). We then selected the top three selling brands ("leaders") in each product type and randomly selected three "follower" brands from those remaining. Three "alternate" (follower) products were then randomly selected in case the three leaders and three followers were no longer sold or could not be found in the market place. Subsequently, we selected the top selling item under each brand to represent the brand.

Procedures

Using the shopping list of food items, FDA staff purchased close to 25% of the products in the Washington, D.C. metropolitan area. Contract field agents then located and purchased the majority of the products from stores across the country. Other contractors coded product information into survey forms, entered the data onto the National Institutes of Health (NIH) mainframe computer, and created several computerized scans of each product label. The final FLAPS 2000–2001 database contains label information for 1,281 processed packaged food products.

Variables

FLAPS included a number of variables describing presence or absence of label terms and write-in of specific statements for a number of subject areas of interest to consumers. Food storage variables include recommendations such as "keep refrigerated," "refrigerate after opening," or "keep frozen." Date information includes "expiration," "sell by," "use by," or date stamps. Allergen information on labels may indicate presence or absence of ingredients such as milk, eggs, wheat, soy or soybeans, and nuts. Food labels may include terms implying pathogen control such as "pasteurized" or "irradiated." Statements such as "bioengineered," "genetically engineered," and "GMO Free" may appear on food labels to indicate bioengineering or genetically engineered foods. Food safety information includes statements such as "do not purchase if seal is broken" or "cook well" and warnings include statements such as "oil will catch fire if overheated" or "there may be a risk associated with consuming raw shellfish." Other information alerts the consumer to the presence of ingredients such as aspartame or sulfites.

Statistical analysis

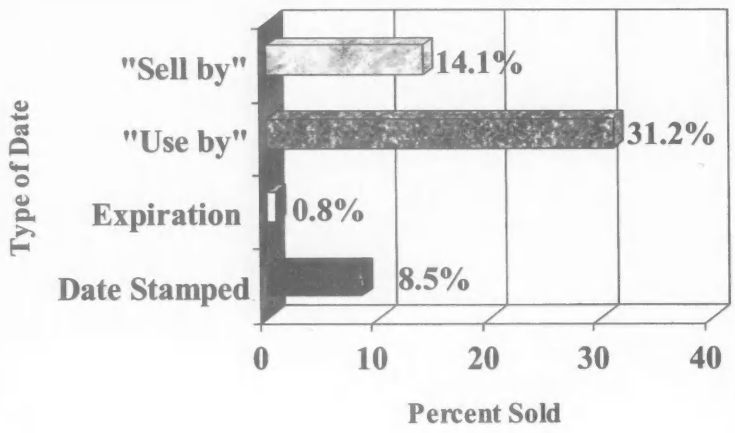
We used the most recent IRI sales data (1999) to weight FLAPS data according to product status as a market leader or follower. Using these data, we calculated weighted estimates to reflect the percentage of products sold bearing various food safety and other statements on food labels.

RESULTS

Food storage

A review of the FLAPS data indicates that, while it is apparent that foods purchased in 2000 and 2001 did

Figure 1. Percent of products sold with a date on the food label



not closely follow the guidance on labeling of foods that need refrigeration that FDA published in 1997, many products in FLAPS bore refrigeration statements using different terminology.

Data show that 17.1% of products sold had a statement that consumers should keep the food refrigerated after purchase. While none of the statements matched those recommended in the guidance for the first group of foods described above, three products (cheese tortellini, cheese ravioli, and pesto sauce) bore a partial statement: IMPORTANT Must Be Kept Refrigerated. Although this type of statement on a product conveys to consumers that they should keep the product refrigerated, it does not make clear whether the refrigeration is for safety or quality purposes. FLAPS food groups with at least 90% of products sold falling into this category included milk (100%); refrigerated meals and side dishes, including pre-cut salads (100%); eggs and egg substitutes (99.4%); refrigerated juices and drinks (97.3%); miscellaneous dairy (94.2%); and refrigerated breads and baked goods (91.9%).

Data show that 13.6% of products sold had a statement indicating that the consumer should refrigerate the product after opening. However, only one product, a shelf-stable dip with sour cream and onions as the primary ingredients, bore an exact statement described above for the second group of foods: IMPORTANT Must Be Refrigerated After Opening to Maintain Safety. For the remaining products, as for the first group of products, described above, it is not made clear whether the refrigeration is for safety or to maintain quality. FLAPS product types most frequently bearing statements in this category included sauces and gravies (100%); soups (88.8%); condiments (69.1%); pickles, relishes and olives (68.2%), and shelf-stable juices and drinks (67.9%).

FLAPS data showed that a small percentage of products sold (1.3%) had refrigeration statements that included a reference to freshness or quality, thus falling into the third group of foods, which do not pose a safety hazard even after opening. Some of the label statements included "for best quality keep refrigerated after opening" or "refrigerate for freshness."

Product dating

FLAPS data show that over half (54.6%) of products sold had a "sell by" date, "use by" date, expiration date, or date stamp. Dates on some dairy products or types of produce may be related to spoilage, which may result in undesirable but not potentially unsafe food. Furthermore, foods within food types vary as to the type of date information that they have on their labels. Figure 1 provides an overview of the prevalence of various types of date information.

Almost one out of every seven products sold (14.1%), from a number of product types, had a "sell by" date. The most frequently indicated product types with this type of product information included milk (87.6%); fresh and shelf-stable breads and baked goods (81.4%); butters, margarines and spreads (64.3%); other dairy drinks and substitutes (58.5%); and refrigerated juices and drinks (51.4%).

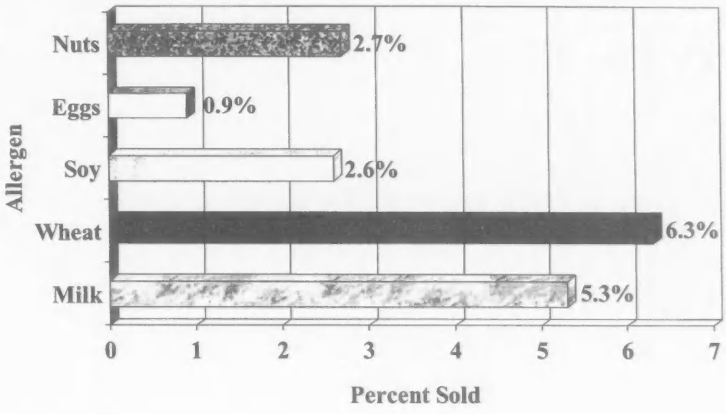
Just under one-third (31.2%) of products sold, spanning many product types, had "use by" dates. The product types with at least 90% of products sold having "use by" dates included hot cereals (100%), cold cereals (99.7%), baby foods (99.0%), refrigerated breads and baked goods (98.4%), and refrigerated meals and side dishes (91.9%).

Less than one out of every ten products sold (8.5%) had a date stamped on the product. We checked product web sites or contacted manufacturers directly and asked why the dates had no descriptive terms. The majority indicated that the dates were "use by" dates (83% of the 8.5%, or 7% of products sold). The two product types with at least 40% of products sold within the type bearing a date stamp included miscellaneous dairy, with 51.5% having a date to "sell by," and bottled water, with 48.4% having a date to "use by." Less than one percent of products sold (0.8%) had an expiration date, with 44.2% of bottled water sold having an expiration date on the label.

Allergen information

We reviewed statements that indicated the presence or absence of allergenic ingredients on sections of

Figure 2. Percent of products sold with an allergen statement on the food label



product labels other than in the ingredient listing (Fig. 2). In some cases, these statements were preceded by the terms "Allergy information" or "Allergy note." For some products, the ingredient listing includes allergenic ingredients in bold type.

Statements about presence of allergens derived from milk ingredients accounted for 5.3% of products sold. They included terms such as "milk based," "contains milk ingredients," "contains potassium caseinate, a milk derivative," and "with whey." The product types most likely to bear these types of statements included baby food products (50.5%), baking mixes (46.1%), cold cereals (35.3%), and breakfast foods (28.4%). On the other hand, only 0.6% of products sold had statements that the product was "milk free." Breakfast foods were the most frequently indicated product type with these statements (23.7%). A closer look at food ingredient lists indicated that 16.2% of products sold had casein or whey in their ingredient list but did not include allergen information other than in the ingredient listing on their food label.

Labels bearing statements that the product "contains wheat" accounted for 6.3% of products sold. The most prevalent product types included cold cereals (90.3%), baking mixes (46.1%), and breakfast foods (30.8%).

Statements indicating presence of soy/soybeans were found on labels of 2.6% of products sold, primarily on labels of cold cereals (34.4%). Only one product in the FLAPS database, a non-dairy rice beverage, indicated that it was "soy free."

Very few products bore statements related to presence or absence of eggs. Only 0.9% of products sold had statements indicating they contain eggs or egg ingredients, with breakfast foods (29.4%) and baking mixes (21.7%) the most prevalent product types. Conversely, only four products, accounting for 0.1% of products sold, had a statement that they were "egg free" or that the product "contains no eggs."

Products with allergen statements related to presence of nuts accounted for 2.7% of products sold. Over half of the nuts and seeds (55.5%), specifically cashew and pecan products, contained a statement that the product "may contain traces of peanuts" or that the product was "produced in a facility that also produces peanut products" and "may contain peanuts" or "traces of nuts." In addition, two out of every five (41.4%) chocolate candy labels bore a statement indicating that the product "contains nuts," "may contain nuts," or was "manufactured in a facility that uses or processes peanuts."

Processes to control pathogens

A number of milk, dairy, fruit, juice/drink, and egg substitute products, accounting for 9.7% of products sold, bore the term "pasteurized" on their labels, and 9.9% had a pasteurized ingredient in the ingredient list. Over three-fifths (61.1%) of all refrigerated, frozen, and shelf-stable juice products had a statement that the product was pasteurized. No juice products included a warning that the juice had not been pasteurized or otherwise processed to prevent, reduce or eliminate pathogenic microorganisms that may be present. One orange juice product labeled "100% freshly squeezed" included a statement that their company "has a fully implemented HACCP safety system" and explained that "A HACCP safety system is a science-based system that identifies and includes preventative controls in food production steps where unsafe conditions could occur" and that "HACCP is the Food and Drug Administration's standard food safety system." The juice did not state that it was pasteurized or unpasteurized. No food labels contained a statement or symbol that the food had been irradiated.

Over one-fourth (27.2%) of products sold included the acidifying agents phosphoric or citric acid in the ingredient list. The most prevalent product types with one of those ingredients included carbonated soft drinks (100%), non-dairy beverage mixes (96.1%), granola bars and trail mixes (63.8%), frozen meals and side dishes (63.7%), dips and spreads (50.7%), and shelf-stable juices and drinks (50.5%).

Bioengineering

FDA purchased a number of the FLAPS products prior to publication of the proposed regulation and draft guidance for bioengineered foods cited above. As a result, the current FLAPS may not adequately character-

ize the use of bioengineered statements on the food label. However, five products, representing only 0.1% of products sold, had statements that the products were made with "non-genetically modified organism (GMO)" ingredients, terms not sanctioned by FDA. The products included two soy beverages, tofu, a veggie burger, and veggie breakfast links.

Other food safety and consumer information

Data indicate that 6.8% of products sold contained a warning not to purchase a product with a broken or missing seal or a statement to the effect that a safety button pops up when the original seal is broken. Example statements include "sealed for your safety," "do not purchase unless cap and neck band are intact," "do not use if seal under cap is broken, " "do not purchase if the safety button is up." Product labels most frequently bearing these types of statements included sauces and gravies (89.6%), refrigerated juices and drinks (89.2%), pickles, relishes and olives (49.2%), fruit and nut butters and spreads (38.3%), and syrups and molasses (37.2%). Several product labels (1.1% of products sold) had statements not to purchase a product if the "bag/carton/cup is open or torn."

Some labels (2.4% of products sold) provided recommendations that the consumer use a thermometer to make sure that a food is fully cooked, or a warning that microwaving may cook a food unevenly or that consumers should not microwave infant formula. Other safe cooking instructions included "bake cookie dough before consuming," "for food safety and quality, follow these cooking instructions," and "cook thoroughly." Baby foods (30.2%) and frozen meals and side dishes (28.5%) were the product types that were most likely to include safe cooking instructions. Other product labels (0.8% of products sold), including shortenings and oils (45.3%) and frozen vegetables (28.6%), bore statements about cooking with oil.

Several labels (0.5% of products sold) included warning statements that the product "may contain occasional fragments of seeds or stems," that "an occasional cherry may contain a pit," or that the product "may contain shell pieces." Dried, fresh and frozen fruit (37.5%) and nuts and seeds (23.0%) were the product types most likely to bear these statements. Other products bore statements to be "careful: small objects, like hard candies, may inadvertently become lodged in the throat."

A few food labels conveyed additional food safety information. One product included the statement "There may be a risk associated with consuming raw shellfish as is the case with other raw protein products. If you suffer from chronic illness of the liver, stomach or blood or have other immune disorders, you should eat these products fully cooked."

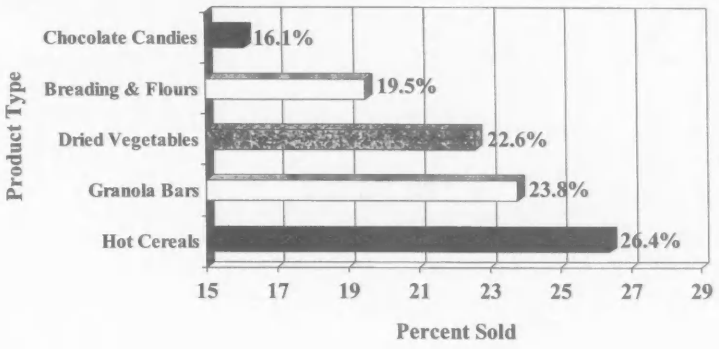
Data showed that 14.2 % of products sold included statements indicating that the food had "no artificial flavors, colors, or preservatives." While these are not food safety statements, they provide information to consumers who wish to minimize their intake of the substances. The most frequently indicated product types with these statements included refrigerated juice and drinks (80.4%), popcorn, pretzels, and chips (78.6%), refrigerated meals and side dishes, including precut salads (69.8%), and frozen juices and drinks (49.3%). Only one product contained a statement on the presence of sulfites ("hazelnut shells bleached with a sulfiting agent"). However, we searched for sulfites in the ingredient list and found that 1.9% of products sold have sulfites (sodium sulfite, sulfur dioxide, sodium bisulfite, sodium metabisulfite, potassium metabisulfite, and potassium bisulfite). The most frequently indicated product types with sulfite ingredients included hot cereals (26.4%), granola bars and trail mixes (23.8%), dried vegetables and grains (22.6%), breading products, flours and meals (19.5%), and chocolate candies (16.1%) (Fig. 3). Other consumer interest statements appearing on product labels included "no caffeine" or "caffeine free" (4.4%), "lactose free" (3.6%), and "no msg" or "no flavor enhancers" (1.3%).

DISCUSSION

The food label can provide important information to the consumer. FLAPS data illustrate that although some types of food safety statements have been used frequently on food labels, others are not so prevalent. Data show that, while manufacturers have been using statements regarding refrigeration and freezing on food labels, the words "important" and "safety" are not included. Although there are no data to explain this, it may be because a negative tone is associated with use the terms, and manufacturers do not want to reveal the possibility that their products may be associated with safety risks.

The quality characteristics of foods (taste, aroma and appearance, as distinct from safety characteristics) depend on good storage conditions, such as temperature and humidity control in the retail store and warehouse. When storage conditions have been optimal, many foods are acceptable in terms of taste and other quality characteristics for periods of time beyond the expiration date printed on the label, and also are safe to eat. If the food is stored at elevated temperatures and high humidity conditions, taste and other quality characteristics deteriorate more rapidly, whereas deterioration occurs more slowly if foods are stored under optimal conditions (correct storage temperatures and low humidity). The expiration date is not necessarily indicative of product quality if storage conditions have been less than optimal. Currently, there are no federal labeling regulations requiring dating on food labels except for infant formula. From a food safety perspective, however, FDA is now considering

Figure 3. Percent of products sold with sulfites in the food label ingredient list



product shelf life as it may relate to reduction of risk to consumers of microbiological contamination of some ready-to-eat foods. In time, dates on food labels of foods in which pathogens may grow if the food is not used within a certain time period may become a food safety indicator that consumers can use to determine whether to eat or toss an uneaten food.

Food safety continues to be a focal point and priority at FDA. The agency will continue to address microbiological safety as related to foods and consider the need for warning or other types of statements on food labels. In 2000, FDA published a final rule requiring all cartons of shell eggs that have not been treated to destroy *Salmonella* to carry the following safe handling statement: "Safe Handling Instructions: To prevent illness from bacteria: keep eggs refrigerated, cook eggs until yolks are firm, and cook foods containing eggs thoroughly." The Safe Handling Statement had to appear on all cartons of untreated shell eggs by September 2001. While the current FLAPS was conducted before the effective date, future surveys may be structured to monitor egg carton labeling. Furthermore, in line with the final rule on the labeling of unpasteurized juice products, FDA will continue to monitor labels of juice products to determine if they are pasteurized or if the required warning statement is borne by those that are unpasteurized or have not received a 5-log kill step to reduce possible pathogens.

FDA recognizes that the labeling of food allergens is a concern for allergic consumers, and additional measures may be needed to ensure that consumers obtain adequate information about the foods they eat. While many consumers may not realize that ingredients such as casein and whey are derived from milk, regulations do not currently require manufacturers using those ingredients to state on food labels that the product contains milk ingredients. To obtain input from consumers and industry, FDA held a public meeting and a public workshop to discuss the labeling of foods containing allergens and the unintended addition of allergens to foods because of processing practices. Addressing food allergen issues has been identified as a priority activity for CFSAN, and the Center plans to continue to develop a strategy for clearer labeling of food allergens.

Bioengineering continues to be another focal point for FDA. Although the agency does not mandate the labeling of foods to indicate that they are bioengineered, it realizes that manufacturers may want to label their products to indicate whether they have or have not been bioengineered. As stated previously, FDA issued draft guidance to industry to assist those who wish to voluntarily label foods with information on bioengineering. FDA will work to issue final guidance in the future.

The Food and Drug Administration Modernization Act of 1997 (FDAMA) joint conference report *(11)* directed FDA to solicit public comment to determine whether the labeling requirement for irradiation should be changed to ensure that consumers would not perceive the label statement to be a warning. In 1999, FDA published a notice requesting that the public comment on whether FDA should revise its current labeling requirements for irradiated foods, and if so, what might those changes be *(19)*. On May 13, 2002, President Bush signed into law the Farm Security and Rural Investment Act of 2002 (Farm Bill), which includes a provision related to irradiation labeling *(12)*. It directs FDA to publish a proposed rule and, with due consideration to public comment, a final rule to revise, as appropriate, the current regulation governing the labeling of foods that have been treated by irradiation. FDA is now beginning the process of implementing these provisions.

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5. Code of Federal Regulations. 2002c. Title 21, Part 1240.61. Mandatory

FLAPS 57 Product Groups

Baby Foods
Baking Mixes
Baking Needs
Beverage Mixes, Dairy
Beverage Mixes, Non-dairy
Beverages – Carbonated Soft Drinks
Beverages – Coffee & Tea
Beverages – Juices/drinks – Frozen
Beverages – Juices/drinks – Refrigerated
Beverages – Juices/drinks – Shelf-stable
Beverages – Meal-type Products
Beverages – Milk
Beverages – Other Dairy Drinks & Substitutes
Beverages – Water
Breading Products, Flours & Meals
Breads & Baked Goods – Fresh & Shelf-stable
Breads & Baked Goods – Frozen
Breads & Baked Goods – Refrigerated
Breakfast Foods
Butters, Margarines & Spreads
Candies – Chocolate
Candies & Gums – Assorted
Cereals – Cold
Cereals – Hot
Cheese
Condiments
Cookies
Crackers
Dairy, Miscellaneous
Dips & Spreads
Eggs & Egg Substitutes
Fruit – Dried, Fresh & Frozen
Fruit – Shelf-stable
Fruit & Nut Butters & Spreads
Ice Creams, Sherbets & Ices
Meals and Side Dishes – Frozen
Meals and Side Dishes – Refrigerated
Meals and Side Dishes – Shelf-stable
Meat/poultry Substitutes
Nuts & Seeds
Pasta
Pickles, Relishes & Olives
Puddings, Gelatins, Toppings & Fillings
Salad Dressings & Toppings
Salt, Seasonings & Spices
Sauce, Gravy & Seasoning Mixes
Sauces & Gravies
Seafood
Shortenings & Oils
Snacks – Granola Bars & Trail Mixes
Snacks – Popcorn, Pretzels & Chips
Soups
Sugars & Sugar Substitutes
Syrups & Molasses
Vegetables – Frozen
Vegetables – Shelf-stable
Vegetables & Grains – Dried

pasteurization for all milk and milk products in final package form intended for direct human consumption.
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Acids, Pathogens, Foods and Us

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SUMMARY

Acids have a lethal or inhibitory effect on microorganisms when they are in high enough concentrations to denature proteins, when they are transported into cells, or when they cause protons to leak into cells increasing the amount of energy needed to maintain the internal pH. Acids have been used to preserve foods for centuries. In recent years they have been applied to surfaces of fresh meats, ready-to-eat foods, vegetables and fruits to destroy pathogens. The major acids used have been acetic, propionic, and lactic. Combinations of acids and other chemicals can be highly toxic to bacteria. Examples include acidified calcium sulfate and acidified sodium chlorite. Bacterial tolerance to acids often increases on exposure of them to moderate concentrations of acids.

SOME IMPORTANT PRINCIPLES

Most people realize that foods that taste sour generally keep much better than bland-tasting foods. Those who understand pH and acidity realize that biological systems respond in various ways to differences in environmental pH and that microorganisms grow at varying rates depending on the pH of the menstruum in which they reside. Yeasts and molds grow much better than most bacteria do in an acid environment, and if we want to selectively grow yeasts and molds while inhibiting bacterial growth, we can do so by adjusting the pH of the medium to 3.5. Even so, some bacteria adapt well to acidic conditions. Fortunately, the lactic acid-producing bacteria are moderately acid tolerant and can reduce the pH of foods such as sauerkraut (pH 3.5), pickles (pH 3.8), cultured buttermilk (pH 4.8–5), yogurt (pH 4.5) and cheeses (pH 4.5–5.2) to values low enough to inhibit growth of spoilage bacteria.

"Acid foods," having a pH below 4.6, may be canned by boiling at atmospheric pressure, whereas those foods with a higher pH must be canned under pressure so that a temperature of 121°C (250°F) is reached. This is because spores of *Clostridium botulinum* can survive treatment for 30 min at 100°C (212°F) in low-acid foods but are more susceptible to heat and will not germinate in high-acid foods. These spores must be destroyed in low-acid foods because they can germinate at pH levels above 4.5. Furthermore, although we have generally considered properly processed acid foods to be safe foods, this assumption has been questioned since outbreaks of hemorrhagic colitis have been caused by *E. coli* O157:H7 in apple cider. Other acid foods associated with infections by this organism include mayonnaise, mayonnaise-based salad dressings,

A peer-reviewed article

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yogurt and salami. The organism survives in acid foods for weeks and for longer times at refrigeration than at room temperatures. In retail mustards, this organism died within hours of being inoculated into them *(22)*.

Proteins in solutions are destabilized and denatured when the pH is adjusted to the isoelectric point, in which the numbers of positive and negative charges on their surfaces are equal, and biological systems cannot survive when their proteins are denatured. Furthermore, some acids, including acetic acid (the acid of vinegar), are themselves toxic to some microorganisms. The toxic form of the acid is the undissociated form. This is why environmental pH must be low enough for the salts of benzoate, sorbate, propionate and acetate to form their respective acids if they are to have a preservative effect in foods. Undissociated small acid molecules can enter the microbial cell and lower the pH therein, whereas the dissociated form cannot enter the cell.

In research with enteric pathogens, the order of effectiveness of acids, from most to least effective, is usually propionic, acetic and lactic acid. Lactic acid has a direct pH-related effect on bacterial viability, whereas propionic and acetic acids exert their effect only when in the undissociated form. Propionic acid acts as a proton ionophore; it facilitates leakage of protons into the cell, thus increasing the amount of energy needed to maintain the internal pH. At pH 3.5, propionic acid is 96% non-dissociated whereas lactic acid is only 15% non-dissociated. However, lactic acid, which is odorless, is often the treatment of choice. In a study with *Shigella*, lactic acid was more effective than acetic acid at pH 4 *(29)*.

ACIDS APPLIED TO FRESH MEATS

For many years, food scientists have experimented with various acids in attempts to destroy pathogens and spoilage microorganisms on surfaces of foods that have the potential to cause foodborne illnesses. In particular, there has been much experimentation with fresh meats, in which the organism of greatest concern is pathogenic *Escherichia coli*, particularly *E. coli* O157:H7. In the 1980s and 1990s, Anderson et al. *(1, 2, 3, 4)* observed that total aerobic bacterial counts on surfaces of fresh meat could be reduced by up to 99% by immersing meat for 15 s in 3% lactic acid (LA) at 70°C. Lower concentrations and temperatures resulted in less destruction, with reductions of about 90% at temperatures of 25 and 40°C and concentrations of 2 and 3% lactic acid. Lactic acid was shown to be a more effective disinfectant than acetic acid. More recently Ariyapitipan et al. *(5)* showed that polymerized forms of lactic acid are superior to non-polymerized forms. Additionally, they and others *(6)* showed that nisin, a bacteriocin, has an additive killing effect when combined with lactic acid on red meat carcasses (99% reduction: 1.5% LA, 500 IU/ml nisin and 25°C).

Recent experiments with hogs artificially contaminated with fecal materials showed that application of water at 80°C for 5 s followed by spraying with 1.8% acetic acid resulted in approximately 99% reductions of both mesophilic bacteria and total coliforms and that 60% of the scalded carcasses and 40% of the skinned carcasses were negative for *E. coli (10)*.

It is common knowledge that poultry can be an important source of salmonellae and campylobacteria. Reductions of 20 to 30% in numbers of these organisms on poultry carcasses result from the normal hydrocooling process, in which carcasses are chilled in cold water containing 20 to 50 ppm hypochlorite

There are two recent reports on applications on broilers of sodium chlorite activated with citric acid (GRAS, 21 CFR 173.325 Fed. Regis. 1998). In the first of these *(25)*, when eviscerated broiler carcasses were dipped in or sprayed with 1200 ppm acidified sodium chlorite, post air-chill counts dropped as follows compared with counts on untreated controls: APC 0.65 log; total coliforms 0.96 log; *E. coli* 1.05 log. Dipping was superior to spraying in reducing counts. There was no detectable residue of either chlorite or chlorate, and chloride concentrations did not differ betweem treated and untreated carcasses. Slight color fading resulted on the chilled carcasses, but not in the cooked chicken. Proponents claim this treatment to be environmentally friendly compared to treatment with trisodium phosphate (TSP) or acids that may cause problems in the effluent of plants.

Researchers in the second study *(13)* tested the effectiveness of acidified sodium chlorite against *Campylobacter*. Because the incidence of *Campylobacter* is quite high on birds showing evidence of contamination with fecal matter or ingesta, the normal procedure is to remove those carcasses from processing lines to be "off-line reprocessed" (OLR). Spraying such carcasses with 1100 ppm acidified sodium chlorite produced count reductions of 99.2%, vs 84.5% for the OLR. Regardless of the method of decontamination, all experimental carcasses were positive for *Campylobacter* post-processing, with numbers of about 14,000/carcass vs 200,000/carcass of eviscerated untreated carcasses.

ACID TOLERANCE AND ACID STRESS

Bacteria often become "acid-adapted" in that exposure to moderate acid environments increases their acid tolerance. Prolonged survival has been demonstrated in acid-adapted organisms in apple cider and sausage *(18)*, cheese *(19)*, yogurt, orange juice and salad dressing *(11)* and tomato ketchup *(27)*.

However, whereas this is true for *Listeria monocytogenes*, it is not always true for *Salmonella*. In experiments with several methods of treating beef jerky, researchers at Colorado State University found that "acid adapted" bacteria of a 5-strain composite of *Salmonella* were at least as susceptible to lethal effects of the marinades and low water activity of the jerky as were the non-adapted bacteria. In addition to the killing effect of the traditional marinade, lethal effects were additive for Tween 20 and 5% acetic acid (vinegar) treatments before drying. The 20-min dip in vinegar lowered the initial pH about one unit, from 5.5 to 4.5 *(8)*.

The acid tolerance of *Listeria monocytogenes* has been linked to its ability to use a proton inside the cell to convert free glutamate to gamma-aminobutyrate and to exchange this molecule for another glutamate outside the cell. The same system has been noted in *Shigella flexneri* and *E. coli* O157:H7. Using the proton lowers the acidity inside the cell.

Samelis et al. *(24)* found that both acid-resistant and non-resistant *E. coli* O157:H7 survived in meat washing fluids containing 1% but not 2% lactic or acetic acids. They suggested that modifications of the microbial environments of plants may occur where organic acids are used routinely, thus changing the potential for contamination by pathogens.

E. coli O157:H7 has been shown to tolerate pH 2.5 to 3.26 in cider and fruit pulps stored at 4°C and to die much faster when storage temperature is high *(21)*. Once activated, the acid-resistance factor is stable at low temperatures for a long time, and acid-resistant cells are more likely to survive passage through the stomach than are non-resistant cells.

Acid adaptation of *E. coli* O157:H7 at pH 5 for 4 h resulted in various changes among strains tested for tolerance to other stresses: high temperature, salt, alcohol and bile. There was a general increase in tolerance of high temperature and of salt but decreased tolerance to alcohol *(9)*.

COOKED READY-TO-EAT FOODS

The International Commission on Microbiological Specifications for Foods has introduced the concept of Food Safety Objective (FSO) as a preventive scheme for managing microbial risks in foods. The FSO for *Listeria monocytognes* is 100/g of ready-to-eat food *(26)*. The following report illustrates how an FSO was obtained with frankfurters.

Acidified calcium sulfate, an organic acid-calcium sulfate combination, showed potential not only to kill the *Listeria* on the surface of products, but also to keep it from coming back *(12)*. Researchers inoculated commercially made frankfurters with a four-strain *Listeria monocytogenes* "cocktail" containing 10^7/g. Four groups were then treated with (1) a saline solution (the control group), (2) acidified calcium sulfate, (3) potassium lactate or (4) lactic acid. The frankfurters were then vacuum-packaged in the usual manner, stored at 4°C for 12 weeks, and evaluated at two-week intervals. The acidified calcium sulfate killed the *Listeria* on the surfaces and also prevented outgrowth during storage. Lactic acid failed to kill all of the bacteria or to prevent their growth during storage. Potassium lactate was ineffective.

The synergy of acetic and lactic acids toward molds on cheese is illustrated in the report of Cabo et al. *(7)*, who showed that heterofermentative bacteria — producers of both lactic and acetic acids — produced conditions in the cheese that inhibited mold growth on the cheese. Low pH caused by the lactic acid forced more acetic acid into the undissociated form and made it lethal to the molds.

DECONTAMINATION OF FRUITS AND VEGETABLES

Luasik et al. *(20)* reported using a wide variety of disinfectants on strawberries. After stems were removed, berries were contaminated with suspensions of 10^7/ml of bacteria and viruses. Disinfectants were applied at 100 and 200 ppm at 43°C (110°F). Alicide, sodium chlorite acidified with citric acid, was the most effective of the 13 products tested. Most products at either concentration reduced numbers recovered by 95% or more, as did 200 ppm of hypochlorite. However, none reduced the numbers by 5 $\log_{10}$ and seldom was a 2-$\log_{10}$ reduction seen.

Recently, Japanese researchers *(17)* showed that acidic electrolyzed water is more effective than 150 ppm hypochlorite or 5 ppm ozone in reducing microbial counts on lettuce. This water was produced by inducing a current of 14 A and 18 V in a dilute salt solution in an apparatus in which the anode and cathode are separated by a membrane. At the anode side of the cell, the current generated produced a solution containing 30 ppm available chlorine, pH 2.6, and a high Oxidation Reduction Potential (ORP) of 1,250, whereas at the cathode the current produced pH 11.4, an ORP of -870 mV and no available chlorine. Kim et al. *(14)* concluded that the primary lethal effect of this water is its high ORP. They suggested that the same effect can be produced with a combination of vinegar and hypochlorite. Treatment of fresh-cut lettuce and cabbage with alkaline electrolyzed water (AlEW) for one minute followed by treatment with acidic electrolyzed water (AcEW) reduced counts of viable bacteria more than did treatment of the vegetables for 10 min in AcEW. At 10°C residual viable bacteria grew faster on the treated vegetables than on those washed in tap water, presumably because of less competition, and initial numbers were seen on day 3 of storage. The lesson: To maximize shelf life, keep temperatures low.

Packing lettuce in frozen AcEW kept the temperature at 2–3°C and lowered populations of aerobic bacteria by 1.5 $\log_{10}$ and of coliforms by

1 $\log_{10}$ in 24 h. The authors suggested it was the release of about 4 ppm of chlorine gas from the AcEW that caused the lethality *(15)*.

Fresh-cut vegetables decontaminated with AcEW, packaged with 100% N_2 and distributed at 1°C will have a very long shelf life *(16)*. Storage at 5°C negates the effects of the disinfecting treatment.

On lettuce inoculated with > 10^7 *Salmonella*, *E. coli* O157:H7 or *Listeria monocytogenes*, the combination of H_2O_2 and lactic acid was slightly more effective than H_2O_2 alone, but lettuce quality was seriously impaired 3 days after lactic acid was used *(23)*. Application of 2% H_2O_2 for 1 min at 50°C produced 4 $\log_{10}$ decreases in numbers of *Salmonella* and *E. coli* and 3 $\log_{10}$ decreases in numbers of listeriae, without impairing lettuce quality.

A mixture of 1.5% lactic acid and 1.5% H_2O_2 on apples, oranges and tomatoes reduced counts of *Salmonella*, *E. coli* and by > 5 $\log_{10}$ per fruit without damage to the sensory qualities *(28)*.

CONCLUSIONS

Bacterial growth and viability can be controlled with acids in many foods. However, foods respond differently to treatments with acids, varying in their changes in color, flavor, and texture. Combining acids with other chemicals provides more hurdles for bacteria to clear, thus increasing the chances of a lethal effect or at least an inhibition of growth. However, although most ready-to-eat acid foods are free of pathogens, treatment of non-acid foods with food grade acids seldom results in achievement of the food safety objective of a 5 $\log_{10}$ reduction in bacterial numbers.

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Congratulations

At IAFP 2003, we offered a drawing for a one-year Membership with our Association and a free registration to our Annual Meeting. We are pleased to announce the following winners of the drawing:

IAFP Membership

Samuel A. Palumbo
National Center for Food Safety and Technology
Summit-Agro, Illinois

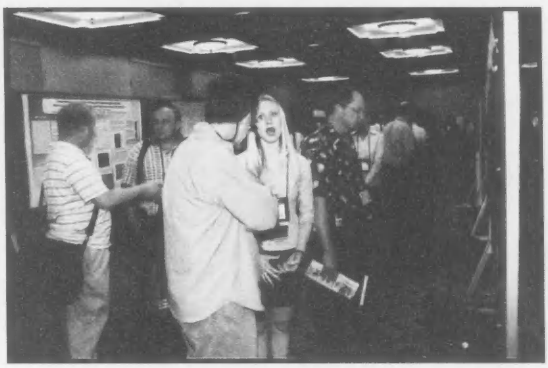
IAFP Annual Meeting Registration

Yuelian Shen
Florida Dept. of Agriculture and Consumer Services
Tallahassee, Florida

Scenes from IAFP 2003

IAFP 2003 — the Association's 90th Annual Meeting once again showed the growth of the Association with a successful meeting and record attendance. More than 1,480 food safety professionals from 32 countries, 48 states, and nine Canadian provinces gathered at the Hilton New Orleans Riverside in New Orleans, Louisiana, August 10–13 for the three-day meeting.

Representatives from more than 90 companies exhibited equipment and services supporting food



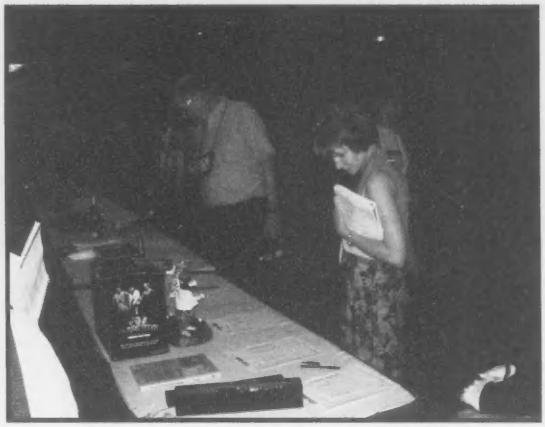
science and safety. It was a fabulous meeting packed with the sharing of knowledge, networking and fun!

Two workshops were held prior to IAFP 2003. The first workshop focused on laboratory data and implementing microbial control. The second workshop was a hands-on course creating and using predictive models in risk assessment. Participants were complimentary of these interactive workshops.

Two receptions were held Saturday evening – the New Member Reception and the Affiliate Educational Reception. Both were well attended and provided excellent interaction among attendees.

Committees and Professional Development Groups (PDGs) met throughout the day on Sunday. Minutes from these meetings are published starting on page 931.

President Anna Lammerding welcomed attendees to IAFP 2003 at the Opening Session on Sunday evening and presented Robert Gravani with the Fellow Award. Dr. Donald L. Zink, Lead Scientist, Food Processing, Food and Drug Administration, Center for Food Safety and Applied Nutrition, Office of Plant, Dairy Foods, and Beverages delivered the prestigious Ivan Parkin Lecture. His presentation was titled "On the Trail of Food Safety – From the Early Days to the Future".



Slides from this presentation are available on our Web site. Following the lecture, a Cheese and Wine Reception sponsored by Kraft Foods was enjoyed by all.

Monday through Wednesday was filled with more than 500 scientific presentations including 25 symposia, 6 technical sessions and 288 poster presentations. Abstracts from IAFP 2003 can be found on our Web site. A special thank you to Chairperson Lynn McMullen and the 2003 Program Committee for an excellent program!

A Plenary Session featuring Dr. Elsa A. Murano, Under Secretary for Food Safety, USDA was held Tuesday afternoon. Dr. Murano's presentation, "Breaking the Cycle of Foodborne Illness: The War on Pathogens", can be found on our Web site.

Charters were presented to two new affiliates, the United Kingdom Association for Food Protection and Portugal Association for Food Protection. Welcome new Affiliates!

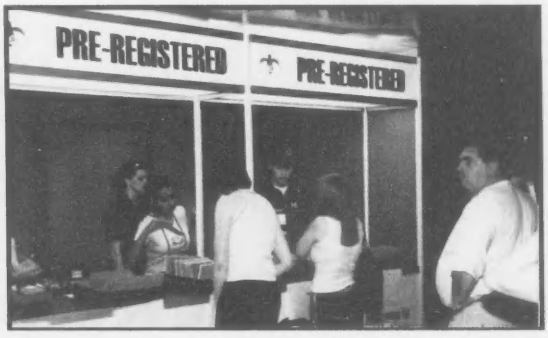
The Annual Business Meeting was held Tuesday after the Plenary Session. President Anna Lammerding reported on the activities and accomplishments of the Association over the past year.

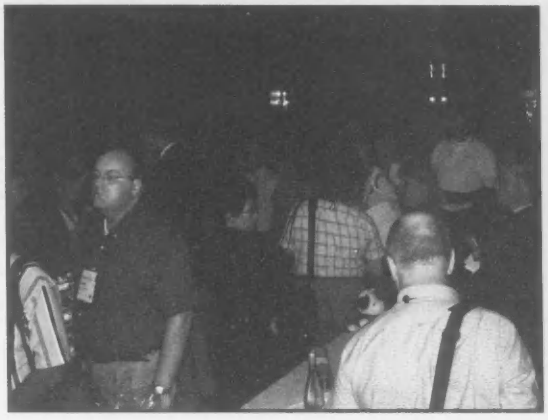
Congratulations to the IAFP Staff, Dave Larson, Wilbur Feagan, Susan McKnight, Fred Weber, and Frank Yiannas receiving the President's Recognition Award. See page 928 for the Business Meeting Minutes.

After attending the daily sessions, it was time to relax and enjoy New Orleans and its many attractions. The Monday Night Social at Mardi Gras World sponsored by IGEN International was definitely memorable. Over 400 attendees participated in this fabulous event. On Tuesday approximately 200 attendees enjoyed a dinner and jazz cruise on the Creole Queen.

The Awards Banquet on Wednesday evening with a record attendance of 450 concluded IAFP 2003. Several deserving individuals were recognized for their dedication to "Advancing Food Safety". See a complete listing of the Award Recipients on page 894.

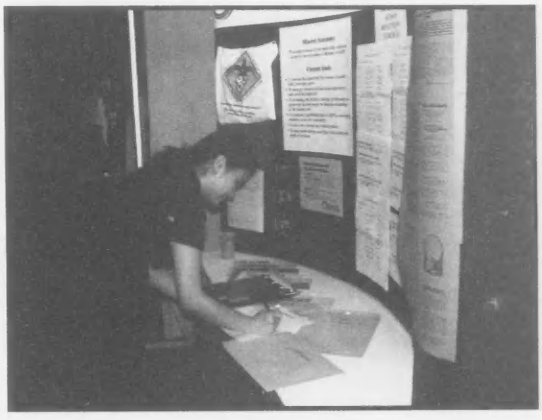
Marlene Janes of Louisiana State University and Doug Marshall of Mississippi State University deserve a round of applause. Marlene and Doug arranged for their students to assist at various functions throughout the meeting. Their help was greatly appreciated!





A special thanks this year to the Student Professional Development Group and their chairperson Michelle Danyluk. This was the second year that the students participated in the meeting by monitoring sessions. Session summaries prepared by the student monitors can be found starting on page 908.

Thanks to all who participated in IAFP 2003! Your participation is what makes this meeting the world's leading food safety conference. Mark you calendars now to attend IAFP 2004 in Phoenix, Arizona, August 8–11.



IAFP 2003 Photos taken by Ron Case

2003 Award Winners

Gillian Kelleher, (left to right), Kathleen O'Donnell, and Mary Ellen Burris from Wegmans Food Markets, Inc. receive the 2003 Black Pearl Award from Wilbur Feagan. F & H Food Equipment Co. and Wilbur Feagan sponsor the award.

BLACK PEARL AWARD

Wegmans Food Markets, Inc.
Rochester, New York

Each year, the International Association for Food Protection honors a single company with its most prestigious award, "The Black Pearl," in recognition of that company's efforts in advancing food safety and quality through consumer programs, employee relations, educational activities, adherence to standards and support of the goals and objectives of IAFP. The recipient of the 2003 Black Pearl Award is Wegmans Food Markets, Inc.

Wegmans Food Markets, Inc. headquartered in Rochester, New York, is a family-owned business. It began as the Rochester Fruit & Vegetable Company in 1916 with two brothers, Walter and John Wegman (Chairman Robert Wegman's father and uncle). As the years progressed, more family members joined the company: Robert's son Danny, president, and Danny's two daughters, Colleen and Nicole.

It is among the 100 largest privately owned companies in America, with over $3 billion in annual sales, 65 stores (in New York, New Jersey and Pennsylvania), and more than 30,000 employees. For six consecutive years, the company has been on *Fortune* magazine's list of the 100 Best Companies to Work for in America, ranking 10th in 2003.

Wegmans' customers talk about incredible service from knowledgeable, well-trained, friendly employees, outstanding quality of fresh foods and private label products, support for local communities, and consistent low prices. You would most certainly hear about Wegmans' clean stores and innovative customer information such as "Cook to 160°" for ground beef and introduction of the country's first private label irradiated ground beef. The computer-based food safety training program has been completed by over 29,000 employees.

Wegmans' business philosophy is that good people, working toward a common goal, can accomplish anything they set out to do. The company's goal of being the very best at serving the needs of customers, can only be achieved if the needs of its own people are fulfilled.

IAFP President Anna Lammerding presents the 2003 Honorary Life Membership Award to Lloyd O. Luedecke (left) and Randall A. Daggs.

HONORARY LIFE MEMBERSHIP AWARD

This prestigious honor is awarded to long-time IAFP Members for their dedication to the high ideals and objectives of IAFP and for dedicated service to the Association.

Randall A. Daggs
Sun Prairie, Wisconsin

Mr. Randy Daggs received his degree in microbiology and public health in 1971 from the University of Wisconsin and began his career at the university as a clinical bacteriologist. From 1978 until 1982 he directed the milk laboratory evaluation program for the State of Wisconsin. He later became administrator of the grade A milk program in Wisconsin, and worked in that capacity until his retirement in 2002.

Throughout his professional career, Mr. Daggs was, and continues to be, an active member of IAFP. He has been an invited speaker at past annual meetings and served as convenor for numerous sessions, including a notable full-day symposium on dairy sanitation in 1990 co-sponsored by IAFP and the National Mastitis Council. Mr. Daggs has served on various IAFP Committees, including the Program, Nominating, and Awards Committees. He is a past member of the Applied Laboratory Methods PDG and a current member of the Dairy Quality and Safety PDG.

Mr. Daggs was president of the Wisconsin affiliate in 1987 and 1988. During his tenure, their newsletter was revised, membership was expanded, and scholarships were enhanced. In 1988 the Wisconsin affiliate received the Shogren Award at the IAFP Annual Meeting in Tampa. Mr. Daggs continues to serve as executive secretary for the Wisconsin affiliate and as its delegate to the IAFP Affiliate Council.

Lloyd O. Luedecke
Pullman, Washington

Dr. Lloyd Luedecke has been an active member of IAFP since 1962. He is a past president of the Washington Affiliate and served as its secretary-treasurer for 26 years. As affiliate secretary he was also the delegate to IAFP's Affiliate Council and served several years as Affiliate Council secretary. He served on numerous IAFP committees and was involved in hosting the annual meetings held in Spokane and Seattle.

In 2000, Dr. Luedecke was recognized as a "Fellow" of IAFP for his many years of dedication to the organization and the industry. Dr. Luedecke utilized much of the information obtained at the annual meetings in his class lectures to provide students with a practical working knowledge of sanitation and the latest developments in processing and regulations pertaining to food quality and safety. Students recognized his excellence in teaching and he received several college teaching awards. Many of his former students are current members of IAFP. Dr. Luedecke's research always focused on improving the quality and safety of dairy products. Results of his research were published in *Milk and Food Technology*, *Food Protection*, *Dairy Science*, *Food Science*, *Applied Microbiology*, and *Food Chemistry*.

Dr. Luedecke retired from full-time teaching and research in 2000 and is currently on a reduced appointment and remains as faculty advisor to the Washington State University Creamery. He continues to participate in the annual WSU Cheese Short Course.

IAFP President-Elect Paul Hall (left) and Russell Flowers (right) present Larry R. Beuchat with the the 2003 Harry Haverland Citation Award. Silliker Inc. sponsors this award.

HARRY HAVERLAND CITATION AWARD

Larry R. Beuchat
Griffin, Georgia

Dr. Larry R. Beuchat is this year's recipient of the Harry Haverland Citation Award for his years of devotion to the ideals and objectives of IAFP.

Dr. Beuchat earned a B.S. degree in horticulture at Penn State University. His M.S. and Ph.D. degrees in food science, with a minor in microbiology and public health, are from Michigan State University. After working in research and development at Quaker Oats Company, he joined the University of Georgia in 1972, where he is now a distinguished research professor in the Center for Food Safety and Department of Food Science and Technology. Dr. Beuchat's current research interests include the microbiology of fruits, vegetables, and nuts; methodologies for detecting and enumerating pathogenic bacteria, yeasts, and molds in foods; metabolic stress and injury of foodborne microorganisms; relationships of water activity to microbial growth; and efficacy of disinfection and preservation technologies.

Dr. Beuchat has written, edited, or co-edited five books; authored or co-authored 66 chapters or monographs; and published 405 refereed scientific journal articles, 182 miscellaneous scientific publications, and 398 abstracts in the area of microbiological spoilage and safety of foods. Dr. Beuchat served as a scientific co-editor of the *Journal of Food Protection* from 1994 to 2001 and is a member of the editorial boards of *International Journal of Food Microbiology* and *Food Microbiology*. He is a fellow of the International Association for Food Protection, American Academy of Microbiology, and the Institute of Food Technologists. He is currently a member of the National Advisory Committee on Microbiological Criteria for Foods and the Food and Nutrition Board and the Food Forum of the National Academy of Sciences.

IAFP Vice-President Kathy Glass (right) and Becky DeGroot, Nelson-Jameson, Inc., present John N. Sofos with the 2003 Educator Award. Nelson-Jameson, Inc. sponsors this award.

IAFP Secretary Jeff Farber (left) and Fred Weber (center), Weber Scientific, present J. Stan Bailey with the 2003 Maurice Weber Laboratorian Award. Weber Scientific sponsors this award.

EDUCATOR AWARD

John N. Sofos
Fort Collins, Colorado

Dr. John N. Sofos is this year's recipient of the Educator Award. This award recognizes an IAFP Member for outstanding service to the public, the Association and the arena of education in food safety.

Dr. Sofos holds a B.S. degree in agriculture from Aristotle University of Greece, a M.S. degree in animal science, and a Ph.D. degree in food science from the University of Minnesota. Currently he is a professor in the Department of Animal Sciences at Colorado State University. He has taught food processing technology, food microbiology, food fermentations, food biotechnology, and meat safety, and has served on over 70 M.S. and Ph.D. committees (over 40 chaired) of students from 18 countries. With his students and collaborators he has published over 160 refereed papers, three books, 30 book chapters, and numerous other publications.

Dr. Sofos has served on committees such as the United States National Academy of Sciences Institute of Medicine Committee on the Review of the USDA *E. coli* O157:H7 Farm to Table Process Risk Assessment, and is currently a member of the National Advisory Committee on Microbiological Criteria for Foods. He has lectured by invitation in 14 countries, has been recognized with distinguished research awards from the American Meat Science Association and the American Society of Animal Science, and is a Fellow of the American Academy of Microbiology and the Institute of Food Technologists. In 2001, he received the USDA Secretary's Honor Award for Superior Service. Dr. Sofos has been a member of IAFP since 1975 and has served as a scientific co-editor of the *Journal of Food Protection* since 1996.

MAURICE WEBER LABORATORIAN AWARD

J. Stan Bailey
Athens, Georgia

Dr. J. Stan Bailey is this year's recipient of the Maurice Weber Laboratorian Award. This award recognizes Dr. Bailey for his outstanding contributions in the laboratory and his commitment in the development of innovative and practical analytical approaches to support food safety.

Dr. Bailey is a lead scientist and research microbiologist for the US Department of Agriculture, Agricultural Research Service where he is responsible for research directed toward monitoring, controlling, reducing and ultimately eliminating contamination of live poultry by human enteric pathogens. During his 30-year career, Dr. Bailey has authored or co-authored over 480 scientific publications in the area of food microbiology, concentrating on controlling *Salmonella* in poultry production and processing, *Salmonella* methodology, *Listeria* methodology, and rapid methods of identification. Dr. Bailey is recognized nationally and internationally and has received numerous awards including the 2002 USDA, ARS Outstanding Senior Research Scientist of the Year.

Dr. Bailey has a B.S. in environmental health sciences, M.S. in food science and Ph.D. in poultry science, all from the University of Georgia. As an active member of IAFP since 1987, Dr. Bailey is a long-time member of the editorial board for the *Journal of Food Protection* and has served as chairperson of the Poultry Safety and Quality Professional Development Group, the Nominating Committee and the Program Committee. Other professional affiliations for Dr. Bailey include serving on the editorial boards of *Poultry Science*, *Journal of Rapid Methods and Automation in*

Microbiology, and the *Journal of Applied Poultry Research*, and membership in Southern Poultry Science Society, Worlds Poultry Science, American Society for Microbiology, American Academy of Microbiology, Poultry Science Society, Georgia Association for Food Protection, and AOAC.

IAFP President-Elect Paul Hall (left) and Tom Valitchka (right), Nasco International, present Fred Weber with the 2003 Harold Barnum Industry Award. Nasco International, Inc. sponsors this award.

HAROLD BARNUM INDUSTRY AWARD

Fred A. Weber
Hamilton, New Jersey

Mr. Fred A. Weber is the recipient of the Harold Barnum Industry Award for his service to the public, the Association, and the food industry.

Mr. Weber has been the principal of Weber Scientific since 1979. His company is a leader in the manufacture and distribution of laboratory supplies to the dairy and food processing industries throughout the United States and Canada. For nearly 25 years his work has focused on many applied contributions to quality control including dairy testing, bacteriological analysis, product and environmental sampling, and water and wastewater monitoring and analysis. Over the years, Mr. Weber has been requested to review various chapters in *Standard Methods for the Examination of Dairy Products*.

In 1986 Mr. Weber became a member of IAFP and has been the Affiliate Delegate and active board member of the Metropolitan Association for Food Protection (MAFP) since its inception in 1993. He served as the MAFP secretary-treasurer from 1998 through 2001. In 2002 the "Fred Weber Service Award" was created in recognition and sincere appreciation of outstanding and untiring efforts in food safety, and is presented annually. Mr. Weber was also the first recipient of this award.

Mr. Weber was IAFP Affiliate Council chairperson in 2001, while concurrently serving as a member of the IAFP Executive Board. He has served as a chair and judge on numerous other award committees, and has served on the *DFES* (now *Food Protection Trends*) Management Committee since 1998, and is the incoming chair.

Mr. Weber has a B.S. from Penn State University.

IAFP President Anna Lammerding presents Alex von Holy with the 2003 International Leadership Award. Kraft Foods sponsors this award.

INTERNATIONAL LEADERSHIP AWARD

Alexander von Holy
Johannesburg, South Africa

Dr. Alexander von Holy is this year's recipient of the International Leadership Award. This award is presented to Dr. von Holy for his dedication to the high ideals and objectives of IAFP and for promotion of the mission of the Association in countries outside of the United States and Canada.

Dr. von Holy received undergraduate and postgraduate degrees from the University of the Witwatersrand, Johannesburg (B.Sc., B.Sc. HONS) and the University of Pretoria (M.Sc., Ph.D.) in South Africa. Dr. von Holy holds a personal chair in microbiology at the University of the Witwatersrand. He is director and partner of Consulting Microbiological Laboratory (Pty.) Ltd. and a food safety consultant, trainer and registered food safety auditor.

Research interests and activities include microbial ecology of foods, biofilms, food hygiene, food safety and food preservation. Dr. von Holy has acted as research supervisor for 25 M.Sc. and 7 Ph.D. students and is co-author of 95 peer-reviewed papers, 179 conference contributions and 43 trade journal papers. He pioneered in-service short courses on food quality, hygiene and sanitation, HACCP, food safety and food microbiology for Southern African food processors, retailers and their suppliers, in which he has trained over 7,000 delegates.

Dr. von Holy is a member of the South African Association for Food Science and Technology (SAAFoST), IAFP and ASM, executive board member of the International Committee on Food Microbiology and Hygiene (ICFMH) and scientific advisor to the International Foundation for Science. He is a member of several food safety-related working groups of the Department of Health in South Africa, and has acted as consultant to the WHO and ICMSF. He is an editorial board member for the *Journal of Food Protection* and is a management committee member for *Food Protection Trends.*

Jenny Scott (left) and Craig Henry, both representing NFPA present Katherine Swanson with the 2003 NFPA Food Safety Award. The National Food Processors Association sponsors this award.

NFPA FOOD SAFETY AWARD

Katherine M. J. Swanson
Minneapolis, Minnesota

Dr. Katherine M. J. Swanson is this year's recipient of the National Food Processors Association's (NFPA) Food Safety Award for her outstanding contribution to food safety research and education.

Dr. Swanson is director, global product safety at General Mills. She received her B.S. in dietetics from the University of Delaware, and her M.S. and Ph.D. in food science from the University of Minnesota. Her career with General Mills began in the Pillsbury organization in 1985. Prior to joining Pillsbury, Dr. Swanson developed innovative microbiological test methods for foods at 3M, provided microbiological consulting services with Economics Laboratory, and was assistant professor of food microbiology at Cornell University.

Dr. Swanson's industrial experience includes serving as director of quality and regulatory operations for Yoplait-Colombo; applied microbiological research on a variety of products including vegetables, bakery products, canned foods, and pizza; and development of specification systems, HACCP programs, and corporate product quality management systems. In her current role, Dr. Swanson's team provides technical expertise on microbial safety and stability, toxicology, food allergens, and premiums for General Mills' products worldwide.

Dr. Swanson is a member of the National Advisory Committee on Microbiological Criteria for Foods, FDA's Science Advisory Board, the International Commission on Microbiological Specifications for Foods (ICMSF), and is a fellow of the Institute of Food Technologists. She is currently chair of the National Food Processors Association's Microbiology and Food Safety Committee and is a member of the American Society for Microbiology and the International Association for Food Protection.

IAFP President Anna Lammerding presents Ben Gale, Santa Clara Dept. of Environmental Health, with the 2003 Samuel J. Crumbine Award.

SAMUEL J. CRUMBINE AWARD

County of Santa Clara Department of Environmental Health
San Jose, California

The Crumbine Award recognizes excellence and continued improvement in a comprehensive program of food protection at the local level. The winner of the 2003 Samuel J. Crumbine Consumer Protection Award is the County of Santa Clara Department of Environmental Health in San Jose, California.

This year's sponsors include: the Conference for Food Protection in cooperation with American Academy of Sanitarians; Association of Food and Drug Officials; Foodservice & Packaging Institute, Inc.; International Association for Food Protection; International Food Safety Council; National Association of County and City Health Officials; National Environmental Health Association; NSF International; and Underwriters Laboratories, Inc.

DEVELOPING SCIENTIST AWARDS

The 2003 Developing Scientist Winners, (left to right); Maria Romero, Clint Johnson, Lynette Johnston, Spring Younts-Dahl, and Pascale Pierre.

ORAL

1st — Lynette Johnston
2nd — Spring Younts-Dahl
3rd — Crystal Ngutter

POSTER

1st — Maria Romero
2nd — Clint Johnson
3rd — Pascale Pierre

FELLOW AWARD

This prestigious award honors professionals who have contributed to IAFP and its affiliates with quiet distinction over an extended period of time. These individuals received a distinguished plaque in recognition of this prestigious honor.

IAFP Past President Jim Dickson (right) presents Robert Gravani with the 2003 Fellow Award.

Robert B. Gravani
Ithaca, New York

Dr. Robert Gravani is a professor of food science at Cornell University. He received his B.S. degree in food science from Rutgers University and his M.S. and Ph.D. degrees from Cornell University. He joined the faculty at Cornell in 1978, after serving as assistant director of the Institute of Food Science and Marketing at Cornell and science director of the Cereal Institute, Inc.

Dr. Gravani works with all sectors of the food system and has developed innovative programs for constituents in production agriculture, food processing, food retailing, and food service, as well as consumers. He has published many scientific and popular articles, and developed numerous education programs for constituents. He is currently the principal investigator of two USDA/FDA collaborative grants on reducing microbial risks in fruits and vegetables.

He received the Cornell Institute of Food Science Teaching Excellence Award in 1994 and was the 1995 recipient of the IAFP Educator Award. In 2001, Dr. Gravani received the IAFP Harry Haverland Citation Award. He is a past president of IAFP, a Fellow of the Institute of Food Technologists and served seven years as a member of the National Advisory Committee on Microbiological Criteria for Foods. Dr. Gravani was appointed to the National Academy of Sciences (NAS) Committee on Review of Scientific Criteria and Performance Standards for Safe Foods and chaired the NAS Subcommittee on Seafood, Produce, and Dairy Products.

AFFILIATE AWARDS

MEMBERSHIP ACHIEVEMENT FOR AFFILIATES

Highest Number Increase:

Southern California Association for Food Protection

Highest Percentage Increase:

Wyoming Environmental Health Association

BEST COMMUNICATION MATERIALS FOR AFFILIATES

New York State Association for Food Protection

BEST EDUCATIONAL CONFERENCE FOR AFFILIATES

Wisconsin Association for Food Protection

BEST ANNUAL MEETING FOR AFFILIATES

Kentucky Association of Milk, Food and Environmental Sanitarians

C. B. SHOGREN MEMORIAL

Ontario Food Protection Association

Affiliate Award Winners: Gene Frey (right) presents Affiliate awards to New York State Association for Food Protection (John Schrade) (left to right), Kentucky Association of Milk, Food and Environmental Sanitarians (Sue Jewell), and Southern California Association for Food Protection (Margaret Burton and Jennylynd James).

Affiliate Council Chairperson Gene Frey (left) presents the Ontario Food Protection Association, (left to right) Malcolm McDonald, Gail Seed, and Judy Greig with the 2003 C. B. Shogren Memorial Award.

IAFP President Anna Lammerding (left) presents Tina Pedroso of the Portugal Association for Food Protection with an Affiliate Charter.

IAFP President Anna Lammerding presents Gordon Hayburn of the United Kingdom Association for Food Protection with an Affiliate Charter.

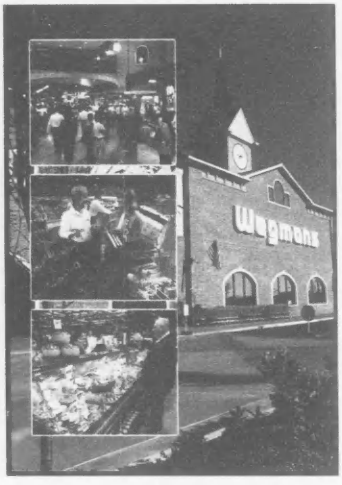
IAFP 2003 Special Contributors

IAFP New Member Orientation	3M Microbiology	3M Microbiology
Tuesday Afternoon Coffee Break	BD	BD Diagnostic Systems
Portfolio Bags	bioMérieux Industry	bioMérieux, Inc.
Notepads with Logo	Bio-Rad	Bio-Rad Laboratories
President's Reception	The Coca-Cola Company	The CocaCola Company
Monday Morning Pastries and Coffee Break	Deibel Laboratories	Deibel Laboratories, Inc.
Speaker Travel Support	Dole	Dole Food Company
Monday Evening Exhibit Hall Reception	DuPont	DuPont Qualicon
Monday Evening Social	IGEN International, Inc.	IGEN International, Inc.
Cheese and Wine Reception	Kraft	Kraft Foods North America
Student PDG Luncheon	Nestlé Makes the Very Best	Nestlé USA, Inc.
Tuesday Morning Pastries and Coffee Break	Nice-Pak The Global Wet Wipe Experts	Nice-Pak Products, Inc.
Monday Afternoon Coffee Break	NSF	NSF International
Awards Banquet Flowers	PepsiCo	PepsiCo
Name Badge Neck Wallets	SDI	Strategic Diagnostics Inc.

Wegmans Food Markets

IAFP 2003 Black Pearl Award Winner

Rochester, New York, USA



Wegmans Food Markets began as the Rochester Fruit & Vegetable Company in 1916 by two brothers, Walter and John Wegman. As more family members joined the team, these humble beginnings transformed into one of the most admired retailers in the food business. It's now among the 100 largest privately owned corporations in the country, with over $3 billion in sales, 64 stores and more than 30,000 employees.

Wegmans' success can't be attributed to any one element. If you were to poll their customers, you might hear comments about incredible customer service, outstanding quality of perishable foods and private label products, giving back to the communities where they do business, and a reputation of clean, attractive, inviting stores. These factors didn't happen easily. Wegmans puts a great deal of effort into providing stores, products, and employees that build customer loyalty.

Not negotiable to Wegmans are high standards, especially in food safety and food quality. Carefully constructed procedures are followed to ensure that the highest quality products arrive at Wegmans' distribution facilities, the cold chain is protected during storage and shipping, and knowledgeable employees at the stores follow strict hygiene practices. The company consistently raises the bar on expected standards.

Food Safety Within Wegmans' Stores

In recent years, Wegmans has become more proactive, anticipating food safety problems and correcting them before they can occur. Employee education has been the key in the changes.

Wegmans is focusing food safety education on the decision makers as well as the front line employees. There is an extensive 2-day HACCP training session with Dr. Robert Gravani of Cornell University for the store management teams and corporate executives (store managers, assistant managers, executive chefs, perishable managers, and service team leaders). It includes development of a HACCP plan. Participants employ the seven principles of HACCP, to gain an understanding of why Critical Control Points are important to food safety and how a particular process step becomes a CCP.

There is a Computer Based Training (CBT) program for all employees, so they could easily adapt the information to the Wegmans' work environment. Approximately 29,000 employees have taken the interactive training program in the first two years. The program is divided into five modules. Topics include food microbiology, good retailing practices such as good personal hygiene, maintaining product temperatures, avoiding cross-contamination, how to wash, rinse, and sanitize, and how to put this information into practice. It takes about 2.5 to 3 hours for a perishable department employee to complete. HACCP is discussed in the CBT training. A shorter version is used for employees in non-perishable departments focusing on aspects of food safety pertinent to them: personal hygiene, maintaining product temperatures, product storage, etc. Food safety practices have been incorporated into job aids, which are written procedures detailing how certain tasks are to be performed.

The Good Retailing Practice (GRP) job aids cover the basic food safety procedures such as personal hygiene, taking product temperatures, calibrating a thermometer, etc. These also contain Skill Checks that allow a department manager to follow up with a new employee to assure that they understand the material.

Procedures at store level have been changed to minimize the potential for cross-contamination. One of the first procedures addressed was rotisserie chicken. The process was changed to eliminate the need for the raw chicken preparation in the deli/prepared foods areas. Now the meat employees do all raw chicken preparation and store the raw product in the meat room and cooler. The prepared food employees load the ovens taking precautions to avoid cross-contamination and then take (and record) product temperatures at cooking and at display to assure that critical limits are achieved.

Employees often pass this knowledge to customers when answering questions about food preparation.

Food Safety by Design

Building food safety into the design of new and remodeled stores increases the success Wegmans' employees have with food safety. Stores are designed with:

- an understanding of food safety regulations. (FDA Food Code and local regulation)
- an understanding of how food flows through an area
- an understanding of the challenges employees encounter when preparing foods
- enough flexibility anticipating future programs and uses for the area

An example of an area that has these considerations included is the Cold Production room. This is a refrigerated room (40–45°F) where cold prepared foods are packaged. Fruits and vegetables are washed prior to entering the room. Once the product has been prepared it is stored in coolers dedicated to finished product. The cold chain is maintained throughout the process.

Hand sinks are plentiful and conveniently located throughout the production area. Stainless steel surfaces are used throughout the production area. The equipment is on wheels or elevated off the floor for easy cleaning. Racking for the coolers has been designed so that shelves can be removed for easy cleaning. Blast chillers are standard equipment in the prepared foods kitchens to allow products to be quick-chilled at retail.

To sustain the retail food initiatives, Food Safety Coordinators (FSCs) have been assigned to help reinforce the food safety message through continual coaching and periodic audits. The audits measure how a store is progressing with food safety. A scorecard is used to communicate the progress to upper management on a quarterly basis.

Wegmans' Supplier Quality Assurance (SQA)

Wegmans' SQA team members work directly with Wegmans Brand suppliers to provide our customers with safe, high quality products. These suppliers include outside vendors, internal production facilities and warehouse/ distribution facilities.

The primary tool used by SQA is the supplier food safety and quality audit. Facilities are prioritized for audits with the focus being on suppliers new to Wegmans and those handling products in high-risk categories. Supplier expectations are clearly outlined in the Wegmans' Codes of Practice, which is provided to potential suppliers to an audit.

The audit is complete Good Manufacturing Practice (GMP) audit of the facility. The auditors review process, HACCP and prerequisite program records. Auditors look for compliance with Wegmans' Code of Practice, HACCP systems with regularly documented reviews, established and documented prerequisite programs such as GMPs, sanitation and pest control. Management commitment is evaluated and auditors look for a strong quality assurance manager with responsibility and authority. The supplier should have systems in place for self-assessment and should include independent audits. A comprehensive and documented employee-training program should be in place.

Wegmans views suppliers as partners, so the SQA team provides guidance and opportunities for improvement to suppliers while keeping Wegmans' customers the primary focus.

Wegmans' Egg Quality Assurance Program

To meet their quality standards, Wegmans has owned and operated its own egg farm since 1967. It is the largest egg farm in New York State (housing nearly 700,000 birds) and utilizes state-of-the-art technology. This facility supplies enough eggs for all the Wegmans Food Markets, Inc. stores. All eggs are kept refrigerated through retail sale.

In 1990, when it was known that *Salmonella enterica* serovar Enteritidis (SE) could be a problem in shell eggs, Wegmans adopted a SE control program. Swab samples are taken from each row in pullet and layer houses every 90 days. These samples are sent to the Cornell Diagnostic Laboratory and analyzed for *Salmonella* group D. All chicks are purchased from tested breeder flocks. All pullet and layer houses are cleaned, sanitized and tested for SE before repopulation. Strict bio-security practices are in place to maintain the health of our birds. Wegmans' Egg Farm has never tested positive for SE.

In addition to the SE program, Wegmans participates in the voluntary New York State Egg Quality Assurance Program, a program endorsed by both New York's Department of Agriculture and Markets and the Health Department. Wegmans is a leader in animal welfare and has embraced the United Egg Producers (UEP) voluntary guidelines for egg producing poultry. Wegmans is fully compliant with the voluntary guidelines; well ahead of the 2008 full implementation required by UEP. USDA performs compliance audits for the program.

The Wegmans' Way

The grocery industry is extremely competitive. Customers who are not content with one store can easily choose another. It is Wegmans' goal to be sure their customers are safe and satisfied. Providing unique, high-quality, great-tasting products is our way to meet that goal. Wegmans' philosophy for the past 30 years has been:

- *At Wegmans, we believe that good people, working toward a common goal, can accomplish anything they set out to do.*
- *In this spirit, we set our goal to be the very best at serving the needs of our customers. Every action we take should be made with our customer in mind.*
- *We also believe that we can achieve our goal only if we fulfill the needs of our own people.*
- *To our customers and our people, we pledge continuous improvement, and we make the commitment:* ***Every day you get our best.***

Ivan Parkin Lecture

presented by

Donald L. Zink, Ph.D.

Lead Scientist, Food Processing
Food and Drug Administration
Center for Food Safety and Applied Nutrition
Office of Plant, Dairy Foods, and Beverages
College Park, Maryland

"On the Trail of Food Safety — From the Early Days to the Future"

I would like to identify some of the origins of the discipline called food safety, in order to give context to a discussion of the elements, or "tools," that we use to accomplish the goals of food safety. Following this, I will discuss what I believe some of the priorities of food safety should be in the future.

Although I am an official of the US Food and Drug Administration, this article covers a wide range of topics, consisting of my own thoughts, which may or may not reflect the position of the FDA.

I have tried to define food safety. Although I am primarily a food microbiologist, I appreciate the importance of other disciplines to food safety, which depends on microbiologists, toxicologists, epidemiologists, food scientists, chemists, nutritionists, health inspectors, veterinarians, educators, packaging engineers, process engineers, attorneys, regulators, and even farmers and ranchers.

As for the origins of the discipline, especially from my perspective as a microbiologist, humanity was aware of the consequences of unsafe food by the dawn of recorded history. By about 2000 BC, there were writings about dietary strictures in China, India, Egypt and Palestine. Early cultures learned the lessons of food safety through hard experience and tried to modify their dietary practices to protect themselves. An absolute requirement of a stable village social structure was the ability to preserve and store foods, because once people ceased to be hunter/gatherers, they became at least partially dependent on others for a safe food supply.

Botulism is an example of an affliction connected long ago to a particular food. In the 10th century AD, Emperor Leo of Byzantium issued a decree forbidding production of blood sausage. However, botulism continued to be a problem for more than a thousand years thereafter.

Actually, the real scourge of the Middle Ages was ergot poisoning, or ergotism caused by the mold *Claviceps purpurea* growing in grain, especially rye. By the 16th century, there was some understanding of the problem, and efforts to control it helped reduce the problem.

From the late 19th century into the early 20th century, a rapid succession of discoveries contributed to food safety. The steam retort came into wide use

for canning foods. Processes for making safe milk, by condensing it with sugar or by evaporation and canning, were developed. *Salmonella* was isolated in 1888 and *Clostridium botulinum* in 1896.

The germ theory of disease took decades to become accepted by scientists and particularly by the lay public. Even into the early 20th century, it was widely believed that filth and unclean conditions directly caused disease. Evidence of this is seen in the Federal Food and Drug Act of 1906, with its emphasis on the prohibition of filth and contamination, regulatory language that remains with us today.

Interestingly, experiments with irradiation in food preservation were carried out as early as 1925.

The discipline of food safety must have started soon after researchers first began to study food microbiology in the late 1800s. The first commercial laboratory was established in 1902. In the 1920s, it was shown that spores die logarithmically when heated, and mathematical methods were developed for calculating retort process times.

Food safety research really took off after World War II. For example, productive programs began at Iowa State University. It is safe to say that the modern discipline of food safety began sometime between the early 1920s and the post-WW II years.

The major tools we have at our disposal to make the world's food supply safer are the following:

1. A social infrastructure to support public hygiene
2. Education and training
3. Food processing and packaging technology
4. Laboratory and field research capability
5. Personal and organizational integrity
6. FSOs, HACCP, SSPOs, GAPs, and GMPs

Today, epidemiology is playing an important role in food safety, helping to identify more cases and more outbreaks, to discover "new" pathogens, to implement more effective preventive measures, to direct consumer education toward at-risk populations, and to gain a better understanding of host-pathogen interactions.

However, programs devised in developed nations may not be the answer for the developing world. There may be a better starting place than HACCP for these nations as we work with them in building a global public health infrastructure.

A return to food safety basics, not just in developing nations but in the developed world as well, may be needed throughout the farm-to-table continuum.

What we call Good Manufacturing Practices (GMP) needs particular attention. The FDA will be reviewing Food GMPs to determine whether or not they should change. The GMP regulations were conceived when the germ theory of disease was still fairly new, and we now know much more about effects of preventive controls on public health. The early emphasis was on visible filth, and although filth is never a good thing, it may not be the best measure of sanitation standards for food safety.

Microbiological standards and methods should also be rexamined. Tools such as coliform counts, for example must be applied wisely. At present, these tests are too widely used and yield data that have no meaning or that cannot be interpreted in terms of what action should be taken on the basis of the result.

When does a bacterium become a pathogen? Epidemiology allows detection of things previously unknown, which can present a problem for the regulator. If a previously benign organism causes an apparently healthy person to become ill, must we treat it as a pathogen henceforth? If not, how many such cases constitute a threshold for action?

We live in exciting times in which the opportunity for breakthrough discovery still exists.

We need to act globally. CODEX is important; it is painfully slow, but slow progress may be good in view of how much we have to do in the developing world.

Our food safety standards and criteria need to be continually challenged, and what doesn't work, even if it has been around for a long time, must be discarded.

We need better processes for validating and standardizing test methods and sampling plans.

Finally, we need to stop putting too much focus on detection methods and not enough on sampling. There are hundreds of PCR and ELISA methods, but the same old sampling and enrichment methods. We have chip-based methods that can detect multiple pathogens, but how to get the food through that chip is a mystery. If a developer provides a biosensor that can detect one *Salmonella* cell, what is the processor supposed to do with that probe in order to find *Salmonella* on a whole chicken?

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Thank You

Plenary Session

"Breaking the Cycle of Foodborne Illness: The War on Pathogens"

presented by

Dr. Elsa A. Murano

Under Secretary for Food Safety
United States Department of Agriculture

Americans enjoy the safest food supply in the world. Data from the Centers for Disease Control and Prevention and USDA's Food Safety and Inspection Service's (FSIS) own regulatory testing indicate that the Agency is headed in the right direction toward further improving food safety.

Despite these positive trends, eradicating foodborne illness is an evolving challenge, and the Bush Administration is committed to taking food safety to the next level, as evident in USDA's vision paper titled *Enhancing Public Health: Strategies for the Future*. Over the past two years, FSIS has focused on five goals to improve food safety programs. They are:

1) Improving the management and effectiveness of regulatory programs;
2) Ensuring that policy decisions are based on science;
3) Improving coordination of food safety activities with other public health agencies;
4) Enhancing public education efforts; and
5) Protect meat, poultry, and egg products against intentional contamination.

In addition to these goals, FSIS is implementing seven new initiatives to take food safety to the next level. First, a New Technology Staff office has been created that will expedite the implementation of safe technologies at slaughter and processing establishments. Second, FSIS is retooling training and education programs for all Agency employees. Third, the Agency has formed a Food Safety Risk Assessment Committee to evaluate and focus resources on hazards that pose the greatest public health risk along the farm-to-table continuum. Fourth, FSIS is working with USDA's Research, Education, and Extension mission area to coordinate food safety research priorities and needs. Fifth, in consultation with livestock producers, researchers, and other stakeholders, FSIS is developing a list of best management practices for animal production facilities reduce pathogen loads before slaughter. Sixth, FSIS is conducting continuous baseline studies to determine the nationwide prevalence and levels of various pathogenic microorganisms in raw meat and poultry. Finally, FSIS will continue to review authorities and regulations and work with interested parties to modernize and enhance its compliance efforts.

Achieving the next level of the Food Safety Vision involves the ability to anticipate problems as much as possible before they arise. FSIS has identified three issues that need to be addressed if FSIS is to attain this next level of public health protection.

The first issue is predicting risk through enhanced data integration. If foodborne illness cycles are to be broken, then consistent and thorough data analysis must occur. This is where industry and government need to work together so that outbreaks can be prevented.

The second issue is improving the application of risk into regulatory and enforcement activities. FSIS recognizes the need to better document food safety problems as they occur in order to analyze conditions that should be corrected. This will help the Agency determine where its resources need to be concentrated so that it can be most productive.

The third issue is a better association of program outcomes to public health surveillance data. FSIS must be able to connect the occurrence of specific pathogens in specific foods to the occurrence of human foodborne illness. Accomplishing this task will help FSIS direct its inspection and enforcement on those practices where risk is deemed to be highest, resulting in a more efficient use of resources.

By concentrating on these goals, initiatives, and issues, FSIS will advance food safety. For more details, check out FSIS' vision paper titled *Enhancing Public Health: Strategies for the Future* at www.fsis.usda.gov.

Session Summaries

Members of the IAFP Student Professional Development Group assisted the convenors by serving as Session Monitors at IAFP 2003. Student Monitors prepared the following session summaries for presentation in *Food Protection Trends*.

Plenary Session – Breaking the Cycle of Foodborne Illness: The War on Pathogens

Dr. Elsa Murano, USDA

Renee M. Raiden, Virginia Tech
and Benjamin Chapman, University of Guelph

At the plenary session during the IAFP Annual Meeting, Dr. Elsa Murano, the current under secretary for food safety at the United States Department of Agriculture (USDA) spoke of the past, present and future of food safety in the US. She informed the audience that while the United States has the safest food supply in the world, we still must work harder in the future to attempt to continue reducing and/or eradicate incidence of foodborne illness. She began with several main accomplishments that have been met while working towards this goal.

The first accomplishment stated was the improvement of management and control of regulatory programs. There are currently 107 trained consumer safety officers in the Food Safety Inspection Service (FSIS), and an automated import information system is being implemented. The agency gave assurance that all policy decisions are, and will be based on science. Proof of this is seen in the new regulations for procedures of *Salmonella* testing, new ground beef regulations, as well as the zero-tolerance ruling for *Listeria monocytogenes* in ready-to-eat meat products. Another accomplishment has been in the improvement of coordination between food safety agencies and other public health agencies. Recently there has been a memorandum of agreement signed between states to aid in cooperation during recalls. A fourth accomplishment mentioned was the enhancement of public education of food safety issues. Consumer education has been achieved through press conferences, live broadcast interviews and cooking demonstrations. In addition a new USDA food safety mobile has been created to travel the across the US and aid in food safety demonstrations. Finally, the USDA has strengthened coordination between government agencies as a response to the heightened terror threat since September 11th in order to protect meat, poultry and egg products from intentional contamination.

Dr. Murano announced that a new FSIS initiative that is currently being implemented. As part of the initiative, the agency is striving to update training programs and create a public health focus by integrating the scientific and technical principals in food safety. This includes a HACCP validation program. Improvements in training will include locating training facilities as close to employee worksites as possible and implicating regional and interactive computer training sessions. Finally the agency will strive to place a priority on risk assessments and attempt to coordinate these with other government and public health agencies.

Finally, Dr. Murano completed her presentation by discussing how to take food safety to an enhanced level in the future. Suggestions include being able to anticipate hazards in the future and predict their risks, in attempts to ensure corrective measures are taken. Coordination between government, public health organizations and industry is essential to ensuring food safety in the US forward in the future.

S01 – Use of Food Safety Objectives and Other Risk-based Approaches to Reduce Foodborne Listeriosis

Leslie K. Thompson, Kansas State University
and Yohan Yoon, Colorado State University

The first steps in developing a food safety plan to control *Listeria monocytogenes* are identifying a baseline, identifying at-risk populations, and identifying "High-Risk" foods along with other considerations such as virulence and dose response. Some control strategies are to reformulate foods, prevent post-packaging contamination, achieve acceptable storage times, and educate those who would be most susceptible to listeriosis. Recently, hazard characterization issues rasied in 96% of all cases of listeriosis include virulence, human infectivity, host susceptibility, and infective dose. The infective dose response is based on the interaction between the food matrix, the pathogen, and the host. For *Listeria*, the infective dose is accepted as high but there are some outbreak cases where the infective dose was low due to lack of testing methods for *L. monocytogenes*. Therefore, a better understanding of physiology and stress response as well as improved detection may change the thoughts on infective dose.

The factors that are considered in primary exposure assessments of *L. monocytogenes* are prevalence and population of the microorganism; amount and frequency of food consumed; and potential for growth of *L. monocytogenes* at refrigeration temperatures are all. In an exposure model, all segments of the food system have a role from farm to table. Each step of the process can increase, decrease or maintain microbial population in the food. Time, temperature, food matrix, pH, acidity, water activity, preservatives, competitive flora, and processing treatments are all essential to determining the possibility of risk in a food. An important part of the continuum that has not been studied well is the persistence of the organism in the home. In addition, there is a need to establish information regarding food safety objectives and microbial criteria, and the impact of risk assessment. Also, food safety activities should be linked to public health outcomes. A food safety objective is the maximum frequency and/or concentration of a microbial hazard in a food at the moment of consumption that appropriately provides a level of protection established as both a scientific and society decision. A risk assessment articulates a public health goal, and a level of exposure must be calculated to achieve that goal. It must then be determined if this is feasible and can industry implement the standard. To reduce listeriosis the goal of strategies should be to reduce exposure of high-risk individuals, prevent growth, prevent contamination, educate, formulate food to prevent or slow growth of organisms, and limit time-temperature abuse. Because human behavior is a major factor in incidences of listeriosis, educating consumers and food handlers about knowing risks and prevent strategies should also be incorporated into food safety programs.

S02 – Intervention Strategies for Ready-to-Eat Meat Products

Adriana Velasquez, University of Nebraska-Lincoln and Marcos Sanchez, University of Nebraska-Lincoln

The session included topics related to intervention technologies that are used by Ready-to-Eat (RTE) meat processors to control the presence and populations of pathogenic bacteria. Technologies such as post-packaging thermal pasteurization, ingredient formulation, and non-thermal processes were discussed in the session. Initially, Bruce Tompkin from ConAgra discussed the development of Food Safety Objectives (FSO) in Ready-to-Eat meats. The presentation focused on the presence of *Listeria monocytogenes* (Lm) in these types of products, including non-cured poultry products. The use of FSOs should be considered for in pack pasteurization processes, for the use of additives incorporated to retard or prevent the growth of Lm and for the validation of code dates for safety. The second presentation included two speakers from Wayne Chemical Co. David Herweyer and Oliver Reeban. The talk focused on the use of chemicals and other sanitizers in manufacturing operations. Videos demonstrating the application of different sanitizing agents on equipment and plant facilities were shown. The presentation concentrated on a product based on Alkalyne Hydrogen Peroxide (AHP). AHP was shown to be effective to control *L. monocytogenes* in plants due to strong oxidizing activity. Some other recommendations were detailed including the elimination of all standing water in manufacturing facilities, the atomization of plant rooms from ceiling to floor to avoid cross contamination, and the usage of plastic wheels instead of rubber due to the potential damage that could be caused by the sanitizing agent. Kathleen Glass from the University of Wisconsin provided a thorough summary of the different additives used in ready-to-eat operations to control pathogens. In order to select the appropriate additive to be sued in an operation, it was recommended to consider several issues including regulations, labeling requirements, consumer acceptance, allergen potential, functionality, sensory effects, costs, packaging, processing storage conditions, pathogen of concern and the efficacy of the product. Efficacy should be estimated based on several properties including solubility, dissociation constant, product pH, synergistic effects between additives, temperature and the potential presence of resistant populations of bacteria. Several additives and associated benefits in meat products were discussed, including the use of nitrites, lactates, diacetates, citrates, phosphates, bacteriocins and new products such as lactoferrin and monolaurin.

Lisa Szabo from Food Science Australia described various non-thermal intervention options to be used in ready-to-eat meat products. One of them is Pulsed Electric Field, which causes the buildup of electrical charge at the cell membrane of the bacterial cells, increasing its permeability, causing the eventual death of the cell due to leakage. Limitations associated with this technology include the lack of inactivation of spores and some food enzymes. Another described example was high-powered ultrasound, which causes cells to collapse due to changes in pressure. This option appears to be environmental friendly but could cause problems due to the possible lack of uniformity of treatment throughout the product. Dr. Harshavardhan Thippareddi from the University of Nebraska-Lincoln presented various alternatives for the thermal post-pasteurization interventions of ready-to-eat meats. Type and composition of the product, packaging, orientation and package design are among the aspects that will determine the appropriate intervention technology to be used. From a different perspective, Kevin Nanke from SureBeam Corporation described the mechanism and effects on the product involved in irradiation of food. He mentioned the increasing consumer awareness of electronic irradiation as well as the growing acceptance of irradiated products available in the market.

S03 – Hazard Identification in the Fresh Produce Industry

Montserrat Hernandez, Universidad Autonoma de Queretaro, and
Glenner Richards, University of Georgia

The presentations that were made during this session identified potential sources of foodborne pathogens that contaminate produce and examined pre- and postharvest factors that are potential hazards for the safety of fresh produce. Drs. Barry Michaels (Georgia Pacific) and Ewen Todd (MSU) discussed the significance of food worker hygiene. Lack of barriers, such as gloves, was identified as the main source of pre- and postharvest contamination. Activities in some Central and South American countries where raspberries, cantaloupes and mangoes have been identified as vehicles of foodborne diseases were observed. Problems associated with field worker hygiene in these areas included high endemic rates, lack of chlorinated water, lack of appropriate supplies and facilities, training difficulties and domestic issues such as child care.

Dr. Trevor Suslow (UC Davis) focused on the prediction of bacterial pathogen presence and behavior. Index, indicator and surrogate organisms were defined and described. An on-farm reservoir microbial survey was undertaken to develop baseline data of non-pathogenic *E. coli*. The results presented indicated that there is no correlation between *E. coli* and thermo-tolerant coliforms found in on-farm reservoirs. Positive *E. coli*/coliform results from water and plant samples were not an indicator of fecal contamination. Without confirmation, MPN tests greatly overestimate *E. coli*, because there are interfering genera. The survival of pathogens on produce was dependent on the arriving population.

Dr. Lee-Ann Jaykus (NCSU) presented data from a multi-institutional collaborative field study (Clean Greens) to assess the microbiological quality of domestic produce (433 samples–cantaloupes and leafy greens). Microbiological quality of produce in the field varied among and between produce types. *Salmonella* was detected only on cantaloupes, while *Listeria monocytogenes* was not isolated from any samples. Most farms and sheds used good agricultural practices, however the contamination level on cantaloupes increased during postharvest processing (washing). This was associated with the wash water quality.

Dr. Jack Guzewich (FDA/CFSAN) highlighted FDA findings with respect to farm investigations of foodborne disease outbreaks associated with produce. Outbreaks associated with produce of domestic and foreign origin continue to occur. The major factors involved are worker hygiene, wild and domestic animal presence in the fields as well as postharvest handling facilities, harvest tools and equipment and water sources. Water quality was identified as the main issue of concern.

Dr. Yuhuan Chen (NFPA) discussed the results of a survey conducted in two states (Maryland and California). Overall, there was low prevalence (0.74%) of *Listeria monocytogenes* in bagged vegetables in both states. However, there were differences between locations (MD: 0.5%; CA: 0.9%). The data collected has been used by NFPA to conduct *Listeria monocytogenes* risk assessment, FDA/FSIS to perform risk modeling and FSIS in-plant dynamic model for deli meats.

Dr. Mark Walderhaug (FDA/CFSAN) described the information needs for transportation and distribution component of a produce risk assessment. It was concluded that the difficulty of the transportation and distribution module was dependent on the risk manager's wants and needs. Data collection was expensive and could affect the company's competitive advantage. Transparency of some risk assessment may have to be sacrificed for security concerns. Currently, there is no complete risk assessment from farm to fork for produce.

S04 – Recipe for Food Safety at Retail

Kristen Matak, Virginia Tech
and Angie Hartman, Virginia Tech

The number of Americans choosing to buy ready-prepared and ready-to-eat meals has dramatically increased in the past decade. According to Fred Reimers of H.E. Butt Grocery Company, there has been a shift in supermarkets to a central market where over 2,000 meals are served daily. Freshly prepared meals called "home meal replacements" have become increasingly common and therefore the manufacturing process of foods is no longer limited to the "manufacturer." Steve Otwell, from the University of Florida, suggested that the introduction of HACCP at the retail level will survive only if there is a good foundation of prerequisite programs based on science-based guidance and uniformity of regulations from state to state. To make progress in the world of food safety at the retail level, there must be a certain amount of change. Frank Yiannas of Walt Disney World offered that education of consumers and employees may be facilitated using innovative approaches such as the newly developed international food safety icons to communicate food safety and HACCP principles. The use of the internet and automated processes of digitally recording/collecting data have proven to be helpful in controlling food safety at the retail level by improving accuracy in monitoring, recognizing trends, and the ability to compare daily HACCP reports. Joe Eifert of Virginia Tech spoke in detail about the innovative International Food Safety Symbols, which are pictures alone or in combination with bilingual words that the non-English speaking workers can understand, regardless of native language, so they can perform proper food safety practices. Some of the symbols currently being used include: do not cross contaminate, do not come to work sick, and danger temperatures for food. In addition, future icons representing reheating food properly, poison/toxic substance, correct refrigeration temperature, discard date/times, and do not thaw at room temperature are being developed.

The prevalence of foodborne allergies is on the rise. Since allergens can cause health and regulatory risks, customer dissatisfaction, and business risk, the FDA requires that an ingredient must be declared on the label if an allergen is added to a food as an ingredient. Ernie

McCollugh explained how managing allergies in the retail environment using the Allergen Prevention Program would help prevent allergens from becoming a problem. This program includes an allergen awareness team, training, raw material program, rework rules, packaging controls, labeling controls, and sanitation programs. Pete Snyder spoke about Food Code Variances, in cases where processes in the Food Code are modified to meet retail needs. This program is important because processors need to be allowed to perform any process that can be both validated as safe and documented by the Retail/Food Process Authorities. To perform a process variance, the manager must first expose the kitchen staff to control hazards and provide a HACCP plan. The kitchen staff must then be trained so they can begin the controlled process. Then HACCP self-inspections are performed to determine the degree of hazard so that improved HACCP action can be taken. Finally, the HACCP authority trains employees so the owner and food handlers can control hazards. Many steps are being taken to increase the level of food protection at the retail level. The importance of proper food handling has not gone unnoticed to those in charge of food safety and quality. These programs and future programs will continue to evolve so that our food supply is as safe as it can be.

S05 – Effective Food Worker Hygiene Interventions: A Risk Assessment Approach

Jarret Stopforth, Colorado State University
and Yohan Yoon, Colorado State University

The safety of our food supply is constantly threatened by introduction of pathogens inherently associated with the product or as a result of environmental contamination. Among some of the most common sources of food product contamination include pests, equipment, facilities, animals and people. In any food processing facility it is inevitable that product will be subjected to human contact and may face potential contamination as a result. The risk of contaminating food and potentially introducing pathogenic bacteria is increased when food workers are infected with a communicable foodborne disease. The risk factors (and extent) associated with infected food workers transmitting disease include: (a) the lack of barriers in food preparation (90%), (b) bare hand contact with food (59%), (c) excessive handling with produce and salad preparation (31%), (d) asymptomatic carrier of disease (31%), (e) symptomatic carrier of disease (26%), and (f) preparation involving more than one food worker (23%). The progression of foodborne disease involving the food worker originates with an infected worker carrying a communicable disease which subsequently contaminates the environment, in turn contaminating other food workers, and all of which have the potential to contaminate the food and result in a rolling outbreak. It is suggested that restaurant food handlers may pose a significant risk to food product safety due to the misconception that food safety knowledge through educational programs implies safe food handling practices. The main factors linked to improper food handling practices by restaurant workers are: (a) working while ill, (b) improper handwashing, (c) cross-contamination, (d) improper glove use, (e) inadequate temperature monitoring, (f) inadequate reheating procedures, (g) improper product holding, and (h) inadequate cooling. When considering transmission of foodborne illness through food worker contamination, it is essential to consider risk assessment with both quantitative and especially qualitative data (QRMA). The factors for consideration using QMRA for mitigation strategy are directly related to the individual food handler and include: (a) exclusion of worker when infected, (b) restriction when infected, (c) hygienic practices, (d) vaccination programs, and (e) cross-contamination potential. Data for use in determining transmission potential using QMRA is based on probabilities of risk reduction or promotion with the inclusion or exclusion of certain preventative strategies. The problem with using this technique is the variability of the data, i.e., differences in contamination load (high vs. low soil) the effectiveness of hygienic practices changes but the variability of the data changes accordingly. It is estimated that 97% of foodborne illness in food establishments is due to poor food handling practices and this creates a demand for training and evaluation of food worker and manager training as it is believed that better trained managers result in production of safer food. It is important for risk assessment models to include attitude and behavioral content defined by certain psychological terms and other considerations for the models are the factors influencing training implementation and training design and delivery. In developing countries, street vending of food is a major problem; however, it is important as a source of income and a way of life. The major cause of food safety problems in these environments include: (a) lack of education and facilities, (b) lack of training, (c) lack of compliance / enforcement, (d) inadequate facilities, and (e) inadequate infrastructure. The benefit of improving personal hygiene activities outweighs the cost of improvements as it is more profitable to prevent rather than try to cure the outcome of foodborne outbreaks which bear the burden of cost related to medical bills, loss in productivity, public health investigation, stock losses and litigation. It would be more sensible to forgo the cost of hygienic supplies (i.e. soap, towels...) than face a higher potential risk of foodborne disease outbreak.

S06 – Investigative Molecular Techniques and Their Application to Food Safety

Renee M. Raiden, Virginia Tech
and Justin Ransom, Colorado State University

As the field of food science advances, molecular techniques will become essential to both detecting foodborne outbreaks and in laboratory research. This symposium exhibited how molecular techniques may be applied to food safety. Lee-Ann Jaykus from North Carolina State University gave an overview of commonly used molecular techniques including polymerase chain reaction (PCR) and pulsed field gel electrophoresis (PFGE). These

techniques are being used to detect the presence of several key emerging pathogens that have have been difficult to culture using traditional techniques, including Noroviruses, *Cyclospora cayetanensis*, *Campylobacter jejuni*, and *Listeria monocytogenes*. The use of genetic processes in investigating these pathogens was stressed and she stated that although these are expensive methods, they can significantly aid in investigative microbiology.

Martin Wiedmann from Cornell University, gave an overview of molecular subtyping. In the past serotyping based on surface antigens was used as the only subtyping method, but currently researchers are using DNA-based methods, ribotyping, and PFGE to subtype bacteria. Currently the most important subtyping program for food safety is PulseNet, a collaboration between the CDC, USDA, and FDA to use PFGE for identifying strains of microorganisms to help determine if outbreaks are related. He stated that the future of investigative molecular techniques lies in DNA based sequencing of specific genes associated with specific microorganisms.

Don Schaffner from Rutgers University complemented the symposium topic by presenting a risk assessment model that incorporates molecular biology data that may be implemented by researchers in the future. As more information is gathered about the genetics of foodborne pathogens, more data about virulence, survival under stress conditions, and other factors will be available to construct risk assessment models that may be more specific to a microorganisms and food.

The role of molecular techniques in the food industry was discussed at length by Vickie Lewandowski from Kraft Foods. She described that molecular techniques could replace time-consuming conventional techniques and would provide heightened sensitivity and specificity for detection of pathogens. She noted that the widely publicized *Listeria monocytogenes* outbreak in fall of 2002 was tracked using PFGE, and researchers were able to link the outbreaks to each other. The creation of a confidential industry-wide database of PFGE patterns of *L. monocytogenes* may also provide industry with a resource to quickly identify potential outbreaks. She stressed the importance of the use of more than one method to be used for confirmation due to varying sensitivities.

Finally Franco Pagotto from Health Canada discussed DNA microarray technology. This technology involves specific DNA probes attached to a slide or membrane. Target DNA is labeled and color change is seen when the target DNA and the probes are bound. Microarray can provide vast information about the genetics of foodborne pathogens in a relatively short period of time.

S07 – Current Issues in the Microbiological Safety of Dairy Foods – From Farm to Table

Kristen Matak, Virginia Tech and
Adriana Velasquez, University of Nebraska-Lincoln

Despite the fact that dairy products are widely distributed and consumed in high quantity, very few major incidences of microbial outbreaks have occurred. However, concerns over the emergence of resistant foodborne pathogens and the possibility of agricultural bioterrorism have given risk managers the task of providing safe quality foods without increasing production costs or imposing more restrictions on international trade. This is a subject that must be addressed at each phase of the food production cycle including at the farm level. Kathryn Boor of Cornell University described the findings of a literature review to understand the science behind current regulations for the production of dairy products. The importance of guidelines for the safe production of dairy products was realized early on, and in 1924 the Pasteurized Milk Ordinance (PMO) was developed. In these guidelines, the standards for the thermal treatment of milk were set according to the findings of a 1957 study by Enright that assured the destruction of *Coxiella burnetti*. Kathleen Kaufman of Cornell discussed the need for programs that assure food safety on the farm as well. One such program mentioned was the New York State Cattle Health Assurance Program. This program addresses three principles of biosecurity at the farm level: (1) preventing disease from entering the farm, (2) preventing disease from spreading within the animal environment, and (3) ensuring the quality of the product going off the farm. Mark Carter from Kraft Foods expressed the need for continued effort to eliminate problems in the processing plant environment. This would include, but not be limited to, validation of processes in the plant, conducting environmental sampling, assuring the quality of raw ingredients, and using indicator organisms to determine quality/safety. In recent years, much research has focused on the safety of the currently available production technologies of food items. Dr. Michael Digeronimo, from Dover Brook Associates explained the safety concerns of aseptic processing and packaging, a usual choice used during production of low acid foods. He highlighted the importance of the criteria that aseptic packaging materials should meet in order to ensure safety of both the product and the consumer. It is also required that the material also offers stability through the absence of chemical interactions with the food and its source must be acceptable for the consumer. Determining factors on the efficiency of the system include consistency during commercial sterilization of the materials to be used as well as in keeping aseptic conditions in the packaging environment. In order to ensure microbiological safety of cheeses manufactured with raw milk, the USDA mandates that the products must age for 60 days at no less than 2°C before being consumed. The results of various studies cited by Dr. Catherine Donelly from the University of Vermont show that some pathogens including *E. coli* O157:H7 and *Listeria monocytogenes* can survive and grow under these conditions. Although post-process contamination is believed to be the greater threat to the safety of these products, screening of incoming raw milk and regular testing for *Listeria monocytogenes* are highly recommended. Dr. Martin Wiedmann from Cornell University discussed the need for a development of an understanding the farm to table transmission of pathogens in order to improve the system.

He also highlighted the importance of being able to predict the effects that changes in the pathogen, the host, the environment and the food will have on foodborne diseases and their transmission.

S08 – Hot Topics in Seafood Quality and Safety

John Allan, University of Georgia
and Hoan Jen Pang, Rutgers University

George Flick (Virginia Tech) discussed histamine production in fish. There are difficulties in tracing outbreaks due to scombrotoxin since record keeping is very poor with regard to where/how the fish were caught, how they were handled after catching, temperatures of the water in which they were caught and temperature they were held at before processing. There is a lack of research performed on scombrotoxins in fish. Some of the problems with the published studies include: (1) lack of fish history, (2) mis-identification of the microorganisms which produce histamines, (3) lack of a standard protocol for histamine testing, and (4) inconsistencies in published results. Dr. Flick pointed out that the dynamics of histamine production are unknown. Carbon monoxide-packaged fish keeps the color of the fish appealing but masks the quality degradation associated with scombroid decomposition. He recommends an expert panel be established to review research and develop protocols for processes from harvesting to consumption.

David Green (North Carolina State University) presented information on scombrotoxin production and prevention. Control is HACCP-based and limits time of exposure to temperatures associated with toxin production. The primary control is temperature which functions to limit production of histamine by bacteria. Scombrotoxin production is associated more with high temperature/short time spoilage than with low temperature /long time spoilage. Examples of control methods that can be used include: (1) evisceration of whole fish and gill removal, (2) freezing of fish, (3) high pressure treatment, (4) competitive enzymes, (5) coding of date and point of harvest, and (6) good hygiene.

Andy DePaola (FDA) discussed risk assessment of *Vibrio* spp. in oysters. *Vibrio* risk assessment performed by Codex Alimentarius should provide an excellent source for development of intervention strategies to reduce *V. vulnificus* illness based on several observations, including: consistent reporting of illness compared to other foodborne diseases, one predominant vehicle (oysters), raw consumption eliminates cook variability and corresponding uncertainty in thermal treatment, and Beta poison fit of model for dose response agrees with the seasonality of cases.

Rita Schoeny (EPA) discussed methyl mercury occurrence in seafood, which causes the most concern of all other heavy metals. The majority of the methyl mercury found in the environment comes from combustion point sources (87%). Methyl mercury accumulates up through the food chain with the muscle tissues of larger predatory fish having the highest levels.

Mike Russell (Gene Scan USA) made a presentation on the detection of genetically modified foods. PCR-based methods rely on genetically modified DNA (GM-DNA) being present in the food. ELISA methods, which are cheaper and easier to use, can be developed to detect protein products from GM-DNA, but require larger amounts of the protein to be present as compared to the amount of DNA need for PCR methods. Real time PCR methods give a relative amount (%) of GM-DNA in the total species DNA of the specimen being tested. The sampling size is very important for determining the presence of GM-DNA and labs should have good quality control programs established to minimize false negative results.

Douglas Marshall (Mississippi State University) spoke on the safety of ready-to-eat seafood. Controlling bacterial pathogens in seafood can be done through various means including, elimination of the microorganism from surfaces through rinses (i.e., lactic acid) and steam treatment, and through inhibition i.e., lowering temperature, adding competitor organisms, modified atmosphere packaging, and the addition of antimicrobials. To control viral levels in product, fecal contamination in the environment must be minimized. High pressure treatments have shown promising results in reducing viral loads, especially in raw oysters. Parasites can be destroyed by freezing and cooking parameters established by FDA.

S09 – New Horizons in Diagnostic Food Microbiology

Laura Bauermeister, Auburn University
and Ethan Solomon, Rutgers University

The goal of this symposium was to provide an update on a variety of new technologies that have been developed to speed the microbiological analysis of foods. These include real-time PCR, biosensors, microarray technologies, and the replacement of serotyping with molecular methods. In his overview, Dr. Peter Feng summarized the difficulties associated with performing rapid methods: interference by normal flora present in the sample, the complexity of the food matrix, and the low numbers of the target organism. Because of these hurdles, most rapid methods still require a culture-enrichment step prior to analysis. Next-generation methods are focused on the shortening or elimination of the enrichment step. A second limitation of the current methods is the variation in assay efficiency; an abundance of rapid methods, and no clear comparative or collaborative evaluation between methods. Lastly, Dr. Feng illustrated how the increased speed and sensitivity of rapid methods create a regulatory dilemma for government agencies and the food industry. The use of standard methodology passes many foods that may not pass under the conditions of rapid methods. In the next lecture, Dr. Pina Fratamico explained the differences of real-time over traditional PCR. Real-time PCR utilizes fluorescent reporter probes that increase in proportion to the amount of PCR product. Advantages

over traditional PCR are that real-time can be used to quantify the amount of initial template, real-time eliminates the need for time-consuming post-processing, and that it is extremely sensitive. She then demonstrated the rapid detection of *Escherichia coli* O157:H7 using a multiplex real-time PCR. The organism was detected in ground beef enrichments after 8 hours. Dr. Marianne Kramer presented the use of evanescent-wave fiber optic biosensors to detect pathogens directly from dirty sample homogenates. The complexities of the food matrix as well as the presence of particulate matter that may skew the results of conventional methods are not detrimental to the sensitivity and specificity of biosensors. She then demonstrated the use of a newly developed biosensor to detect *Salmonella* from spent sprout-irrigation water. Dr. Patricia Griffin lectured on the use of molecular techniques to type *Salmonella* isolates. Traditional *Salmonella* classification has been based on the characterization of the O and H antigens, known as serotyping. Serotyping is a tedious and time-consuming process. To take advantage of the simplicity of DNA technology, Dr. Griffin and her colleagues have developed specific probes based on the sequence of flagellar and O-antigen genes. Their goal is to develop probes for all of the common *Salmonella* serotypes in the United States. The applications of microarrays in the food industry was presented by Dr. Claude Mabilat. Microarrays (biochips) are extremely powerful tools to differentiate target organisms from backround flora. Advantages of biochips include great accuracy and robustness (redundancy). In the last lecture, Dr. Michael Brodsky presented the need for the accreditation and validation of analytical methods. Methods of analysis are extremely varied between laboratories and even within laboratories. Dr. Brodsky encourages the use of "fit for purpose" methods. The creation of eCAM (electronic compilation of analytical methods) will enable laboratories to select from a web-based list of proper methods.

S10 – Food Allergens: Past, Present and Future

Adriana Velasquez, University of Nebraska-Lincoln and Montserrat Hernandez, Universidad Autonoma de Queretaro

This session focused on the importance of food allergens and their impact on human health and the food industry. Susan L. Hefle from the University of Nebraska-Lincoln, mentioned that for sensitive individuals, the presence of allergens in food is potentially life threatening. Currently, there is no known cure for this sensitivity and the only successful method to manage allergic reactions is through avoidance of foods containing the allergen. Formulated foods, however, present a different challenge. In such cases, the individual relies on accurate ingredient labeling. Dr. Kenneth Falci from FDA-CFSAN, emphasized the need to increase awareness of food allergens. He also mentioned that the major goal of the FDA-CFSAN is to provide guidance to industry and regulators on how to manage allergens through appropriate manufacturing and labeling practices. As part of these efforts, the FDA is conducting food allergen education programs for both consumers and industry employees. The agency also is developing a strategy for clear, easy-to-understand labeling of food allergens.

FDA-CFSAN awareness efforts currently focus on the eight foods that are most frequently implicated in serious allergic responses: milk, eggs, fish, wheat, tree nuts, legumes (particularly, peanuts and soybeans), crustaceans and mollusks. Allergenic proteins in these eight foods are estimated to cause 90% of the allergic reactions in the US Some of these foods, such as milk and eggs, are often used as ingredients in formulated products. Dr. Jupiter Yeung from NFPA mentioned that a number of test kits are manufactured in the US for commercial use and there are some other kits under development. Although there is not a test kit for each allergen in the food supply, kits are available for peanut, milk and egg protein. Although plans include standard development for other allergenic proteins, much work is needed to achieve this goal.

Bob Richardson, from General Mills, discussed the importance of sanitary design related to food allergens. He suggested the use of parallel modules to ensure the isolation and careful control of the path of allergenic ingredients when present in the plant. Also, as in all other food safety scenarios, training of engineers and employees is highly recommended.

Mark Moorman from W.K. Kellogg mentioned that the highest incidence of food allergenic reactions occur in children. He mentioned that the most common reasons for product recalls are incorrect ingredient statements, mixed foods, and/or inadequate allergen sanitation in the plant. The type, concentration, and form of the allergen are some of the determining factors in the sanitation of food plants to ensure the prevention of contamination.

Sheila Cohn from the National Restaurant Association reviewed the facts related to food allergens and the food service industry. She mentioned and suggested the use of the existing Food Allergy Training Guide, an already available resource for food establishments. The Food Allergy Initiative and Anaphylaxis Network created this set of guidelines in 2001. She also explained that the possibility of cross contamination is very unlikely to be completely eliminated in some restaurants due to multiple uses of utensils. As a consequence, special menu labeling could actually lead to a false sense of security by consumers since the lack of allergenic agents can not be completely guaranteed.

S11 – Costs of Industry and Government Food Safety Actions: What is at Stake?

John Allen, University of Georgia and Justin R. Ransom, Colorado State University

Amber Jessup (FDA-CFSAN) discussed how human costs from foodborne illness are derived. These costs include loss of productivity, medical costs, etc. To

determine the value of a life there are several approaches that can be used. A Hedonic approach can be used to determine how much people are willing to pay for a safety measure (e.g. irradiation of ground beef) to be put in place knowing that it could prevent illness or even death. The "Quality Adjusted Life Years" method places increased value on younger individuals due to the future years of productivity remaining for them.

Speaker Stan Bailey (USDA-ARS) presented costs associated with on-farm intervention strategies to reduce pathogen contamination. Some of these costs include: vaccines, facility improvements, monitoring programs, increased personnel, and sanitation and cleaning procedures. Producers also must factor in the costs of not performing certain interventions as well, which requires risk analysis and management strategies. Interventions can also provide certain cost savings related to prevented recalls, litigation, and bad publicity. Initiating interventions must require complete management commitment.

Larry Cohen (Kraft Foods) discussed the costs of in-plant interventions. These costs include sanitation, equipment/facility design, and personnel training. Deciding when and how thoroughly to perform plant sanitation protocols can control some of these costs. For instance, intensified deep cleaning of the environment and equipment with complete shutdown of production might only be performed every few weeks with a less intense cleaning daily or weekly—of course this would vary from plant to plant. Regulatory enforcement can lead to increased costs as well (i.e., a positive *Listeria monocytogenes* result requiring intervention).

Lori Ledenback (Kraft Foods) compared costs associated with in-house versus contract laboratory testing. Factors to consider include: overhead, labor, shipping of specimens, and the cost of obtaining results. To maintain the quality of results, proficiency samples are needed which require oversight and review. Audits can be done internally or through contracting with an outside reviewer. But, impartiality in conducting audits must be strictly adhered to. Flexibility in testing should be considered as well as certain times of the year may be busier than others and require higher turnaround time of lab results.

Phil Spinelli (USDA-FSIS) presented on the federal mandate requiring that government agencies must show the costs associated with new food regulations before being able to implement them. An economic assessment is required in order to identify where the market is failing to control a certain risk and then to aid in developing regulation to correct the failure. Also, an assessment is used to gather information about the economic impact of a regulation on industry, society, and government. The economic assessment consists of identifying the baseline level of a certain risk and then determining how it will change with new regulation.

Jenny Scott (NFPA) spoke about the costs of intervention versus recalls from the industry perspective. Market forces, food regulations, and liability laws drive the industry to pay the costs associated with intervention strategies (e.g. packaging, testing, environmental control, holding product during testing, etc.). The costs recalls are both direct and indirect. Direct costs include loss of product, cost of handling recalled product, wasted labor time, and other operational costs. Indirect costs include damage to brand reputation, decrease in stock value, and litigation expenses. A company must therefore weigh the financial costs/benefits associated with deciding to implement an intervention to determine what approach best suits the future needs of the company.

S12 – Spoilage and Pathogenic Fungi and Yeasts

Megan Hereford, Virginia Tech
and Angela Hartman, Virginia Tech

Ailsa Hocking spoke about ochratoxin, a kidney toxin that is formed by unrelated species of *Aspergillus ochreus*, *Penicillium verrucosum*, *Aspergillus carbonarius* and *Aspergillus niger*. While most isolates from *A. ochreus* do not produce toxin, the majority of isolates of *A. carbonarius* and *A. niger* form varied levels of ochratoxin, and isolates of *P. verrucosum* may produce the major source of Ochratoxin A. While fungicides are ineffective, rapid drying is probably the most effective control and milling reduces ochratoxin by 30–60%. Due to ochratoxin production and spoilage by fungi, Maribeth Cousin stated that there is a need to identify fungi, detect mycotoxin producers, use online monitoring, and use detection for biosecurity concerns. Rapid methods such as flow cytometry, detection of acids, enzymes, or volatiles produced by the fungi, or immunological methods such as fluorescent microscopy, ELISA, and latex agglutination are commonly used for general fungal detection, detection of specific genus/species, or for mycotoxin producers.

Larry Beuchat spoke about metabiotic associations of fungi and foodborne pathogens. A metabiotic association occurs when the growth of one or more microbes causes an environmental change that favors the growth of the other microbe. It has been shown that spoilage molds in tomatoes are capable of raising the pH so that *Clostridium botulinum* can grow and produce toxin. It was also shown that 20.2% of healthy portions, 26.4 % of decayed portions, and 67% of *Alternaria* spoiled portions of fruit and vegetables were found to contain *Salmonella*.

Lloyd Bullerman spoke of the economic impact and control of Fungi and mycotoxins in food. The presence of fungi in food can lead to significant costs for food producers. Approximately 5 to 10% of the world food supply is lost annually due to the presence of fungi and mycotoxins, and FAO estimates that about 25% of the world's food crops are affected by fungi. The total yearly cost in the US is estimated in the hundreds of millions to billions. The most common fungi found in foods are *Aspergillus* spp. that cause losses in corn, peanuts, and cottonseeds, among others. This organism has a worldwide occurrence. *Fusarium*, which produces fumonisins, causes

losses in corn and corn products and is found in all corn growing regions. Ochratoxin produced by *Aspergillus* and *Penicillum* spp. effects wheat, barley, green coffee, raisins, wine and beer.

Deepak Bhatnagar spoke of another problem caused by fungi, the production of aflatoxin in foods, which can occur pre or post harvest. This toxin has been shown to cause cancer in humans and animals, and aflatoxin B1 shows acute toxicity. The three lines of defense against aflatoxin are: preventing toxigenic fungus from getting to the crop; preventing the toxigenic fungus from invading the crop; and controlling toxin formation if it enters the plant. The proposed solution for achieving these three goals is genomics.

Dr. Stanley Brul spoke of use of genomics to develop novel antifungals for food use. He noted that fungi might be utilized for production of value added components in food, as well as it can spoil food or produce toxic compounds. Through use of genomics, spoilage in products may be prevented, making fungus more sensitive to preservatives, both natural and added.

S13 – Assuring Food Safety and Security

Sally Foong, Iowa State University
and Angela Hartman, Virginia Tech

Overall strategy for FDA is awareness, prevention, protection, response, and recovery. Threat assessment models are based upon the Battelle Study, FDA-CFSAN Assessment Tools, IFT Task Order, and intelligence gathering. Critical needs for analytical methods (screening the fields and laboratories) are from sampling, behavior in foods, and validation of methods. Rapid detection can be carried out using lateral flow devices, biosensors, molecular methods, ELISA, LC-MS, GC-MS, g-ray detectors, and a or b detectors. Product security systems include product authentication (overt, covert, or forensic); tamper evidence (labels, tapes, seals); and trace and tracking systems (digital, barcodes, and electronic codes). Recovery systems validate disinfectant, decontaminate production areas, involve factors influencing disinfectant, and validation. Laboratory networks include FERN (Food Emergency Response Network).

Food safety is an issue of accidental or natural occurrence. Food security is an intentional threat which involves personnel, product, and property. An increase in screening and supervision of the human element is needed. Risk assessment matrix is used to deal with food security risks. Currently, there is a need to assess or evaluate current practices, to identify weaknesses, and to implement controls. The NFPA assists the industry by implementing the 3 "Ls" which are "Light it, lock it, and limit access". Better communication network; better secure information sharing, collaboration, cooperation, and coordination through intelligence, threat assessments, vulnerability assessments, and rankings; laboratory capacity and competency; and tools (both scientific and behavioral) are important in assuring food safety/security.

Livestock operations are possible weapons of mass destruction. "B-NICE" is the acronym for biological (zoonotics), nuclear, incendiary, chemical, and explosives as other methods of destruction. Transportation and distribution of livestock is the key. Assessment of terrorism threats is based on intent, capability, and vulnerability in determining when the threats are credible. North Carolina Homeland Security Initiatives include task forces, teams, and training programs or exercises. Food security issues involve public-private partnerships, role of physicians and medical examiners, rapid detection and accurate patient history, state and federal laboratories, surveillance in-plant and on farm, access to retail or food business or customer database, and industry staff food security training. Transportation security issues include trucks, loads, bulks; distribution; and drivers' background checks.

Homeland Security is to protect the food supply in the United States. Terrorists can exploit multiple pathways in terms of weapons of mass destruction. Attacks on food supply other than being an easy target, cause sickness and death, disruption without deaths, and destroy brand names. Distinguishing between natural occurrence and intentional threat is difficult. The FSIS Directive Food Security Monitoring Procedure (Liberty Shield) enhances inspection activity, surveillance of in-distribution and import facilities, laboratory sampling for threat agents, and surveillance of human illnesses. Public Health Security and Bioterrorism protects the food supply by improving international meat inspection, recruitment from overseas in food production, and otherwise expand capacity to protect against the threat of bioterrorism. The FSIS Surveillance activities include consumer complaint monitoring systems, FoodNet, district veterinary medical specialists, epidemiology officers, regulating sampling data, and CDC.

S14 – Applied Microbiological Genomics for Food Safety and Quality

Laura Baurmiester, Auburn University
and David Rasmussen, University of Tennessee

Dr. Stanley Brul of the University of Amsterdam and the Unilever Research group opened the session with the topic, "The Challenge of Genomics in Food Microbiology". Also presented was a history of genetic advancements, milestones, ranging from 1859 to the present, noting the rapid change in our understanding of molecular structures and how 200–300 microbial genomes are know currently.

Dr. Brul next addressed the issue of biomarkers and their significance in the medical field, as well as potential use in the food industry. Biomarkers were noted for being useful for elucidating the effects of processing, identifying desirable fermentation traits, as well as discovering gene functions and cellular mechanisms.

Micro-arrays are an alternative to PCR, which can only look at one biomarker at a time, for the simultaneous

examination of the expression of an organism's entire genome under specified conditions. Different production methodologies for probe manufacturing were explained, comparing oligonucleotide synthesis verses pre-fabricated spotted arrays, with the pre-fabricated arrays being cheaper, yet having lower specificity than the synthesized probes.

Finally, an example of the application of micro-array technology was provided by a discussion of predictive behavior of *Bacillus subtilis* based upon gene expression during sporulation. Differences between a wild type strain and a heat resistant endospore in the presence of metals or minerals were detected by micro-array technology, otherwise known as "transcriptomics".

The second speaker, Dr. Servé Notermans of the TNO Nutrition and Food Research Institute (in The Netherlands), provided the next seminar, "Predictive Microbiology based on Genomics: exploring a new technology." After a brief history of microbiology was given, genomics was defined as the analysis of (genetic) patterns by pattern recognition via multivariate analysis. Micro-array technology was again for the focus of the discussion. Micro-arrays were derived from dot-blot hybridization, being spotted arrays of an organisms genome made available through high-throughput PCR amplification, yet now having 40,000 gene probes able to be spotted on each slide.

Dr. Notermans discussed how the bacterium can act as a sensor, exhibiting variable gene expression depending upon the conditions the bacterium is exposed to. RNA expression is tested for after a bacterium is grown in different growth parameters, including temperature, pH, time, and water activity. Repeated measurements of gene expression of a bacterium under various conditions then can provide a database of gene expression patterns at those different conditions. Micro-array technology may then be predictive for gene expression at a given set of conditions for a specific bacterium upon comparison of the databank for the specific microbe. Genomics (transcriptomics) therefore is an excellent tool for the access of emerging capacity of a microbe.

Dr. Paul Takhistov of Rutgers University provided the final discussion of the afternoon, "Cell-based Assay and Biosensors as the New Tools for the Detection and Qualification in Food Microbiology." Biosensors are devices that incorporate a biological sensing element connected to a transducer. BioMEMS detectors were discussed followed by a three types of tranducers: optical, electrical/electrochemical, mechanical. Dr. Takhistov discussed the advantage of BioMEMS over micro-arrays, as it provides continual monitoring capabilities. Flow cytometry and Nano-patterned Gold Surface were also discussed. Dr. Takhistov noted the advantages of having real-time sensors and the robustness of cell based assay sensors. Also discussed were numerous technologies relating to cell-based assays and biosensors.

S15 – *Campylobacter*: A Pathogen in Need of Resolution

Ethan Solomon, Rutgers University
and Yohan Yoon, Colorado State University

This session focused on the pathogen *Campylobacter*. The speakers were ordered so that the audience was first given a background on the sources and ecology of the organism, then in-depth coverage of the difficulties associated with microbiological analysis and detection of *Campylobacter*. This was followed by a fascinating talk on the goals of the poultry industry regarding *Campylobacter*. Finally, the application of quantitative risk assessment to understanding the ecology of the organism and risk factors for human illness was presented. The order of the speakers did an excellent job of bringing out the true "farm to table" difficulties associated with this pathogen, and why any resolution is still seemingly out of reach.

Although *Campylobacter* is the most frequently reported agent of foodborne gastroenteritis, its importance has been understated compared to other organisms. The level of infection of *Campylobacter* has decreased 24% since 1996; however, the consumption of poultry products and raw milk as well as international travel continue to be associated with *Campylobacter* infection. The degree to which cross-contamination plays a role in infection is still unknown and is difficult to study using case-control. Also the level of person to person spread is unknown. These are areas requiring study in order to further reduce the level of *Campylobacter*. Dr. Eric Line discussed the difficulties associated with cultural methods for the detection of *Campylobacter*. Although more than 40 formulations for selective media for *Campylobacter* have been published, there is no standard methodology for the organism, further complicating intervention strategies. Contamination and low levels of target organisms hamper cultural methods for the detection of *Campylobacter*. Therefore, recently, new non-cultural methods have been put forth for the detection of *Campylobacter*. These methods may be extremely useful in understanding the ecology of the organism. The use of RT-PCR and its advantages over traditional PCR was also presented, detecting mRNA as an indicator of viable cells.

In industry, risk assessment is necessary to characterize the ecology of the organism in order to devise better intervention strategies and reduce the incidence of human illness. A further need in the poultry industry is better carcass enumeration methods as well as the structuring of performance criteria based on public health impact, not on process capabilities. Lastly, a large ongoing risk assessment in Iceland was discussed. The goal of the work was to understand the farm to table risk factors for the organism.

S16 – Microbial Stress Response to Intervention Technologies

Jarrett Stopforth, Colorado State University
and Marcos Sanchez, University of Nebraska-Lincoln

The session provided a review on the response of bacteria and viruses to the stress caused by several

intervention technologies such as irradiation, modified atmosphere packaging (MAP), ozone and heat, pulsed electric fields and high pressure processing. Aubrey Mendonca from Iowa State University indicated that the effectiveness of irradiation to control bacteria depends on the physiological state of the bacterial cell and the atmospheric gas composition used for packaging. Bacteria growing during the exponential phase were found to be more susceptible to irradiation when compared with organisms in the stationary phase that are able to repair DNA damage. Additionally, it was demonstrated that bacteria exposed to other environmental stresses such as starvation, heat shock, acid shock and osmotic pressure tend to be more resistant to this treatment than controls.

John Novak from the USDA-ARS-ERRC provided a summary of findings on the potential use of the combination of ozone and heat to eliminate spores of *Clostridium perfringens*. This organism responds to stress by developing spores that can resist up to 1 hour of heat at 100°C. Ozone was shown to be effective by attacking the cell membrane, thus allowing heat treatments to be more effective for the control of this pathogen.

Howard Zhang from Ohio State University summarized the work of several researchers in the area of pulsed electric fields. The benefits of this treatment included the rupture of cell membranes, the reduction in the number of bacteria (up to 5 logs) in acid liquid foods, the non-thermal nature of the treatment that minimizes organoleptic alterations of food products, and the minimal effect on the natural flavor and freshness of products treated. Some studies in juices to control *L. monocytogenes*, *Salmonella* Hartford, *E. coli* and *Staphylococcus aureus* were presented, indicating the effectiveness of this treatment.

Gary Richards from Delaware State University focused on antiviral intervention technologies. Such interventions should focus on damaging nucleic acids and the capside of viruses. Some include heating and cooling, freezing and thawing, chemical disinfectants, restriction enzymes and irradiation. The capside was also shown to be affected by high hydrostatic pressure treatments, such as Hepatitis A virus which can be eliminated by 450 MPa of pressure for 5 minutes. Finally, several pre- and post-harvest interventions to control viruses were detailed.

The last presentation was given by Dallas Hoover from the University of Delaware summarizing the resistance of sporeforming organisms to high pressure treatments. The technology used in meat, fruits, salsa and seafood products in levels from 100 to 800 MPa produces the leakage of intracellular components of the cell by damaging the membrane. However, a 15% reduction in the size of the product, damages to fragile foods and destruction of hydrophobic bonds may limit its applicability. In addition, the process may not be effective to eliminate spores. Endospores from bacteria were shown to resist up to 1724 MPa (250,000 psi) for 45 minutes. In fact, high pressure was found to induce germination of spores at levels of 100MPa by releasing dipicolinic acid, thus increasing hydration of the cells followed by germination.

S17 – Current Issues in Food Toxicology

Kelly Stevens, Universidad Autonoma de Queretaro
and Lynette Kleman, North Carolina State University

Speakers in this session provided an overview of topics that are of current interest in food toxicology as it relates to food safety. Robert Hollingworth from Michigan State University kicked the symposium of current issues in food toxicology off with a very thorough review of the safety determinations and challenges of foods derived through biotechnology. His presentation included a review of methods producing genetically modified food, as well as several examples of the use of biotechnology used in plant foods. He continued with an overview of the four major concerns of biotechnology derived foods including antibiotic resistance, toxicity of the transgene itself, toxicity of the transgene product, as well as secondary effects from transformation. Standard methods to assess safety were also discussed including animal tests and epidemiological methods.

Dr. Hollingworth concluded that genetically modified foods present a low health risk, stating that the safety of foods is not determined by the method which they are produced, but by the composition of the food itself.

James Griffiths explored the definition(s), regulatory framework and safety of functional food ingredients. He separated functional food ingredients into dietary supplements and food additives and reviewed the major similarities and differences of these classifications as well as how they pertain to food processors. He proposed a scheme for public acknowledgment for ingredient manufacturers that undergo a higher standard of review.

The session ended with a lively discussion presented by Penelope A. Fenner-Crisp regarding the justified and unjustified use of human subjects and data in regulatory policy. The key premise of her presentation dealt with the issue of the key scientific and ethical issues that need resolution concerning the use of human data in safety assessments of chemicals, additives, nutraceuticals, and foodborne pathogens and whether different scientific and ethical standards should be applied based on the test substance i.e., pesticides, direct food additives, nutraceuticals, and pathogens. Her presentation ended with a discussion of the current administration policies and pending legislation in this topic area.

S18 – Science-based Shelf-life Dating of Ready-to-Eat Refrigerated Foods

Sally Foong, Iowa State University
and Elizabeth Duffy, Texas A & M University

Products are dated for food safety, stock rotation, assurance of nutritional value, and consumer selection. Product dating is open-dated for most perishable foods, "sell by" dates for perishables, "best if used by" dates for shelf-stables, and "consume within x days after opening"

for products in new packaging technology. Dating is not uniform and not clearly understood. Rules and regulations vary. The purpose of dating is quality assurance. Product variability in terms of packaging styles influence dating. Consumer education is important.

MAP and vacuum packaging increase public health hazard. Although they increase shelf-life and retain sensory characteristics of foods, they also suppress pathogens, especially psychrotrophs. RTE foods stored in refrigerators for extended time, enables growth. Retails and consumers may not store refrigerated foods properly. Innovative strategies are needed to kill or suppress growth of pathogens. Possible alternatives may be to decrease shelf-life, single serving packaging, or smaller portions.

Factors in RTE foods that may lead to illness are host-pathogen interaction, frequency and amount of food consumed, frequency and level of contaminant, potential for pathogenic growth, and storage time and temperature. Microbiological factors to setting dates include microbial strain, physiological state, inoculation method, recovery and enumeration methods, statistical certainty, and reliance on literature, models, or inoculated pack studies. If foods support growth, reformulate to inhibit, inhibit during distribution (freezing), inhibit with packaging, or aseptic or pasteurize in package to reduce recontamination after opening.

Estimation and validation of safety-based shelf-life dating is obtained from challenge studies. Products that have been tested include cheese, dressing and condiment, and RTE meats where formulations were challenged with specific pathogens in a shelf-life study. Safety-based code dating can be used for a variety of products and the process is matrix dependent and time consuming but can add significant value to the products. Coding provides a significant opportunity to learn more about the products.

A problem with open dating is not just time kinetics but time-temperature. Parameters in designing experiments include time to detect (TTD) period, lag period, and growth period. Lack of data is from growth and contaminant levels that are lower than detection. Microbial sensor tags are available but with limited use. A possibility is to combine time-temperature integrators (TTI) with open dates. The goal of TTI is to alert consumer if conditions existed in distribution where pathogens could grow (temperature abuse). Radio frequency identification (RFID) is the best active TTI.

From the European perspective, shelf-life studies look at qualitative issues such as microbiological and organoleptic qualities. Product safety with respect to pathogens is not assured. Safety is assumed dealt with through management tools like HACCP. Experimental designs for testing must mimic real practices which are often difficult to develop. More work is required in determining shelf-life of chilled products from practical testing (shelf-life and challenge), having greater variation in key parameters, working towards standard protocols (agreements to all parties so that comparisons can be made), and understanding how shelf-life determination ensure degree of standard.

S19 – All the Latest Jazz – Recent Foodborne Disease Outbreaks

Megan L. Hereford, Virginia Tech
and Renee M. Raiden, Virginia Tech

This symposium provided an overview of some of the key foodborne disease outbreaks that have occurred in recent history, as well as some of the current food safety issues. The discussion began with Dr. Sami Gottlieb from the CDC speaking about a multistate Listeriosis outbreak associated with Turkey Deli Meat. She detailed the steps and actions taken by the CDC that covered this outbreak that lasted from July to November of 2002. There were a total of 54 cases, and the CDC conducted a case control study. They used environmental and food isolate patterns from implicated deli meat producers and compared them to human isolates using pulsed field gel electrophoresis (PFGE). Environmental testing was important in guiding regulations regarding foodborne outbreaks in ready to eat meats. Dr. Kristin Holt from the USDA, FSIS discussed the seven procedural steps during an FSIS product regulated outbreak. They include: Surveillance; Outbreak Identification (FSIS product suspected); FSIS begins an investigation; FSIS analysis of existing data; FSIS regulated product implicated; Agency action; and, FSIS assessment and lessons learned.

Dr. Katrina Kretsinger, from the CDC, spoke about a foodborne outbreak of *Salmonella* Newport in tomatoes that occurred from August to September of 2002 in restaurants in Maryland and New York, and a hospital in New Hampshire. PFGE patterns were used to identify case cluster. This particular pattern was an unusual one, and from July to November of 2002 of 512 cases of *Salmonella* infection this PFGE pattern matched 288 of the isolates. This outbreak was traced back to a single broker and packer in Virginia, which included 1 packing shed and 25 farms. It was thought that the possible source of contamination in this case was mammals and birds that were present in the shed and packing line. In a related talk, Larry Beuchat, from the University of Georgia, spoke about the behavior of *Salmonella* on and in tomatoes. He said that the organism is present on the skin as well as the stem scar, and active chlorine is not efficient in reaching it when tomatoes are washed. At a level of 11-320 ppm there is no significant reduction in bacterial cell populations on the surface of tomatoes, and this is same in the core of the tomato.

Hyperendemic botulism was an interesting addition to this symposium. While this is not an issue affecting the US it is a problem in the Republic of Georgia, formerly the Soviet Republic of Georgia. Katrina Kretsinger from the CDC discussed that the Republic of Georgia has the highest rates of botulism in the world. The methods of canning that are used are sited as the cause for these outbreaks. Currently the CDC is working to infiltrate the country and determine how to intervene so they can reduce the outbreaks.

Mary Palumbo from the California Department of Health discussed an outbreak of 58 cases of *Salmonella* Thompson in Southern California that was quite unusual. Through investigative techniques they were able to trace three different outbreaks of S. Thompson that occurred in beef, turkey burgers and bread; back to a bakery that shipped bread to restaurants. Using PFGE they were able to determine that these outbreaks were all related, and they traced it back to an ill employee that was not wearing gloves. The speaker stressed the importance of molecular investigative techniques in aiding with this outbreak.

The final speaker was Sherri McGarry from the FDA discussed the outbreaks of *Salmonella* Poona from imported cantaloupes from Mexico. Between 2000 and 2002 there were 4 multistate outbreaks with 35–50 reported cases per outbreak. A CDC research team found that there was no wastewater treatment set up and there was raw sewage in the fields, the pesticides were mixed with untreated water and there was poor training of the workers. In addition the packing shed was open and wild animals and birds were present. The CDC intervened halting all imported cantaloupe from Mexico, and implementing training programs, a cantaloupe certification program and criminal action against firms. With these programs, the growers can work towards cleaning up their environment and once they complete this, they can be certified to export cantaloupes to the US again.

S20 – Food on the Move

Kristen Matak, Virginia Tech
and James Folsom, University of Georgia

The threat of bioterrorism is a major concern for the federal government. Programs are being designed to increase the security of the food supply and the safety of travelers within the US and abroad. Foodborne illnesses and outbreaks have been reported among travelers on airlines and trains, but the surge of recent outbreaks on cruise ships has caused many to wonder who is responsible for the safety of the food in these venues. The FDA's CFSAN has developed a voluntary "Interstate Travel Program" under the Public Health Service Act where the major objective is "to prevent the introduction, transmission, or spread of communicable diseases from one state to another." This program is made up of a series of food security educational materials and training based on the Food Code and the principals of HACCP and is aimed at airlines, trains, buses and other vessels where food is served. Regular inspections and certification are part of this program. In response to several major disease outbreaks on cruise ships, in 1975 the CDC developed a voluntary "fee-for-service" Vessel Sanitation Program (VSP) based on a modified Food Code. Any vessel that carries more then 13 passengers, has an international itinerary, or that calls on US ports must meet the criteria established by VSP in the "Vessel Sanitation Program Operations Manual" and may be subject to unannounced inspections. The International Flight Catering Association (IFCA) and the International Inflight Food Service Association (IFSA) have developed new food safety standards for the airline industry. These standards have included implementation of a "process specific" HACCP program and industry guidelines for all facets of the industry that deal with food and food service. NASA Food Technology is looking at ways of developing food processing technologies that may be used for travelers in space. The next generation of food is to extend shelf-life from 9 months to over 5 years. Safety, nutritional composition, and palatability will all play major roles in the success of this program. The highly publicized outbreaks on cruise ships have increased public awareness of food safety problems and safety programs are revamping to address these issues. While state and federal programs are designed to educate, regulate, assist and provide oversight to food handlers, food safety is the responsibility of everyone in the food industry.

S21 – Aquaculture: Safety and Quality Issues

Krishaun Caldwell, University of Georgia

Good Aquaculture Practices and the Role of HACCP- Juan Silva, Mississippi State University, Mississippi State, MS, USA. Dr. Silva outlined in this presentation Good Aquaculture Practices (GAPs). The role that the Food and Drug Administration, Environmental Protection Agency, United States Dept. of Agriculture and other government agencies play in ensuring high quality and safety of aquaculture products to consumers. These government agencies monitor the following areas: selection of site, soil quality, water source, water quality management, feed quality, animal control, human hygiene, ensuring proper worker sanitation, and the proper use of chemicals. Some of the Critical Control Points (CCPs) include: The production site, water quality, feed quality, chemicals used as well as drugs that may used.

Advances in Reducing the Off-flavors in Farm-raised Catfish, Casey Grimm, USDA-ARS-SSRC, New Orleans, LA, USA. This presentation began with an overview of off flavors, such as the causes, detection, prevention, and mitigation of off flavors in catfish products. Such things as algae, and algal metabolites that catfish may take up in the water cause the off flavors in catfish. Some of the odors in catfish can be described as blue green-earthly musty aroma, grassy-resembles fresh cut grass, diesel-hydrocarbons, and rotten-resembling that of decaying fish. Some others include: mothballs, corn, and piney. Dr. Grimm also stated how these undesirable flavors could be controlled. The manipulation of nutrition such as decreasing nutrients, reducing the amount of PO_4 and shifting the Nitrogen to Phosphorous ratio. This low ratio is good for cynaobacteria and may also increase inorganic nitrogen.

Modified Atmosphere Packaging of Aquacultured Seafood Products- Juan Silva, Mississippi State University, Mississippi State, MS, USA. Dr. Silva presented recommendations for the packaging of various types of fish as well as the shelf life of fish products. He made

recommendations for the packaging of fatty fish, lean fish, and cooked fish. The shelf life of catfish is as follows: iced packed — 4–10 days; retail — 2 days; with antimicrobials- 2–6 additional days; chill pack — 19 days, modified atmosphere packaged — 12–75 days. Also presented were some factors that have a direct influence on shelf life. These include: initial load, chilling and temp. of product, handing/ sanitation, packaging, and storage of the product. In addition, Dr. Silva made some recommendations for the improvement of shelf life. He recommended that the Aerobic Plate Count for raw fish should be <10,000 CFU/g, there be a HACCP plan in place, a hazard/risk assessment should be conducted, there should be a system validation, proper labeling, time/temperature integration, and noted that sensory spoilage precedes toxin, and the maximum shelf life should be <30 days.

Chemical and Drug Use in Aquaculture — Rosalie Schnick, Michigan State University, North Central Regional Aquaculture Center, LaCrossse, WI, USA. The top 5 aquaculture-producing nations are: (1) China, (2) India, (3) Japan, (4) Philippines, and (5) Indonesia. Some recent issues related to the use of drugs are banned antibacterials, and banned malachite green residues in salmon. The worldwide issues related to drug use are that there are few approved drugs, and that there is a lack of regulations, validated analytical methods, risk assessment and management, and finally international harmonization. The solutions to these problems would be to educate farmers, produce a quality program, HACCP program, the development of analytical methods, create a national surveillance program, and to compile human health risk data.

Pesticides and Environmental Organic Pollutants in Farmed Fish- Charles Santerre, Purdue University, West Lafayette, IN, USA. The concerns with pesticides and environmental pollutants are that they can enter through the feed and some of the pesticide residues include DDT, which is the number 1 pesticide found in farmed fish. Also listed were chloroclanes, Hexachlorobenzene (HCB), and heptachlor epoxide. Residues of PCB (polychlorinated biphenyls), which was banned in 1979, is a B-2 carcingogen, and has a FDA action limit of 2 ppm. The at-risk population includes women who are pregnant or breast-feeding, women who will become pregnant, and children under the age of 15. Some of the sources of PCB in the diet include 13.6% from farmed salmon, 8.4% from other types of fish, 6.3% from beef, 5% from pork, 8% from poultry, and 2% from milk/milk products.

International Perspective on Aquaculture – Peter K. Ben Embarek, WHO, Geneva, Switzerzerland. The recent changes in the supply of fishery products in a result of the sources of fishery products and the expansion of aquaculture. Developing countries are a major supplier of fishery products (87%) and most are found in the tropical/ subtropical belt. Also, it is the fastest growing food production system. Some of the food safety issues related to aquaculture are that diarrhea (foodborne or water borne) causes 2 million deaths/year in developing countries, in industrial countries up to 30% of the population contracts the disease and up to 20 million die as a result. Dr. Embarek also listed the outbreaks from 1990–1998 related to seafood. Fish was responsible for 263 outbreaks and 1,661 cases, Moluscan shellfish 66 outbreaks, and 3,281 cases, other shellfish 8 outbreaks and 148 cases for a total of 237 outbreaks, and over 5,000 cases. In the United States the main agents are: histamine, ciguatera toxin, viruses, *Salmonella*, and *V. parahaemolyticus*. In Russia: *C. botulinum*. Japan: *V. parahaemolyticus*, and in China: *Trematode parasites*. The research needs in this area are to determine and monitor national prevalence and disease in humans and in farmed fish, develop surveillance, and study transmission.

S22 – The Evolution of Foodborne Pathogens

Kristen Matak, Virginia Tech
and James Folsom, University of Georgia

Marguerite A. Neill and Martin Wiedman convened this session. The evolution of several notable pathogens and a method of analyzing the evolution of bacteria were presented.

Thomas Cebula from FDA, CFSAN, began by discussing the role of methyl-directed mismatch repair (MMR) in the evolution of bacteria. MMR mutants exhibit rates of mutation that are higher than their wild type compatriots. In addition these mutants share DNA more successfully with other bacteria. The implications are that small numbers of the mutants could be present in the wild type populations, and that could speed the adaptation to the ever-changing bacterial microenvironment, as well as drive the further evolution of pathogenic bacteria.

The next speaker, Thomas S. Whittam from Michigan State University, presented information on the evolution of *Escherichia coli* O157:H7. Extensive information on the evolution of *E. coli* O157, was given, including its diversification from a common ancestor shared with *E. coli* O55:H7. *Escherichia coli* O157 evolved as the result of the accumulation of many mobile genetic elements. Many more pathogens may arise through this kind of sharing of DNA.

Andreas J. Bäumler, from Texas A&M, presented information on the evolution of a novel membrane protein in *Salmonella enterica* subspecies I, which allowed it to make the jump from reptiles to warm blooded animals. This subspecies of *Salmonella enterica* causes 99% of human illness compared to the other enterica subspecies, which are isolated mostly from reptiles. This is the result of a protein (ShdA) that mediates prolonged intestinal carriage, ultimately allowing the jump to warm blooded animals. This protein isn't found in the reptilian *Salmonella enterica* subspecies.

Examples of how MultiLocus Sequence Typing (MLST) can be utilized to explore the evolution of Foodborne Pathogens were presented by Martin C. J. Maiden, from University of Oxford. This method is the result of the advent of high throughput procedures for the genetic characterization of bacterial isolates. The improvement in

cost effectiveness of these procedures will help to make them mainstream

The final speaker Martin Wiedmann, greatly expanded on his theory of three *Listeria monocytogenes* lineages. Using a wide variety of techniques he found that Lineage I and II seem to be predominantly clonal in nature, whereas those of Lineage III are more diverse. Lineage III isolates seem to exhibit much more evidence of recombination, and are more diverse.

S23 — Natural Antimicrobials — Current Trends and Future Perspectives

Leslie K. Thompson, University of Georgia,
and Joshua Gurtler, University of Georgia

The use of natural antimicrobials in the food industry was discussed in this symposium. Some of the main goals include: prolonging shelf life, preserving quality, and/or inhibiting (inactivating) pathogens within a food product. Factors such as the microbial flora, intrinsic properties, extrinsic properties, and processing of the food product all affect the success of natural antimicrobials. There is a push to find effective natural antimicrobials that can be used in foods, because they may offer potential health benefits and products with clean labeling, and the absence of "synthetic" compounds may be more desirable to consumers. There are three different types of natural antimicrobials: animal derived, plant derived and bacteria derived.

Animal derived antimicrobials are usually biological secretions coming from milk, eggs, and muscle tissues. Their antimicrobial characteristics can harmfully affect microorganisms by depriving them of nutrients, exposing them to a toxin or by binding to a specific bacterial surface component, disrupting the cell. Some concerns associated with animal derived antimicrobials are their cost, effectiveness, potential for causing allergies, or interferences with food matrices.

Plant derived antimicrobials usually come from spices and essential oils. Some of these include, cinnamon, cloves, thyme, and oregano and have been shown to be effective antimicrobials. A major concern however, with these substances is that they have very strong flavors and therefore, cannot be added to all foods without creating off-flavors.

The metabolic products of microbial derived antimicrobials can also inhibit spoilage and pathogenic bacteria. Acids, bacteriocins, diacetyl, CO_2, H_2O_2, and reuterin are all compounds produced by bacteria that have been shown to have antimicrobial properties.

The addition of natural antimicrobials to packaging materials is another research area receiving attention. The concept is to insert, or apply the antimicrobial to packaging materials, which will then come into direct contact the food, or be released from the matrix as a vapor. A great deal of work has gone into the diffusion of antimicrobials from packaging matrices, with controlled release of the compounds essential. There have been promising results but the effect of food properties needs further study.

The food industry is very interested in natural antimicrobials because of the potential for consumer-friendly labeling. Some of the set backs that have been seen include the antimicrobials incompatibility with the current manufacturing process, or that they are not truly natural and do not have GRAS status. They can also create organoleptic problems, altering the taste of the food product. The use of antimicrobials may also add cost or complexity to producing the product. For a natural antimicrobial to be adopted by industry, it would need to be broad spectrum and effective over a wide pH range and wide product range. In addition a simple and rapid method must be available to confirm/verify its presence/level in food.

Regulatory issues with natural antimicrobials were also discussed during the symposium. A large problem is determining which agencies have jurisdiction over the substance. In order to get regulatory approval, the safety, efficacy, and claims must be proven.

S24 – Risk Communication – Putting Food Safety in Perspective

Lisa Mathiasen, University of Guelph
and Ben Chapman, University of Guelph

This symposium had a wide range of speakers including risk communicators, journalists, industry leaders and physicians. David Ropeik from the Harvard Center for Risk Analysis provided attendees with a general overview of risk assessment and made his presentation very interesting with humorous photographs and stimulating anecdotes. For example, from whom would you rather receive a glass of water... Oprah or Saddam?

As humans weigh the costs of the risks and the benefits, we learned that many factors come into play in their ultimate actions and decisions; for example: trust, control, uncertainty and fear. An understanding of these factors is imperative to effective risk communication, however understanding these factors alone are not enough.

Risk makes a good story, which tempts media outlets to over-dramatize the facts. It is important that risk communicators not only understand the public, but the media as well. Another concern for risk communicators is the potential for the skewing of facts by activist groups as Cary Frye from the International Dairy Foods Association explained. While many activist attacks make the news, they often back fire especially when going up against sound scientific evidence.

David Schmidt from the International Food Information Council described some effective messages that resonate with consumers. These include current information about the risk, and proving consumers with actions (instead of doing this, try this). As explained by Carolyn O'Neil, author of *The Dish on Healthy Eating and Being Fabulous* if you take the science, focus on the key messages and make it fun consumers will pay attention. Carolyn provided suggestions of "on the air" makeovers of kitchens, refrigerators and desktops to address food safety risks and motivate consumers to practice food safety at home.

Dr. Daniel (Stormy) H. Johnson explained risk communication from a physician's perspective. Physicians, a trusted source of information, must understand the value of science and the risks in order to help others. By providing patients with information and then a choice of their actions doctors can put a realistic premium on safety. By demonstrating the importance of science, effective messaging and the establishment of trust this session on risk communication successfully enhanced media and consumer communication strategies for attendees.

S25 – Emerging Issues in Water Quality for the Food Industry

Jordan Bowers, Auburn University,
and Yassaman Shafaie, Rutgers University

Topics discussed in the Emerging Issues in Water Quality for the Food Industry session included microbial contaminants in drinking water, biofilms, impacts of animal agriculture on water quality, and water treatment technologies for the food industry. Organizer and convener, Susan K. McKnight presented an overview of the importance of water and water quality to humans in a food industry setting.

Kelly A. Reynolds from the University of Arizona discussed microbial contaminants in drinking water. These contaminants can be viral, bacterial, or protozoan and can cause a wide range of illnesses and in some cases chronic sequelae. Reynolds also mentioned emerging issues in drinking water quality, such as, emerging pathogens, treatment plant reliability, and contamination control.

The next speaker was Jeannette Thurston-Enriquez from USDA-ARS. She discussed the impact of animal agriculture on public and animal health and microbial water quality. Thurston-Enriquez presented information on animal waste dissemination routes, manure-borne pathogens, and applications for the management of the prevention of water contamination by livestock. Contamination of water sources can be from runoff of feeding operations, improper application of manure to field as an organic fertilizer, bioaerosol generation or direct deposition into the stream.

Jim Van Vooran from Environmental Health Laboratories, presented information on issues concerning the safety and quality of water in the food industry. He discussed source water testing performed under the Safe Drinking Water Act (SDWA) which was passed in 1974. This act requires monitoring for 16 inorganic and 54 organic chemicals, 3 radionuclides and 3 microorganisms and is based on three-year monitoring cycles. Drinking water regulations, current drinking water issues, and water quality programs in other countries was also discussed.

The affects of biofilms on water quality and product safety in the food industry was presented by Adrian Peters from the University of Wales Institute. Information was presented on the role of water in food production; as well as problems regarding biofilm growth and development in the food industry. Biofilms were specifically discussed in regards to food contact surfaces, product wash water, and water lines. A case study on biofilms in vending machines water hoses was presented including recommendations for assessing the presence and removal of biofilms from food surfaces.

Kristina D. Mena from the University of Texas Health Center at Houston, discussed information on assessing water's role on food quality and foodborne diseases. She spoke of hazard identification, microbial agents of disease, dose response and exposure assessment, risk characterization and assessment applications, and challenges in microbial risk assessment, to list a few.

The final speaker, Peter M. Kennedy from Quality Flow, Inc. discussed water treatment technologies for the food industry. Information was presented about the evolution of water treatment, modern treatment equipment and technology, such as gas chlorination, UV light filters, and ozone generators, as well as ideas about choosing appropriate water treatment technology for your specific needs.

T01 – Microbiological Methods

Jordan Bowers, Auburn University,
and Jamie Isonhood, North Carolina State University

Topics discussed in the Microbiological Methods session included the use of PCR, Thin Agar Layer Resuscitation Media, DNA probe assays, and an Optical Interferometer Biosensor. Joshua Gurtler from University of Georgia, presented the recovery of *Listeria monocytogenes* (Lm), *Jonesia denitrificans*, Salmonellae and *Pediococcus* sp. using three modifications of an ecometric method across nine media. Excellent recovery of L.m. was observed with TSAYE, PALCAM, MOX, and Baird Parker. The best recovery for the other strains was obtained using TSAYE, although MOX was equally effective for recovering *J. denitrificans* and modified PRAB was best for *Pediococcus* sp.

Jeffrey Kornacki from University of Georgia, compared a modified drop plate method with conventional plating methods, spread plating and pour plating, across three solid media for recovery of *L. monocytogenes* in broth and frankfurters. No significant differences were found for all three plating methods. Heat injured cells were best recovered using TSAYE without the MOX overlay, and the overlay (TSAYE/MOX) was more effective than using MOX alone.

Beth Crozier-Dodson from Kansas State University, compared two mediums for the recovery of injured organisms in the air. A resuscitation medium that was developed at Kansas State University called Thin Agar Layer (TAL) was used. This study resulted in the TAL medium producing higher counts of target and non-target microorganisms recovered and less viable non-culturable microorganisms on all media, than without the TAL.

Gitika Panicker from University of Alabama-Birmingham, discussed the use of oligonucleotide microarrays and PCR to detect total and pathogenic *Vibrio vulnificus*. Biotin-labeled multiplexed PCR-amplified *viuB* and *vh* gene segments were oligonucleotide arrayed to detect total and clinical strains. PCR was used to amplify 16S

rDNA and *viuB* regions to specifically identify clinical isolates. These methods provide a sensitive and specific detection of microbial pathogens in shellfish.

Wendy Lepper from Silliker Inc., presented research on two rapid methods involving bioMérieux's Second Generation VIDAS and Qualicon's Automated BAX (ABAX), both kits developed for *L. monocytogenes*. Five processed meat and poultry products were tested, fortunately none were positive. The VIDAS (63/100) was able to detect 9 more samples than ABAX (54/100), but differences between the two methods were not statistically significant.

Omar Oyarzabal from Neogen Corp., presented a comparative analysis of the ELISA based test kit for *Listeria* spp. versus conventional methods. Seafood, meats, dairy products, and fruits and vegetables were inoculated and then stored for 48 h followed by a 24 h enrichment step. The two methods were found to be comparable. Doris D'Souza from North Carolina State University presented research on Nucleic Acid Sequence Based Amplification (NASBA) method, which targets RNA rather than DNA, to detect *Salmonella enterica* serovar Enteritidis from foods (chocolate, meats, poultry, seafood, etc.). The RNA was extracted using the NuliSens® Basic Kit. The NASBA electrochemiluminescence (ECL) reaction produced an end-point detection limit of 10^2 CFU/reaction, similar to PCR. The method was rapid and sensitive for detection of low levels of *Salmonella* contamination in a wide variety of foods.

Julie Jean from North Carolina State University, presented research on NASBA in a multiplex format for the specific and simultaneous detection of hepatitis A and Norwalk-like viruses. The multiplex NASBA system with ECL was more sensitive than RT-PCR (Reverse Transcription-Polymerase Chain Reaction). Detection of viruses inoculated on deli style turkey and lettuce was comparable, demonstrating the flexibility of the assay to detect viruses in foods.

Loralyn Ledenbach from Kraft Foods, discussed a system using BioSys for the rapid enumeration of yeast and mold in salad dressings. Yeast was detected within 15 hours and mold between 32 to 70 hours.

Patrick Marek from University of Connecticut, discussed PCR to optimize a rapid and specific detection of *P. expansum* on fruits. Post-harvest spoilage of fruits by this organism results in abbreviated shelf life and great economic losses to the fruit industry. C. M. Ngutter from Unversity of Vermont, discussed the impact of selective versus non-selective recovery procedures on the recovery of nitrite-induced injury of *L. monocytogenes* from frankfurters. Three objectives were tested, to determine if sodium nitrite has the ability to injure cells, and, if the injury is reversible, also to compare recovery of the injured cells using *Listeria* Repair Broth (LRB) and UVM. Nitrite was found to injure cells, and the injury was completely reversible. LRB was consistently far superior to UVM in the recovery of injured L.m. cells in RTE meats containing sodium nitrite.

David Gottfried from Georgia Tech Research Institute, discussed pathogen detection using an Optical Interferometer Biosensor. It is a small, robust, highly sensitive tool that requires no tagging or rinsing at a low cost, that offers real-time monitoring of pathogens

T02 – Food Safety Management and Communication

Gitika Panicker, Univeristy of Alabama-Birmingham and Marcos Xavier Sanchez, University of Nebraska

A variety of topics relating to food safety management were covered in this session. Spring Younts-Dahl, Texas Tech, presented a study on the prevalence of *Escherichia coli* O157:H7 in beef cattle after being fed a regular diet and a direct-fed microbial culture of *Propionibacterium* and *Lactobacillus acidophilus* strains. Cattle fed with the probiotic mix presented ~50% less *E. coli* than controls.

Keith Vorst, Michigan State, presented a study on transference coefficients for *Listeria monocytogenes* during commercial slicing of delicatessen products. The table, back plate, metal guard, blade and product collection area of the slicer were found to be critical for transferring this pathogen.

James Arbogast, GOJO Industries, showed the importance of hands, gloves and utensils as cross-contaminating agents for *E. coli* and *Salmonella* in food-service operations.

Dr. Ricardo Molins focused on some issues regarding food safety regulations in the US, like the need for a database for food-borne pathogen contamination surveillance; successful intervention methods, followed by effective risk assessment studies; communication to the public and maintenance of HACCP standards.

Jennifer Thomas, California Department of Health Services, introduced the Food Safety Notification System, a novel program to disseminate health information. It allows the center to provide information to key individuals that can act to prevent additional exposures. The web-based system transmits messages in multiple formats including cell phone, text, e-mails, fax and voice mail.

Several presenters from the University of Wales Institute-Cardiff, UK participated in this session. Ginny Moore presented a study to determine the efficacy of sponges to recover microorganisms from surfaces. Of interest was the fact that although the sponge was able to remove 80% of the bacteria artificially inoculated on a surface, only 1% of the bacteria were recovered from the sponge during sampling, thus suggesting that bacteria may in fact get trapped in the sponge matrix.

Louise Fielding presented information on the importance of air quality in hand drying devices. The air of toilet rooms was found to be contaminated with *Enterobacteriaceae*. Aerosols and hot air dryers showed high counts of indicator bacteria and *Staphylococcus aureus*.

David Lloyd presented trends and costs of microbiological failures in ready-to-eat manufacturing facilities. It was found that failure increased proportionally with production increases and that 22% of cases were linked

to new temporary staff. Total costs were estimated at 386,000 for small and medium sized facilities.

Leane Ellis presented data based on a survey and visits with 850 small and medium sized operations in regards of the usage of hazard based quality management programs. It was found that 87% of plants having trained employees were able to identify hazard problems, versus 50% recognition in non-trained facilities.

The session also included several presenters from the University of Guelph in Canada. Benjamin Chapman described the implementation of a pro-active, on farm food safety program based on surveys and training visits to growers of vegetables. Liz Gomes described an educational resource to engage senior high school students in conversations about genetically engineered food. Results showed an increased knowledge among students after their participation in focus groups and field trips. Lisa Mathiasen summarized the findings of a study that determined common food safety errors observed in cooking shows worldwide. The main findings included the lack of hand washing, cross-contamination and time-temperature violations.

T03 – Produce Microbiology

Glenner Richards, University of Georgia
and Renee Raiden, Virginia Tech

Presentations made in this session assessed efficacy of various decontamination methods and interactions of foodborne pathogens with several produce items.

Louise Fielding, University of Wales Institute, treated strawberries with ozone (10, 50, 100 ppm) for up to 8 h after inoculation with *Salmonella* and *E. coli.* These treatments resulted in 0.9 – 3.3 log reduction of microbial population. Organoleptic qualities were not significantly affected. Higher ozone concentrations and longer exposure times would give more efficacious decontamination, however this has cost and safety implications.

Y. Han, Purdue University, compared spot and dip inoculated strawberry seeds and flesh. Bacterial distribution was more uniform for spot-inoculated samples. Recovery did not differ significantly at 0, 2 h, 1 day and 3 days after inoculation. Spot inoculation had a higher reduction in *E. coli* population, when the samples were treated with chlorinated water. Dip-inoculated data showed a larger standard deviation.

Suresh Pillai, Texas A&M, Irradiated various retail brands fruits and nuts (walnuts, dates, raisins) infested with molds. Mold loads on retail dried fruits and nuts are variable. D values and inactivation rates varied due to differences in populations and response. Product, mold species and mold population affected e-beam effectiveness. 3 kGy was effective for total removal of molds. A 5-log reduction was obtained with 8 kGy, but it is not known whether this dose inactivated mycotoxins.

Tatiana Koutcham, NCFST, IIT, preformed an assessment of critical product and process parameters to validate UV disinfection of juices in flow through reactors and achieve a 5-log reduction in the population of *E. coli* K12 inoculated into unpasteurized fruit juice. The effect of absorbance, turbidity, and flow rate on UV inactivation varied with brands of apple juice. Inactivation rate was affected by flow rate but not microbial load.

Bassam Annous, USDA-ARS, found that *E. coli* spray-inoculated onto apple flower or fruits were able to survive field conditions on the surface and in the core. Internalization of *E. coli* can occur in the field at blossom or fruit stage and that apple orchards should be located away from pasture land where exposure to contaminated dust or irrigation can occur.

Pascal Delaquis, Agriculture and Agri-food, discussed whether accumulation of wound associated metabolites affect *Listeria monocytogenes* during storage. Metabolites on cut or wounded lettuce limit *Lm.* growth. The anti-listerial factor accumulated in wounded iceberg lettuce stored anaerobically. The role of natural defense mechanisms in the ecology of foodborne pathogens in stored packaged fresh-cut produce must be examined. The nature of the factor remains unknown.

Gro Johannessen, NVI, found that the use of untreated manure does not significantly influence the bacteriological quality of lettuce. While *E. coli* O157:H7 was detected in firm manure, slurry and soil fertilized with the respective manures, the pathogen was not detected in lettuce.

Robert Gravani, Cornell University, completed a survey determining that worker understanding of toilet and hand-washing hygiene as well the status of facility hygiene in NY packing houses needed improvement.

Lynette Kleman, North Carolina State University, evaluated the microbiological quality of leafy greens and cantaloupes from the field to the packing area and the prevalence of foodborne pathogens. For both groups, there was no remarkable increase in Total Aerobic Bacteria throughout. Total coliform count, *Enterococcus* and *E. coli* count increased at the rinse step for cantaloupes, but for leafy greens *E. coli* count remained low. *Salmonella* was detected on 3.3% of cantaloupes samples.

Trevor Suslow, UC Davis, presented two research projects. *Citrobacter* is a primary co-enriched genus in *Salmonella* environmental and crop-based surveys. Survival of inoculated *C. youngae* is population dependent, but not proportional. Survival of *C. youngae* on lettuce leaves showed a significant decrease from the outer to inner leaves, but was still recoverable after 14 days. In his second presentation, he discussed that hydrocooling reduced *Pectobacterium caratovora, E. coli* O157:H7 and *Salmonella* populations at the stem end, but not the tip end of asparagus. The *Salmonella* population decreased. The predominant serotype recovered was Montevideo, while Agona was not recovered. Asparagine content in the tip could be a predictor of shelf life, as it increased 7–10 fold within 24–72 h after harvest; and sugar content declined in parallel.

J. E. Nychas, Agricultural University of Athens, found that *Monascus ruber* indicated the highest growth and widest

"habitat domain" with respect to pH and NaCl at 30°C. pH, NaCl and temperature affected ascospore germination. Temperature affected ascospore germination, more than the growth/no-growth interface. The gradient plates allowed for quantitative expression of fungus growth.

T04 — Food Handling in the Domestic Food Service Environment

Adriana Velasquez, University of Nebraska-Lincoln
and Lisa Mathiasen, University of Guelph

The way consumers handle food, as well as their cooking and eating habits are determining factors in the safety of the products. Surveys are usually used to show what consumers know about food safety and what they do when handling raw meat in the domestic environment. Roy Betts from Campden & Chorleywood Food Research Association presented the results of a survey performed in England and Scotland. Most participating members seemed to consider their kitchens to be clean and to have some knowledge about meat storage. Finally, he highlighted the importance of developing and spreading simple messages for consumers to follow to ensure safety in the domestic environment.

Vince Radke from CDC-NCEH expressed the existing need for the development of a system-based approach to food safety. This system would include an integral understanding of the dynamic interactions between the environment, host, and available epidemiology data to be able to identify how and why disease occurs.

Robin Lee from CDC-NCEH presented the results of a study on the prevalence of high-risk egg handling practices in various restaurants across the nation. Most participating food establishments seemed to use both shell and pasteurized eggs and to also pool them which could lead to microbial cross-contamination. Even though egg preparation policies exist, she recommended that guidelines are further revised and enforced to ensure safety.

Vince Radke spoke again reviewing the operational elements of retail food protection programs across various states. He mentioned that a great inconsistency exists between states in terminology and electronic databases used. Due to this fact, states can not be compared with one another consistently, thus it is difficult to have a centralized model of their operations. Behaviors of food workers could also contribute significantly to foodborne illness. Therefore it is important to continually strive to understand, monitor and modify these behaviors.

Laura Green from CDC, demonstrated that many efforts have contributed to the understanding of food worker behaviors with her summary of food workers food handling studies. Through the use of surveys, focus groups, and observation workers' food safety knowledge, attitudes and behaviors have been assessed, and have shown that even though workers may possess considerable food safety knowledge, their behaviors do not reflect this knowledge.

In Laura's second presentation she explained some barriers that could account for the discrepancy between knowledge and behavior. Such barriers include: time pressure, staffing conflicts, demographic characteristics, personal beliefs, kitchen facilities and restaurant policies and procedures. With similar barriers in mind the FDA has undertaken some activities to assist industry and regulators in preventing foodborne illness, as described by John-Mikel Woody. The main focus of these activities is the implementation of active managerial control over the risk factors that most contribute to foodborne illness. By training regulatory staff, creating a HACCP based inspection program, encouraging compliance and enforcement, promoting industry and community relations, providing program support and resources and through program assessment the FDA hopes to decrease food handling risks by 2010. However in order for such a program to be effective evaluation and modification is necessary to maintain program efficiency and effectiveness as demonstrated by David Lloyd from the University of Wales. All of the information presented has contributed to a better understanding of food handling in the domestic food service environment.

T05 – Foodborne Pathogens

Laura J. Bauermeister – Auburn University
and Jordan Bowers, Auburn University

The Foodborne Pathogens technical session encompassed many topics. Manan Sharma from University of Georgia, discussed survival characteristics of wild-type and *rpoS*-deficient *Escherichia coli* O157:H7 in various alkaline cleaners. Conclusions drawn from this study included similar lethality patterns between strains, suggesting that the *rpoS* gene may not offer any direct protection when organisms are exposed to cleaners or alkaline conditions; similar population reductions at different growth phases indicated cleaners were sufficient in overcoming different physiological ages; viability and heat resistance of cells is affected by composition of cleaner, pH, and cleaner application temperature.

Wade Fluckey from Texas Tech University, looked at *Salmonella* and commensal enteric bacteria in feedlot cattle for the prevalence, potential cross-contamination, and antimicrobial drug susceptibility patterns. Results indicated between-animal fecal to hide contamination during transportation and hide to carcass contamination, suggesting a link between feedlot isolates and carcass isolates in the plant.

In his first talk, Justin Ransom from Colorado State University, determined how the prevalence of *E. coli* O157:H7 in feedlot pen floor fecal samples affected carcass sample prevalence during the slaughtering process. This data offers guidance in risk assessment as well as developing intervention strategies to reduce *E. coli* O157:H7 on fresh beef. Ransom indicated in his second talk that there is a need for reduction in prevalence and density of pathogenic bacteria on cattle hides when entering the slaughter floor. Effective decontamination was accomplished by using 1% cetylpyridinium chloride on animal hides, possibly reducing the prevalence and contamination of *E. coli* O157:H7.

Stephanie DeLong from the CDC, reported on the trends of *Salmonella* serotypes in the US from 1996–2001. Information from FoodNet indicated a decline in *S.* Typhimurium and *S.* Enteritidis (SE) exhibits success in meat, poultry, and egg food safety programs, but an increase in *S.* Newport, *S.* Heidelberg, and *S.* Javiana creates a need for further evaluation of risk factors.

Rob Davies from Veterinary Laboratories Agency looked at SE PT4 and *S.* Typhimurium DT104 trends in the UK SE persists in a few vaccinated flocks and is the predominate strain in packing plants, eggs, and spent hens. Improvement in cleaning, disinfection, pest control, and laying flock monitoring programs are needed.

Kun-Ho Seo from FDA-CFSAN, compared conventional and rapid detection and enumeration methods for *Salmonella* Enteritidis. *Salmonella* Enteritidis can be detected and enumerated within 4 hours using real-time PCR. This may provide the food industry with a useful tool in monitoring product safety and quality.

Victoria Lappi from Cornell University indicated an improvement in *Listeria monocytogenes* contamination patterns when implementing employee training and targeted intervention strategies in a ready-to-eat smoked seafood plant.

John Allan from University of Georgia, demonstrated the importance of removing the organic material during cleaning as it may allow for the formation of condensate, aiding the survival of *L. monocytogenes*.

Konstantino Koutsoumanis from Colorado State University found that the initial inoculum density of Lm affected the limiting factors associated with pH, water activity (a_w), and incubation temperatures. This information was used to develop a growth model indicating non-homogeneous cell populations of Lm and growth limits are best represented by distributions.

Guy Longeragan studied variation of *E. coli* O157:H7 within cattle fecal pats, how many samples per pat were necessary to determine prevalence, and if samples can be combined or what the optimum numbers of samples are. Data suggested that *E. coli* O157:H7 is not evenly distributed within pats, the greater the number of sample pats the greater the prevalence, however the optimum number of samples needed is still not clear.

T06 – Risk Modeling

Laura J. Bauermeister, Auburn University
and David Rasmussen, University of Tennessee

Topics discussed in this Risk Modeling session included the development of specific model systems, how to test the robustness of the models, and how to overcome issues when data is limited. Kause discussed the development of a Monte Carlo risk assessment model for *Listeria monocytogenes* (Lm) in hot dogs and deli meats. This model was used to demonstrate the effectiveness of testing and sanitizing food contact surfaces for *Listeria* spp. (Lspp) by the consideration of frequency and amount of Lspp on food contact surfaces, the transfer of Lspp to ready-to-eat (RTE) product and the ratio for Lspp to Lm from published data. Information obtained from this risk assessment provided the FSIS with limits regarding Lm for RTE products. Koutsoumanis compared the use of a safety monitoring and assurance system (SMAS) to the traditional first-in first-out method. SMAS uses continuous product temperature monitoring and predictive models for growth evaluation of Lm. Within a local market results between the two models were similar. However, in an export market the use of SMAS reduced the number of spoiled products. Skandamis developed predictive models of several spoilage organisms in fresh meat, as a function of temperature and atmosphere packaging conditions. After comparing data to predictive growth rates of specific spoilage organisms from other sources, the models provided a reliable means of predicting shelf-life. Campos used a method of assessing the validity of microbial growth models by computing the robustness index (RI). This is a ratio of the standard error of prediction to the standard error of calibration for each model. The RI provides a quantitative means for evaluation of the various growth models. Powell proposed the use of Bayesian synthesis as an evaluation of robustness in predictive models. Bayesian synthesis assumes that information regarding inputs and outputs of the premodel is available from other sources. Davidson did a comparison of the Monte Carlo and Fuzzy models of *Campylobacter jejuni* through a poultry processing plant. Fuzzy models gave more conservative, yet identical numbers, where the Monte Carlo model varied with each simulation. Nevertheless, as long as the complexity of the model was relatively simple the means of the two models were relatively close. Kasuga conducted a risk model for *Vibrio parahaemolyticus* in Thailand. A small scale exposure assessment was done using the popular Bloody Clam in the region. Many limitations existed and assumptions were made, however, this served as an example for the first-step data generation for the risk model in this situation. Greig discussed a rising concern of *Cryptosporidium* and *Giardia* infections associated with mung bean sprouts in Norway. A risk assessment was conducted to determine the probability of infection and also to determine what data is still needed. Although the reported incidence of these infections in Norway is low, the risk assessment suggested that the probability of infection from *Cryptosporidium* and *Giardia* is much higher than what is reported each year in Norway. Walls discussed the outcomes of a workshop held in December 2002 to improve the scientific basis of microbial dose response models. When available these models are based on human feeding trial data. This creates many limitations; some current approaches to overcome the limitations are to use animal and tissue culture methods. The challenge is to develop meaningful mechanistic models that are not excessive.

Minutes of the 90th Annual Business Meeting

August 12, 2003
New Orleans, Louisiana

President-Elect Paul Hall welcomed attendees and introduced President Anna Lammerding.

Moment of Silence

President Anna Lammerding asked those present to observe a moment of silence in memory of departed colleagues. She also noted that this year's Annual Meeting was dedicated to the memory of Harry Haverland.

Call to Order

The Annual Business Meeting of the International Association for Food Protection was called to order at 4:50 p.m. at the Hilton New Orleans Riverside in New Orleans, Louisiana. A quorum was present as defined by the IAFP Constitution.

With the approval of the Executive Board, President Lammerding appointed Randy Daggs as Parliamentarian for the Business Meeting.

Minutes

Minutes from the IAFP 89th Annual Business Meeting were approved as they appeared in the October 2002 *Dairy, Food and Environmental Sanitation*. The motion was made by Christine Bruhn and seconded by David Fry.

President's Report

President Anna Lammerding reported on programs and activities of IAFP over the past year. She reported that a food toxicology group met to determine interest in forming a PDG, the Student PDG continues to see growing involvement with students serving as room monitors, and audiovisual assistants for IAFP 2003, and holding their third job fair.

President Lammerding then presented the President's awards. David Larson, IAFP Publisher Representative, received the award for his continued efforts with the Exhibit Hall and Sponsorship programs in addition to selling advertising for the journals. Awards were presented to the IAFP Staff; Donna Bahun, Julie Cattanach, Bev Corron, Lucia Collison McPhedran, Karla Jordan, Pam Wanninger, Didi Loynachan, Donna Gronstal and Farrah Goehring for their tireless efforts on behalf of the Association. She then presented awards to Fred Weber, Weber Scientific, for his work on the *FPT* Strategic Plan and for implementing the Maurice Weber Laboratorian Award; Wilbur Feagan, F & H Food Equipment Company, for his support of the Association through the Black Pearl Award and the Foundation Fund; Susan McKnight, Quality Flow, who began the Water Quality & Safety PDG and for her enthusiasm and support; and Frank Yiannas, Disney World, for being a strong personal supporter of the Association, an active member of the Florida Association that makes great gifts to the Foundation Fund, and, as Chair of the Retail Safety & Quality PDG, headed the International Food Safety Icon project.

President Lammerding then presented Charters to the two new Affiliates. Gordon Hayburn and Louise Fielding accepted on behalf of the United Kingdom Association for Food Protection and Tina Pedroso accepted on behalf of the Portugal Association for Food Protection.

Tellers Committee Report

Peter Slade, Teller, reported there were 790 votes received, with 6 being illegal. Frank Yiannas was elected as Secretary for the 2003–2004 year. A motion by Michael Brodsky and seconded by Jack Guzewich to accept the report and destroy the ballots was approved.

JFP Management Committee Report

Chairperson Isabel Walls reported 20% more manuscript submissions were received last year with 80–90% being published within 10–12 months of submission, half of the articles were from outside the US. *JFP* Online has been active for one year, and since online manuscript submission began in April, 36% of the 2003 manuscripts received were submitted online. The Committee considered a request regarding providing complimentary PDF reprints to authors and determined that the financial implications to the Association should be considered before making such a decision. There was considerable discussion regarding an article published in *FPT* and it was ultimately determined that they recommend to the Board that a formal policy for articles relating to food security should be developed. John Sofos agreed to another four-year term as Scientific Editor. Isabel thanked the IAFP Staff for their continued hard work with the Journal.

FPT Management Committee Report

Fred Weber reported that this was the first committee meeting as *Food Protection Trends* with 31 people in attendance. The new look and name for the journal began in January 2003. Weber thanked Christine Bruhn for her work as Chair and thanked outgoing member Harold Bengsch for his work both as a committee member and as the first Committee Chair. The article "Food as a Weapon" was added to the agenda at the beginning of the meeting. There was much discussion on the topic with several

members, the Scientific Editor and one of the authors participating. Fred expressed his appreciation to Isabel Walls and the *JFP* Editors who attended to give their perspective. Recommendations will be made to the Board to formulate a policy for enhanced review of articles that impact food safety and security and to reappoint Bill LaGrange for another four-year term as Scientific Editor. Fred noted that due to low article submissions, the journal is looking for articles.

Foundation Fund Report

Stan Bailey reported that the Committee's discussion focused on Harry Haverland and how to continue his work and goals. One goal, suggested by Wilbur Feagan, was to build an asset base of one million dollars over the next few years. This year's Silent Auction raised a total of $4,605.50. Everyone was encouraged to donate items to next year's auction. Recommendations to the Board included sending Members a letter requesting memorial contributions to the Foundation Fund, consider naming the Fund the "Harry Haverland and IAFP Foundation Fund," include a specific amount to the Foundation Fund on the membership renewal forms with an option for the member to strike out that amount from the form, and include a Foundation Fund contribution of $100 on the application form for exhibitors with the option to strike the amount. Gale Prince was elected as Vice Chair. Zeb Blanton, Frank Yiannas and Peter Hibbard of the Florida Association for Food Protection then presented the Foundation Fund with a $1,000 check in memory of Harry Haverland. Other members also contributed cash and checks in honor of Harry.

Affiliate Council Report

Gene Frey reported that 23 Affiliates, including the United Kingdom, were present at the meeting. This year two new Affiliates received their charters. Gene also noted that the Affiliate Education Session needs financial support and thanked Fred Weber for his continued support. The new Affiliate Council Secretary is Stephanie Olmsted. Two of the Affiliate membership awards were dropped and replaced with a single Membership Achievement Award that focuses on the affiliates' efforts to grow their membership from within. Gene noted that leadership for the Affiliate Council was turned over to Steve Murphy, Chairperson, and Stephanie Olmsted, Secretary.

Executive Director's Report

David Tharp reported that overall, the past year was a good one for the Association. Even in the tough economic conditions of the last year, Membership continues stable at just short of 3,000, which provides evidence of the quality information on food science and food safety distributed by IAFP. Publications ran on schedule throughout the year and record numbers of articles were submitted for the *Journal of Food Protection*. A nice growth curve for *JFP* Online was reported.

Student involvement continues to grow with the Student PDG holding its fourth annual luncheon this year in New Orleans. Again this year, students served as session room monitors and audiovisual assistants. In addition, students from Louisiana State University and Mississippi State University assisted the IAFP staff at registration and with social events. David thanked all students who helped out during IAFP 2003.

The General Fund Statement of Activity for the year ending August 31, 2002 was distributed showing results that reduced the General Fund balance by $62,460. This was a very disappointing result to an otherwise great year. David pointed to a few reasons for the financial results: IAFP's investment portfolio lost more than $20,000, excess revenues for IAFP 2002 came in about $10,000 short of what was expected while the same shortfall of $10,000 was experienced from the Annual Meeting Workshops, and we incurred higher than expected expense for Journal production and shipping costs. On a better note, projections for this year show us recouping at least a portion of this loss.

David reported that IAFP 2003 again has set many new records. Attendance is expected to be above 1,450 attendees, submitted technical abstracts increased by 33%, 46 submitted symposium were received, a 15% increase in exhibitor booths and a 50% increase in Annual Meeting sponsorship revenues were seen. Even with this growth, IAFP 2003 continues to be small enough to network with the worldwide leaders in food science and food safety.

To conclude, David thanked the IAFP staff for their hard work in preparing for the Annual Meeting while carrying out their day-to-day responsibilities. He also recognized the Executive Board and IAFP Members for the trust and support they place in him.

Unfinished Business

No unfinished business was brought before the Annual Business Meeting.

New Business

Ewen Todd brought up a question of adding Annual Meeting presentations to the Web site. David Tharp responded that there would be much cost involved and difficulty obtaining the presentations from the presenters. Ewen asked that we consider adding a request to symposium organizers on the Call for Symposium form to provide the presentations for the Web site for next year.

Michael Brodsky presented four proposed amendments to the Association Bylaws as printed in *Food Protection Trends*. He was asked for clarification of each of the amendments. A motion was made by Christine Bruhn to amend the Proposal 2 by inserting the following wording after IAFP: "and shall contain articles of scientific and general interest." Then remove "and" and capitalize "the". Discussion took place with some opposition to the amendment. A motion was made by Sid Camp and seconded by David Fry to table the amendment for consideration next year. Christine Bruhn moved that the word "quiet" be removed from the Proposal 4. A motion to amend was seconded by David Golden and passed with one opposed. A motion to approve the amendments to the Bylaws as presented and amended was made by Jack Guzewich and seconded by Ewen Todd. It passed with one opposed.

Adjournment

President Lammerding adjourned the meeting at 5:52 p.m.

Respectively Submitted,

Jeffrey M. Farber

Highlights of the Executive Board Meeting

August 8–14, 2003

Following is an unofficial summary of actions from the Executive Board Meeting held at the Hilton New Orleans Riverside in New Orleans, Louisiana, August 8-14, 2003:

Approved the following:

- Minutes of April 27–28, 2003 Executive Board Meeting
- Issuance of Affiliate Charter for the Portugal Association for Food Protection
- Certificate of Merit for Fritz Buss of the Wisconsin Association for Food Protection
- Reappointment of John Sofos as Scientific Editor for the *Journal of Food Protection*
- Reappointment of Bill LaGrange as Scientific Editor for *Food Protection Trends*
- A Student Membership with *JFP* Online only (does not include print copies) for $48 per year

Discussed the following:

- E-mail votes taken since the last meeting
- *FPT* & *JFP* update
- Web site report
- Membership report
- Advertising sales report
- June financial statements reviewed and compared to budget
- Summer Affiliate Newsletter
- IAFP Officers made presentations at three Affiliate meetings. Four presentations are scheduled through fall
- Potential new Affiliate organizations — Vermont, Japan, New Zealand, South Africa
- Affiliate Educational Session and sponsorship
- Noncompliant Affiliate
- Committee appointments
- Foundation Fund Committee — new Committee Members
- Communicable Diseases Affecting Man Subcommittee meeting after IAFP 2003
- Possible Food Toxicology PDG
- Committee and PDG Chairperson reports
- Committee recommendations
- IAFP 2003 — exhibits and sponsorship
- IAFP 2003 — opening session, business meeting, plenary session and awards banquet
- IAFP 2003 — Review
- IAFP 2003 — Workshops
- IAFP 2004 — Saturday golf tournament
- IAFP 2005 — Capital Area Affiliate to serve as LAC
- IAFP 2006 — Alberta Affiliate to serve as LAC
- Future Annual Meeting site selection
- IAFP on the Road — Worldwide Food Expo — October 2003
- IAFP on the Road — Food Safety Summit — March 2004
- European Meeting
- 3-A Sanitary Standards, Inc. — next board meeting at end of September
- IAFP and World Health Organization Non-Governmental Organization status

Next Executive Board meeting: October 2, 2003

Committee Minutes

IAFP 2003 – August 10-13, 2003

Held at the Hilton New Orleans Riverside
New Orleans, Louisiana

STANDING COMMITTEES

Food Protection Trends Management Committee

Members Present: Fred Weber (Chairperson), Isabel Walls (*JFP* Chairperson), Carl Custer, Steve Berry, Dan Erickson, Alfred Fain, Judy Greig, Bill LaGrange (Scientific Editor) Tom McCaskey, Catherine Nnoka, John Rushing, Gloria Swick-Brown, Tom Tieso, Alex Von Holy, and Edward Wellmeyer.

Outgoing Members Present: Christine Bruhn (Outgoing Chairperson) and Harold Bengsch.

Members Absent: Michael Grant, Gisele LaPointe, Chris Newcomer, Deog-Hwan Oh, and Peter Slade.

Board Members Present: Kathy Glass, Liason; Anna Lammerding, Paul Hall, and Jim Dickson.

Staff Present: Donna Bahun, David Tharp, and Lisa Hovey.

Guests: *JFP* Scientific Editors: Joe Frank, John Sofos, Michael Davidson, LeeAnne Jackson, Jenny Scott, Ann Draughon, and Ron Case.

Meeting Called to Order: 10:05 a.m.

Recording Secretary of Minutes: Christine Bruhn.

Addition to the Agenda: Concern was expressed that an article just published in *FPT*, "Food as a Weapon" could be used as a resource for terrorism. Moved to discuss this late-breaking issue at the beginning of the meeting to allow interested members and visitors the chance to participate and leave for other meetings. It was also agreed to discuss the direction the publication should take regarding publication of controversial articles.

Detailed concerns were expressed by a member of the FDA. The FDA has carefully avoided placing detailed information into print to prevent misuse by terrorists. There is concern when locations are noted, i.e. schools, restaurants, toxic dose needed; presences-absence of an antidote. The opinion was expressed that it is not necessary to go into details and that a policy to review, by the FDA, is needed in the future.

Food manufacturers then gave their perspective. There are other appropriate venues to alert people of vulnerability. They did not find the information of value to the industry, but believe the details may provide assistance to a rogue terrorist as a "one-stop-shop." It was additionally commented that there is a need for this information but not in such a public venue.

The Scientific Editor discussed the review procedure. The manuscript was received in August 2002 and was reviewed by senior reviewers and published one year later. The Editor found it a good historical review of using food to kill people. He believes people so inclined can obtain this information from the Web or elsewhere in the public domain. Ignorance is not bliss and heightened surveillance is the best offense.

A committee member commented that when teaching vulnerability, there is a need to have concrete evidence to teach more effectively.

One of the article's authors also responded. They believe this information should be available. The specifics never get to the level where people use it. The list of agents is on the CDC Web site. The paper was built from a standing-room-only presentation. The paper does not tell you how to make toxins.

Smaller companies and distribution centers do not have the resources to develop a comprehensive security program. As an educator, the author's role is to get information out, so industry can prepare itself. A committee member commented that he is currently reviewing an article that might threaten the balance between education, government and the food industry. He will suggest that the article be published, but that the FDA have an opportunity to respond in the same issue of *FPT*.

The Chairperson and Editors of the *Journal of Food Protection* gave their perspective on this issue, which had been previously discussed at their committee meeting. They were highly concerned about the publication of this amount of detail and would have sent it to review persons familiar with bio-terrorism. The *JFP* Committee decided to consider a policy like ASM – a box for the author (or reviewers) to check if an article contains sensitive information.

The FDA member reiterated their willingness to review our articles.

A motion was made and seconded for *FPT* to formulate a policy for enhanced review of articles that impact food safety and security.

Old Business: The Committee Proceeded to address the original agenda on an abbreviated basis. The minutes from the 2002 meeting were approved (Fain motion; Swick-Brown second).

Reports to Committee: Anna Lammerding, IAFP President, reported from the Executive Board. They are excited about the name change to *FPT*. United Kingdom and Portugal are new Affiliates this year. A new PDG was being explored for Food Toxicology. They are very excited about the new IAFP Food Safety and Quality Icons. The Outreach Education PDG revised the booklet "Before Disaster Strikes." The Committee on Communicable Diseases Affecting Man is formulating a paper regarding food hygiene for workers. The Committee suggested that *FPT* is the appropriate venue for its publication.

David Tharp, IAFP Executive Director, gave a report. Membership is stable. Gold and Silver sustaining memberships have increased. 500 Members now have *JFP* Online, and the number is growing. There were 426 technical papers submitted for this meeting, a 33% increase. A record number of symposia were submitted, and they are working to accommodate more. Expected are over 1,400 attendees this meeting, with a record 108 exhibit booths. The Foundation Fund continues to grow, with $170,000 in assets.

Scientific Editor, Bill LaGrange, detailed the types of articles published in 2002; the number of manuscripts submitted and published in 2002 and 2003 to date; timelines between submission and publication.

Publication Editor, Donna Bahun, said it is taking longer to publish due to concern that if *FPT* publishes three articles monthly, we may run out of articles. We need to encourage more articles on food safety. Chairperson Fred Weber urged the Committee to encourage their colleagues to submit articles.

The status of the 2002 recommendations to the Executive Board were discussed. The request to publish certain ILSI and other symposium abstracts in *FPT* was accepted but hasn't been done and should still be pursued. Thoughts on Food Safety column report: An updated committee was formed to solicit topics, including Steve Berry, Fred Weber, and Anna Lammerding. *FPT* Strategic Plan: Fred Weber requested the Committee carefully review the plan and use it to help provide direction to the journal. They should use this plan as a foundation for discussion and recommendations at the 2004 meeting (August 8, 2004).

New Business: A motion was made and seconded (Bengsch motion; McCaskey second) that Bill LaGrange be appointed for another four-year term. This is a recommendation to the Executive Board. The redesign of *FPT* received very favorable comments from Steve Berry and other members agreed. Donna Bahun was commended on her great graphic design work. Additionally, it was discussed that this journal should now be more attractive to advertisers, and we should solicit more use of color throughout.

Letters to the Editor and Readers Comments policy. It was clarified that "Letters to the Editor" pertain to manuscripts published while "Readers Comments" pertain to general comments. Isabel Walls said that *JFP* now has a written policy on "Letters to the Editor". Donna Bahun responded that *FPT* has an internal editorial policy and this policy will be circulated to all Committee members. Fred Weber, mentioned that, according to the Reader's Survey, this is a highly valued part of the journal and must be encouraged.

Fred Weber thanked departing Chairperson, Christine Bruhn, for her excellent job over the past two years, and recognized departing member, Harold Bengsch, who indicated that he will no loner be active on the Committee. Harold was warmly thanked not only for his 40 years as an IAFP member, but as the first Chairperson of this Committee.

Recommendations to the Board:

1. *FPT* to formulate a policy for enhanced review of articles that impact food safety and security.
2. Bill LaGrange be reappointed for another four-year term as Scientific Editor.

Next Meeting Date: August 8, 2004, Phoenix, AZ.

Meeting Adjourned: 4:03 p.m.

Chairperson: Fred Weber.

Journal of Food Protection Management Committee

Members Present: Isabel Walls (Chairperson), Roger Cook (Vice Chairperson), John Sofos (Scientific Editor), Michael Davidson (Scientific Editor), Joseph Frank (Scientific Editor), Fred Weber (*FPT* Chairperson), Bev Corron, David Acheson, Maria Teresa Destro, Warren Dorsa, Judy Fraser-Heaps, Randall Phebus, Payton Pruett, and Elliot Ryser.

Members Absent: Mindy Brashears, Lone Gram, Mark Moorman, Melissa Newman, Greg Siragusa, and Marian Wachtel.

Board Members/IAFP Staff Present: James Dickson, Anna Lammerding, Paul Hall, David Tharp, Katherine Glass, Lisa Hovey, Bev Corron, and Didi Loynachan.

Guests Present: Jack Guzewich, Larry Beuchat, Jeff Rhodehamel, and Ailsa Hocking.

Meeting Called to Order: 10:05 a.m.

Recording Secretary of Minutes: Roger Cook.

Old Business: Minutes of 2002 meeting were reviewed and approved (Dorsa, Hocking).

New Business:

- Amendments to agenda: Added discussion on "Food as a Weapon" article (Dorsa).
- Report from IAFP President: Anna Lammerding provided an update of activities in 2002.
- Report from IAFP Office: David Tharp provided an update of activities in 2002.
- Report from *JFP* Scientific Co-Editors: Joseph Frank tabled a report of activities in 2002 and 2003 to-date. Volume 65 (2002) contained marginally less pages/manuscripts than in 2001, primarily due to the determined effort to reduce the backlog in 2001. In contrast, to date in 2003 the number of pages and manuscripts is up 20% over last year. Despite the increased Editor workloads, 77% and 91% of articles are published within 10 and 12 months respectively. This contributes to the high standing in which the journal is now held. The backlog is now optimal at 2.4–2.5 issues. The Committee thanked the Scientific Editors for their continuing hard work.
- Report from Administrative Editor: Bev Corron tabled reports on:
  - Online-submission to *JFP*. Implementation (April 2003) went rapidly and smoothly. To date 127 of 352 papers were submitted electronically to the journal (36%) – well above expectations.
  - *JFP* Online. Again implementation one year ago went rapidly and smoothly. We now have almost 500 member subscribers and 30 institutional subscribers. Initial issues with Ingenta support now minimized. Many subscribers to the online version still taking the paper version. Committee members made positive comments. Committee offered vote of thanks to Bev Corron, Didi Loynachan, and all the IAFP Staff for their efforts.
  - Supplements to *JFP*. Three supplements to the journal are planned for this year; two within the standard journal publication, and the third, a separate volume.
  - Letter to the Editor policy. A formal written policy was prepared based on existing unwritten policy and except for grammatical errors, was accepted.
  - Assignment of Copyright. After review by legal team, Committee agreed current policy is acceptable.

- Complementary reprints for authors: A request was received to consider the provision of a complementary electronic copy (PDF format) of papers to authors. The Committee agreed with the concept following comprehensive discussion on financial technological, and behavioral issues. However, it was also agreed that the financial consequences to IAFP should be considered, and the following recommendation was made:
- That the IAFP staff consider the financial implications of provision of a complementary electronic copy (PDF format) to the corresponding author of papers accepted for publication by *JFP*, and further that they consider whether or not provision would be open to all corresponding authors or just those that are IAFP Members.
- Page charges: It was agreed that the policy on page charges should remain as is.
- Articles related to Food Security: Warren Dorsa and Paul Hall reported on concerns with a paper published in *FPT* (August '03) entitled "Food as a Weapon". The issue of whether this could be used as a guide for food terrorists (professional or amateur) and freedom of speech considerations were discussed. *JFP* Editors indicated that currently they have procedures in place to review and consider whether such articles are appropriate for publication in *JFP*. However, the Committee agreed that the following recommendation be made to the Board:

Recommendations to the Board:

1. That the IAFP staff consider the financial implications of provision of a complementary electronic copy (PDF format) to the corresponding author of papers accepted for publication by *JFP*, and further that they consider whether or not provision would be open to all corresponding authors or just those that are IAFP Members.
2. Articles related to Food Security: Warren Dorsa and Paul Hall reported on concerns with a paper published in *FPT* (August '03) entitled "Food as a Weapon". The issue of whether this could be used as a guide for food terrorists (professional or amateur) and freedom of speech considerations were discussed. *JFP* Editors indicated that currently they have procedures in place to review and consider whether such articles are appropriate for publication in *JFP*. However, the Committee agreed that the following recommendation be made to the Board: That while the *JFP* Editorial Board has issues of security in mind when determining fitness of a paper for publication in *JFP*, a formal policy for articles relating to food security should be developed.
3. John Sofos has very kindly agreed to extend his term by four more years as Scientific Editor for *JFP*.

The Committee recognized that Ailsa Hocking, Eric Line, Servé Notermans and Jeff Rhodehamel were completing their term with the Committee this year and offered thanks for their significant contributions.

Next Meeting Date: August 8, 2004, Phoenix, AZ.

Meeting Adjourned: 11:45 a.m.

Chairperson: Isabel Walls.

Program Committee

Members Present: Gary Acuff, Catherine Donnelly, Alejandro Castillo, Emilio Esteban, Faye Feldstein, Gordon Greer, Margaret Hardin, LeeAnne Jackson, Tim Jackson, Vickie Lewandowski, Shelagh McDonagh, Lynn McMullen, Indaue Mello, Steven Murphy, and Ron Schmidt.

Members Absent: Ingrid Klinth Holm.

Board Members/Staff Present: Anna Lammerding, Paul Hall, Kathy Glass, David Tharp, and Bev Corron.

Guests: Over 10 guests attended the meeting.

Meeting Called to Order: 4:00 p.m.

Recording Secretary of Minutes: Gary Acuff.

Summary of Activities and Actions Taken: The following people have finished their term on the committee: LeeAnne Jackson, Ingrid Klinth Holm, Lynn McMullen, Karen Mullery, and Steven Murphy. On behalf of the Program Committee, we want to thank them for their contributions during their term. Their efforts were, in part, responsible for the successful programs presented at the Annual Meetings, and we truly appreciate all their hard work and dedication.

Members who will join the committee this year are: Alejandro Castillo, Faye Feldstein, Tim Jackson, Indaue Mello, and Ron Schmidt. Catherine Donnelly will serve as Vice Chairperson for IAFP 2004 and will become Chairperson for IAFP 2005 in Baltimore, MD.

The committee reviewed symposia and workshops proposed for IAFP 2004. Further review of all symposia will be made at the Wednesday meeting.

Summary of Program Committee Meeting, Wednesday, August 13: Members Present: Gary Acuff, Catherine Donnelly, Alejandro Castillo, Emilio Esteban, Faye Feldstein, Gordon Greer, Margaret Hardin, Tim Jackson, Vickie Lewandowski, Shelagh McDonagh, Indaue Mello, and Ron Schmidt.

Members Absent: None.

Board/Staff Present: Paul Hall, Kathy Glass, and Bev Corron.

Meeting Called to Order: 12:30 p.m.
The committee reviewed 45 proposed symposia. After detailed discussions, 10 proposals were rejected and 4 were recommended to be combined with other proposals. Total accepted symposia were 31. Letters will be sent out to the organizers with instructions to finalize their submissions. Final acceptance will be made at the January meeting.
The committee reviewed five workshop proposals. All five workshops were accepted for further development. Three workshops will be in conjunction with IAFP 2004. The remaining two workshops will be off-site workshops being planned for spring 2004.

Recommendations to Executive Board: The committee will draft a Proposed IAFP Policy on Non-presentation. This policy will affect poster and oral presenters who fail to present an accepted abstract at the Annual Meeting. It is recommended that upon acceptance by the Board, the policy take effect immediately.

Next Meeting: January 16–18, 2004, Phoenix, AZ.

Chairperson: Gary Acuff.

SPECIAL COMMITTEES

3-A Committee on Sanitary Procedures Committee

Members Present: Ron Schmidt and Charles Price.

Guests Present: Steve Sims (advisor), Dan Erickson, and John Bruhn.

Members Absent: Sherry Roberts, Randy Elsberry, William Fredericks, Michael Ely, Jon Lauer, Adolf Liebe, Gary Newton, Stephen Pierson, John Ringsrud, Stanley Welch, Lynn Wilcott, Don Wilding, and Philip Wolff.

Board Members/Staff Present: Jeff Farber and Didi Loynachan.

Meeting Called to Order: 10:05 a.m. (by Ron Schmidt, Acting for Sherry Roberts, Chairperson).

As a quorum was not achieved, no formal business was conducted at the meeting. Thus, the meeting was an informal discussion, or brain-storming session about the role of CSP.

Recording Secretary: Ron Schmidt.

Old Business: Report from 3-A Meeting, May 12–16, 2003, Milwaukee, WI.

New Business: The new directions of 3-A SSI were discussed. This process appears to be moving smoothly and CSP is in support of the direction it is moving. The current and future CSP role was discussed. It was emphasized that the strength of 3-A is the triad approach and that thorough review of standards by CSP is important to the integrity of the program.

Streamlining the Standards Writing Process: Ways in which CSP may facilitate or assist in streamlining the standards writing process was discussed. While there has been some suggestion that thorough nature of CSP may, in fact, slow down the process, it was the opinion of those assembled that this is not founded, and that such thorough review was imperative to the program. It is CSP's suggestion that the whole process be looked at with regard to identifying potential slowdown points or "log jams".

Several suggestions were discussed:

* Task forces need to be reminded to be more thorough in regard to submitting standards for review in better shape, with the scope more well-defined and using language from the current version of the 3-A Model Standard in writing standards and that the 3-A SSI clerical staff proofread and assist in making sure that the current model language is being used, and make appropriate editorial changes prior to the final submission;

* While consideration is given to staffing situation and the back-log of work prior to the May meeting, it was suggested that every attempt be made to provide standard documents to CSP members for review with more lead time than has been traditional. Further, the use of "Track Changes" feature in MSWord is strongly encouraged;

* CSP should have more involvement in the task forces and participate in the discussion throughout the process. The involvement of task force members in CSP discussion is also welcome and encouraged. However, the organizational structure of meeting separately should be continued;

* CSP should meet (as needed) more often than just the May meeting (suggested twice/year). This could be accomplished via conference call or internet/email. 3-A SSI should be pursued for funding (as appropriate) to facilitate such meetings;

* 3-A has a strong track record with regard to efficiency of standards writing when compared to the time lag involved with many other technical standards writing bodies (e.g. Codex, EHEDG);

3-A Annual Meeting. In discussion of the 3-A Annual Meeting, it was suggested that the format and scheduling of the May meeting should be evaluated to optimize time utilization and to allow for more interaction between CSP and task forces. Further, the time proximity of the meeting dates to those of the biennial NCIMS meeting may cause problems for CSP (and PHS) members which are heavily involved in NCIMS. It was further suggested that there be a general 3-A issues session at the next 3-A meeting.

Printing of Standards: CSP strongly suggests continuing the printing of 3-A standards in the IAFP Journal as a benefit to IAFP members. They further suggest that the process be evaluated to optimize the efficiency of timely printing of the standards.

Review and Revision of Documents: The 3-A Model Standard Document was discussed. This document has traditionally been a little "fluid", and often, different stakeholders may be using different versions of the document. This needs to be more efficiently handled and the document should be thoroughly reviewed and all changes and revisions be put through the 3-A process prior to final inclusion in the document.

NSF/3-A Document: It was suggested that this document may need to be reviewed and revised as well.

Third Party Verification/Certified Conformance Evaluators (CCE): The progress of the CCE examination and orientation process was discussed. Certification exams were given to CCE candidates at two locations. Plus, a CCE orientation has been held. Dan Erickson, a CCE, reported on these activities. In the discussion that followed, it was suggested that the CCEs will play a strong role in 3-A in the future.

Symposium Proposal for 2003 IAFP Meeting: The concept of CSP submitting a proposal for a symposium for the 2003 IAFP meeting was discussed. Schmidt and Smucker will put the proposal together with input from Price.

Recommendations to Executive Board: While this was not a formal meeting (quorum not achieved), no formal recommendations are given. However, the committee asks for board support in the issues discussed above.

Next Meeting Date:

The concept of holding a CSP meeting at the World Food Expo in October 2003 was discussed. This would depend upon the need for standards review activity.

The CSP will meet at the annual 3-A meeting as well as at the IAFP meeting in 2004.

Chairperson: Ronald H. Schmidt (Acting for Sherry Roberts).

Audiovisual Library

Members Present: Tom McCaskey, Judy Harrison, Don Schaffner, Dorothy Wrigley, Warren Clark, and Bob Sanders.

Members Absent: Kenneth Anderson, Debra Bradshaw, Alejandro Castillo, Debra Cherney, John Christy, Dean Cliver, Bernadette D.G.M. Franco, Veneranda Gapud, Donna Garren, Alice Haverland, Joseph Iwan, Ruff Lowman, Howard Malberg, David McSwane, Cindy Roberts, Jean Ross, Peter Slade, Frank Yiannas, and Anna Lammerding.

Guests Present: Robert Marshall and Gregory Phillips.

Board Members/Staff Present: Lisa Hovey and Lucia McPhedran.

Meeting Called to Order: 3:05 p.m.

Recording Secretary of Minutes: Judy Harrison.

Old Business: Review of library since last meeting. All requests for materials were fulfilled this year. The wait was no more than two weeks. Additional videos that were purchased made operation flow smoothly. New videos were purchased or donated totaling

$1,285.07 for 10 single titles and 1 series. Additional copies of two of the most popular ones were added for $358.40.

New Business:

1. Budget: Warren Clark recommended reviewing budget for last few years. After looking at figures, it was decided budget is adequate for now;
2. Member Survey: A recommendation was made to survey members about types of materials they would like to see in library. Lucia will draft a form for review and possible inclusion in *Food Protection Trends*, Affiliate newsletters, and on the Web site;
3. Long Range Goal: Make a searchable database of everything available for education and training in the food safety area and where to direct members to find materials not in our IAFP library;
4. Spanish materials: Call requests, 10% are for Spanish materials. Lucia will check to see if National Ag Library has more resources of this type. A particular area of interest will be in the poultry processing area. Judy Harrison will contact the IFT Extension Division about possible videos to include. Don Schaffner suggested that Tom McCaskey send all committee members an electronic list of holdings in the National Ag Library.

Recommendations to Executive Board: The committee would like to ask permission to include the AV survey in *Food Protection Trends* and on the IAFP Web site.

Next Meeting Date: August 8, 2004, Phoenix, AZ.

Meeting Adjourned: 4:40 p.m.

Chairperson: Tom McCaskey.

Committee on Communicable Diseases Affecting Man

Members Present: Ewen Todd, Bert Bartleson, Jack Guzewich, Judy Greig, Barry Michaels, Chris Griffith, Faye Feldstein, Pete Cook, and Sabah Bidawid.

Members Absent: Agnes Tan, Richard Swanson, Dean Cliver, Lori Simon, Dan Maxson, and Sagar Goyal.

Board Members/Staff Present: Kathleen Glass.

New Members/Guests: Peter Tips, Douglas Park, Jeanette Lyon, and Kristen Brown.

Meeting Called to Order: 8:15 a.m.

Recording Secretary of Minutes: Charles Bartleson.

Old Business:

1. Discussed this year's symposium (2003) on food worker hygiene.
2. Partially 2 papers on "The Importance of the Infected Food Handler in Foodborne Illness Outbreaks."

New Business:

1. Developed suggestions for symposium (2004).
2. Discussed future projects (risk assessment paper) and revision of booklets (HACCP).
3. A select group of the committee will continue working on the food worker-hygiene paper following the conference.

Recommendations to Executive Board:

1. Symposium (2004) "Transfer and Spread of Pathogens in Food Environments."
2. Does Executive Board want CCDAM to revise the HACCP manual beginning in 2004?
3. Write a draft of a risk assessment approach to food worker hygiene in 2004.

Next Meeting Date: August 8, 2004, Phoenix, AZ.

Meeting Adjourned: 6:00 p.m.

Chairperson: Ewen Todd.

Constitution and Bylaws

Members Present: Michael Brodsky, Ron Case, David Fry, and Robert Sanders.

Members Absent: None.

Board Members/Staff Present: Frank Yiannas and Didi Loynachan.

New Members: Charles Price.

Meeting Called to Order: 3:05 p.m.

Recording Secretary of Minutes: Michael Brodsky.

Old Business: None.

New Business:

1. Committee ratified all proposals to Bylaws that were approved by E-mail.

2. Michael Brodsky endorsed to remain as chairperson to 2004.
3. Ron Case unaminously endorsed to become chair after 2004.

Recommendations to Executive Board:

1. Reinstate C&B Committee membership of Charles Price and David Fry immediately.
2. Add Zeb Blanton, current president of Florida affiliate to committee (pending Frank Yiannas discussion with Zeb to confirm his willingness to serve).
3. Add Steve Murphy incoming chair of affiliate council as a committee member starting in 2004.
4. Accept committee recommendations for extension of Michael Brodsky's term as chair to 2004 and Ron Case's assumption of chair after 2004.

Next Meeting Date: August 8, 2004, Phoenix, AZ.

Meeting Adjourned: 3:20 p.m.

Chairperson: Michael Brodsky.

Foundation Fund Committee

Members Present: Stan Bailey, Jeffrey Farber, Paul Hall, Bob Marshall, Susan Sumner, Wilbur Feagan, Roger Cook, and Gale Prince.

Members Absent: Peter Hibbard, Kathleen Glass and Earl Wright.

Board Members/Staff Present: Anna Lammerding, Paul Hall, Lisa Hovey, and David Tharp.

Meeting Called to Order: 1:05 p.m.

Recording Secretary of Minutes: Bob Marshall.

Old Business:

1. Reviewed the investment policy of IAFP Board to invest in mutual funds with A. G. Edwards as advisor.
2. David Tharp explained that IAFP has allocated funds for support of speaker travel to augment those allocated by the Foundation. These are invested with Foundation Fund monies and should be accounted for separately.
3. Paul Hall announced the effort to gain corporate donations to the fund will be continued.
4. Paul Hall suggested a conference call of the committee between annual meetings would be valuable.

New Business:

Motion made, seconded and passed:

1. To include in the membership renewal form a line indicating a $10.00/member contribution to the Foundation Fund with the option for the member to strike out that amount from the form.
2. To include on the application form for exhibitors a contribution of $100.00 to the Foundation Fund with the option to strike that amount from the form.
3. To form a subcommittee to develop a plan for recognizing donors to the Foundation Fund. The sub-committee is Gale Prince (chair), Susan Sumner, and Stan Bailey.
4. That there be a mailing to IAFP members announcing that the Foundation Fund invites donations in memory of Harry Haverland the first and long-term chair of the fund committee who passed away in June 2003.
5. That the IAFP Board consider naming the Foundation Fund as follows: The Harry Haverland and IAFP Foundation Fund.
6. Gale Prince was nominated and elected by the committee as Vice Chairperson of the Foundation Fund Committee.
7. That efforts should be made to avoid conflicts between the times of the meeting of this committee and others on which the members serve.

Recommendations to Executive Board: That each of the motions passed by the committee be approved and endorsed by the Board of Directors of IAFP (except motion 3, a prerogative of the Foundation Fund committee).

Next Meeting Date: August 8, 2004, Phoenix, AZ.

Meeting Adjourned: 2:59 p.m.

Chairperson: Robert Marshall.

Nominating Committee

Members Present: Sam Palumbo, Lee-Ann Jaykus, LeeAnne Jackson, Carl Custer, Peter Slade, Michael Johnson, and Michael Davidson.

Board Members/Staff Present: Paul Hall and David Tharp.

Guests Present: John Cerveny.

Meeting Called to Order: 3:05 p.m.

Recording Secretary of Minutes: Sam Palumbo.

Old Business: Agenda and 2002 minutes approved.

New Business: Members of the committee proposed a list of potential candidates from the academic sector. From the suggested names, a list of 9 possible candidates was assembled. The committee will await input from the membership before holding a conference call in early November to select the final candidates for the ballot. Nominations close Oct. 31, 2003. Further details are given in the August, September, and October issues of *Food Protection Trends*.

The committee used the following criteria in selecting and evaluating potential candidates.

1. Promotes the goals of IAFP
2. Attends IAFP Annual Meeting on a regular basis
3. Leadership skills
4. Can work well with IAFP Membership and the IAFP professional staff
5. Prior IAFP participation on professional development groups, participation on appointed committees, organizer of symposia for Annual Meetings, etc.

Recommendations to Executive Board: None.

Next Meeting Date: Conference call, early November 2003.

Meeting Adjourned: 4:10 p.m.

Chairperson: Samuel Palumbo.

Past Presidents' Committee

Members Present: Jack Guzewich, Jenny Scott, Gale Prince, Ann Draughon, Dave Fry, Michael Brodsky, Ron Case, Harold Bengsch, Bob Sanders, Bob Gravani, and Henry Atherton.

Members Absent: Sid Barnard, Jim Dickson, Bob Marshall, Howard Hutchings, Orlowe Osten, Archie Holliday, Leon Townsend, and Earl Wright.

Board Members/Staff Present: Anna Lammerding and David Tharp.

Meeting Called to Order: 3:19 p.m.

Recording Secretary of Minutes: Jack Guzewich.

Old Business: Agenda and 2002 minutes approved.

New Business: Moment of silence for Harry Haverland, Dick Whitehead, and Bill Kempa; For 2003 Jack Guzewich and Jenny Scott to co-chair to bring chairmanship in line with by-laws; *JFP* online: questioned whether switching to online would allow for cost savings due to decreased publication and mailing costs, e.g. would online subscribers drop hard copy subscription thereby reducing those costs; suggestion made that international lounge might be established to encourage attention to these members; and discussion of Foundation Fund support for students. David Tharp discussed Association finances.

Recommendations to Executive Board:

1. That the board consider developing a program for financial support for students in the finals of the Developing Scientist Competition.
2. The Executive Board develop a policy for dealing with publication or presentation of food security-related information.

Next Meeting Date: August 8, 2004, Phoenix, AZ.

Meeting Adjourned: 4:35 p.m.

Chairperson: Jenny Scott and Jack Guzewich.

PROFESSIONAL DEVELOPMENT GROUPS

Applied Laboratory Methods PDG

Members Present: Timothy Jackson, Robert Brooks, Michael Brodsky, Elizabeth Johnson, Claire Lee, and Shelagh McDonagh.

Members Absent: Catherine Bowyer, Mueern Aslam, Donna Christensen, Nigel Cook, Joseph Eifert, Paulo Rogerio Franchin, Eileen Garry, Angelo Depaola, Jose Elizundia, Pete Friedman, James Gary, Kristi Harkins, Lee-Ann Jaykus, Dean Kirkeby, Richard Jacobs, Lee Jensen, Vidya Reddy Kethireddy, Kathy Kordana, Frederick Leung, Kim Lor, Ruby Lee, Bill Lionberg, Robert Marshall, Douglas McDougal, Lydia Mota De La Garza, Melissa Newman, Randall Phebus, Michael Roberson, Nandina Natrajan, Deog-Hwan Oh, Sandra L. Poirier, Lawreence A. Roth, Michael Ryan, James Schuman, Joe Shebuski, Jeanette Thurston-Enriquez, Theresa M. Scheuring, Thomas Schwarz, Elizabeth Tharrington, Yvon Trottier, Chris Wilkins, and Wei Zhang.

New Members: Patrice Arbault, Philip Combs, Patricia Rule, Jeff Kornacki, Michael Sole, Kay Sadler, Frederica Copeland, Orla Cloak, Ruth Eden, Christine Aleski, Michael Williams, Patricia Rule, Wendy Warren, Reginald Bennett, Jill Gebler, and George Wilson.

Meeting Called to Order: 10:00 a.m.

Recording Secretary of Minutes: Patricia Rule.

Old Business:

1. Thanked Robert Brooks for past performance as Chairperson.
2. Discussed the purpose of PDG for promotion of professional development related to specific area.
3. Reading of Anti Trust Statement.
4. Requested volunteer for minutes Secretary.

New Business:

1. General discussion of previous and current workshops
2. Requested update from Jeff Kornacki and Patricia Rule on this year's Workshop: Assuring Confidence in Laboratory Data.
   a. Jeff Kornacki reported the workshop to be success in spite of lower than expected attendance (9). The background of the attendees was appropriate for the content and there was a high level of discussion and interaction from all in attendance.
   b. All were in agreement to the value of the workshop and a repeat performance in 2004 under the new Title: "Defensible Data: Quality Systems for Microbial Food Analysis."
3. Chair requested input from the members for nominations for the 2004 Laboratorian Award. Criteria for the award will be emailed to current and new members so that nominations can be provided.
4. General discussions of symposium topics for 2004, with some possibilities for *Campylobacter, Enterobacter sakazakii,* Molecular Methodology, Validation of Methods.

   Agreement for two symposia:

   a. Evaluation and Implementation of New Methods, co-convenors Phillip Combs and Ruth Eden.
   b. Joint symposium with Microbial Risk Analysis PDG: "Risk and Control of *Enterobacter sakazakii*" co-convenors Maria Nazarowec-White/Tim Jackson.
5. General discussion about emerging concerns: *E. sakazakii Mycobacterium,* BSE and other toxicology testing methods. All in agreement for vigilance to the current environment and methods are not limited to microbiological testing (see mission statement — "To provide a forum for the exchange and sharing of information related to the development and use of laboratory methods for the analysis of food and related commodities").
6. Call for nominations for new Vice Chair. Patricia Rule nominated and voted in for new Vice Chair 2004.
7. Discussed the option of the Applied Methods PDG to have Web page on the IAFP Web site.
   a. Readings from the Committee Handbook (p. 20–21) for the general intent and guidelines for use.
   b. The members were in agreement that this would be a value to the group.
   c. No champion was assigned at this time.

Recommendations to Executive Board:

1. Propose Workshop for 2004: "Defensible Data: Quality System for Microbial Food Analysis", co-convenors Jeff Kornacki and Patricia Rule.
2. Propose Symposium for 2004: Evaluation and Implementation of New Methods, co-convenors Phillip Combs and Ruth Eden.
3. Propose symposium in cooperation with Microbial Risk Analysis PDG for "Risk and Control of *Enterobacter sakazakii*" co-convenors Maria Nazarowec-White/Tim Jackson.
4. Propose the development of a Web page for the Applied Laboratory Methods PDG on the IAFP Web site.

Next Meeting Date: August 8, 2004, Phoenix, AZ.

Meeting Adjourned: 12:05 p.m.

Chairperson: Timothy Jackson.

Dairy Quality and Safety PDG

Members Present: Steve Murphy, Gaylord Smith, Kay Sadler, John Rushing, Helene Uhlman, Linda Haywood, Stephanie Olmsted, Dan Erickson, Ron Schmidt, Charles Price, Joe Smucker, Steve Sims, C.R. Gilman, Gene Frey, Don Breiner, Kathy Glass, and Randy Daggs.

New Members: Melinda Fortune, Kristen Matak, Michelle Clark, John Bruhn, Dave Blomquist, Lori Ledenbach, Vickie Lewandowski, and John Sanford.

Meeting Called to Order: 1:10 p.m.

Old Business: Symposia Development:

A. Overview and update (S. Murphy).
   1. Topics offered for 2003: BSE – rejected because the topic was not about food safety. Foot and mouth – rejected the topic because it was no longer current/relevant. Regulatory review/update – initially approved; later rejected.
   2. Selection process: Last year Program Committee initially accepted 32 symposia for 24 spots. Initial selection process to be more stringent in 2004.
   3. Criteria to consider when submitting a symposium proposal: Well-planned – have appropriate selection of topics and speakers. Topic should be current or "timely." Topic must be fully developed by established deadlines.

B. Discussion/comments.
   1. Dairy students will often attend IFT for technical info.
   2. Students also attend ASM because of technical nature of dairy topics.
   3. Producer topics "not the way to go;" IFT seems most attractive to students. Dairy contingent still prominent among IAFP membership. Producer milk quality still important for retail product quality.
   4. Question: How do we encourage dairy science departments to send their students?
      A. Can the PDG advance technical issues?
      B. Laboratory methodology may be a topic to raise awareness.
      C. Consider a review of known dairy science/state of dairy science.

New Business:

Dairy symposia for 2004 Annual Meeting:

A. Suggested topics.
   1. Why is milk regulated?
   2. Raw milk cheese.
   3. Retail products shelf life.

B. Peripheral/Cross-over topics.
   1. Equipment sanitation (proposed by 3-A Committee on Sanitary Procedures).
   2. Alfatoxins (possible crossover subject with Toxicology PDG).

Board Recommendation:

1. Review committee membership – many inactive people still listed as active.
2. Consider ways to advertise IAFP dairy symposia among constituency.
3. Recommend Gaylord Smith as new PDG Chairperson.

Next Meeting Date: August 8, 2004, Phoenix, AZ.

Chairperson: Don M. Breiner.

Food Safety Network PDG

Members Present: Sid Camp, Giselle Julien-Davis, Steve Bell, Brian Himelbloom, and Paul Uhler.

Board Members/Staff Present: Jim Dickson and Donna Bahun.

New Members: Gideon Zeidler.

Meeting Called to Order: 10:07 a.m.

Recording Secretary of Minutes: Giselle Julien-Davis.

Old Business: No old business discussed.

New Business: Mission statement review: Mission statement was reviewed and accepted by group. Proposed by Brian Himelbloom, seconded by Giselle Julien-Davis "to provide IAFP members with information on current trends and issues in Food Protection."

Proposal for Symposia: Steve Bell proposed (seconded by Brian Himelbloom and unanimously accepted) submitting a topic for next years meeting. Topic will be "Emerging Technology and Applications in Food Safety and Security."

Recommendations to Executive Board:

1. Recommend accepting topic proposed by the Food Safety Network PDG, Emerging Technology and Applications in Food Safety and Security, as a mini 2-hour symposia for next years IAFP meeting.
2. To accept new PDG mission statement reading: "to provide IAFP members with information on current trends and issues in Food Protection."

Next Meeting Date: August 8, 2004, Phoenix, AZ.

Meeting Adjourned: 11:30 a.m.

Chairperson: Sid Camp.

Food Sanitation PDG

Members Present: Mark Moorman, Gordon Mowat, Frank Pool, Gloria Swick-Brown, Dennis Bogart, Peter Snyder, Veny Gapud, Ginny Moore, Scott Burnett, Tom Boufford, Larry Mendes, and Fred Reimers.

Board Members/Staff Present: Paul Hall.

New Members: Jeff Varcoe, Adel Makdesi, Charles Giambrone, Michael Curiale, Valerie W. Ling, Bill Weissinger, Zeb Blanton, John Foster, Lynn Helmers, Trevor States, Mark Carter, and Sally Vater.

Meeting Called to Order: 1:00 p.m.

Recording Secretary of Minutes: Mark Moorman.

Old Business: The allergen symposium proposed at the San Diego meeting was accepted and will convene Tuesday morning, August 12, 2003; Acceptance of revised mission statement will now state "To provide information on developments in cleaning and sanitation in the food industry."

New Business:

1. Food Safety Icons, Mark Carter has requested support from the Food Sanitation PDG in developing food safety icons for food manufacturing. Select members will support.
2. An opportunity to bring to membership a symposium on making the case for sanitation. Despite having knowledge, sanitation time and focus tend to go to the wayside.

Recommendations to Executive Board:

1. Proposal to consider symposium entitled "Sanitation – Because You Have to be Clean to be Safe."

Next Meeting Date: August 8, 2004, Phoenix, AZ.

Meeting Adjourned: 3:00 p.m.

Chairperson: Mark Moorman.

Fruit and Vegetable Safety and Quality PDG

Members Present: Philip Blagoyevich, Mahipal Kunduru, Toni Hofer, Bassam Annous, Alex Castillo, Nigel Cook, Donna Garren, Joe Furuike, Robert Gravani, Jack Guzewich, Linda Harris, Jennylynd James, LeeAnne Jackson, Stephen Kenney, Kali Kniel, Karl Matthews, Nancy Nagle, Servé Notermans, Franco Pagotto, Glenner Richards, Jena Roberts, Thomas Schwarz, Randy Worobo, and Tony Valenzuela.

Members Absent: Susan Abraham, Nese Basaran, Dave Beebe, William Bodenhamer, Maria Brandl, Dan Cahalan, Larry Beuchat, Robert Brackett, Fred Breidt, Carmine Cappuccio, Bruce Cords, Pascal Delaquis, Jeff Farrar, Rosario Corona, Peyman Fatemi, Paulo Franchin, Eileen Garry, John Gorman, Edith Garrett, James Gary, James Gorny, Sagar Goyal, Randy Groff, Brenda Halbrook, Judy Harrison, Alan Hathcox, Montserrat Hernandez Iturriaga, Bill Hoerner, Kook Hee Kang, Steve Hessey, Michael Jantschke, Alison Larsson, Les Lipschutz, Kathy Kordana, Ruby Lee, Howard Malberg, Cheryl McCall, Susan McKnight, Azlin Mustapha, Edna Negron, Deog-Hwan Oh, Lydia Mota De La Garza, Derrick Okull, Frances Pabrua, Enrique Palou, Jim Pfeifer, K. T. Rajkowski, Janell Percy, Sandra L. Poirier, David Riggs, Joan Rosen, Michael Ryan, Manan Sharma, Lawrence Roth, Robert Stovicek, Susan Sumner, Dike Ukuku, Michael Villaneva, Cha-Mei Tang, Marian Wachtel, Ming Chang Wu, Devon Zagory, and Wei Zhang.

Board Members/Staff Present: Frank Yiannas and Jeff Farber.

New Members: Mickey Parish, Rene Cardinal, Sabah Bidawid, Pamela Wilger, Shanna Lively, Ethan Solomon, and Brian Yuan.

Meeting Called to Order: 1:00 p.m.

Recording Secretary of Minutes: Toni Hofer.

New Business: 2004 Symposia/Workshop Ideas: The group discussed five workshop ideas with the top three submitted.

Recommendations to Executive Board: None at this time.

Next Meeting Date: August 8, 2004, Phoenix, AZ.

Meeting Adjourned: 2:40 p.m.

Chairperson: Philip Blagoyevich.

Meat and Poultry Safety and Quality PDG

Members Present: Gary Acuff, Carl Custer, Stan Bailey, Phil Blagoyevich, Michael Bradley, John Cerveny, Warren Charminski, Al Fain, Jerry Erdmann, Margaret Hardin, Richard Holley, Ruff Lowman, Shelagh McDonagh, Lynn McMullen, Ann Marie McNamara, Joseph Meyer, Randall Phebus, Dianne Peters, Jeff Rhodehamel, Jenny Scott, and Paul Uhler.

New Members: Eric Johnson, Marcos Sanchez, Suzanne Duquette, Ian Jenson, Peter Bodnaruk, Bruno Cristau, Denise Ebler, Kristina Barlow, John McEvoy, Gary Acuff, Andres Vargas, Kevin Webster, Adriana Velasquez, Wafa Birbari, and Orla Cloak.

Old Business: Thanked outgoing chairperson Ruff Lowman. Ruff reviewed current symposia. Chairperson Carl Custer read anti-trust guidelines.

New Business: Chair outlined three proposed symposia for 2004; Chair called for nominees for Vice Chairperson. Gary Acuff nominated Margaret Hardin. No other nominations. Margaret Hardin elected by acclamation.

Chair called for new symposia for 2004.

- Nuts and Bolts of Validation (Acuff and McNamara).
- Secondary Inhibitors (R. Phebus and R. Holley).
- Need for Leak-proof Packaging for Raw Products (R. Lowman).

Recommendations to Executive Board: None.

Next Meeting Date: August 8, 2004, Phoenix, AZ.

Meeting Adjourned: 1:05 p.m.

Chairperson: Carl Custer.

Microbial Risk Analysis PDG

Members Present: Servé Notermans, Philip Blagoyevich, Yuhuan Chen, Dianne Peters, Robert Sanderson, Jenny Scott, Ewen Todd, Barry Michaels, Jerry Erdmann, Maria Nazarowec-White, Ken Malone, Tony Valenzuela; Joseph Meyer, Don Schaffner, Richard Whiting, Leon Gorris, Michael Brodsky, Lee-Ann Jaykus, and Ruff Lowman.

Board/Staff Members Present: Anna Lammerding.

New Members: Paul Baxter, John Bassett, Michael Curiale, Richard Hayes, Jean Kamanzi, Mickey Parish, and Jeff Varcoe.

Meeting Called to Order: 10:15 a.m.

Recording Secretary of Minutes: Leon Gorris.

Welcome and Introduction. The chair welcomed all present. All attendees briefly introduced themselves. The PDG membership roster was circulated for additions & corrections.

Minutes of 2002. The meeting approved these.

Additional agenda items. No new items were submitted.

Old Business. Don Schaffner recalled the request at last years PDG for members to submit articles for publication in *Food Protection Trends*. Don has now 2 articles in press on application of MRA techniques. Don found *FPT* very easy to work with and experienced a fast turn-around time in the peer-review process. The chair encouraged the meeting to consider *FPT*.

Ewen Todd mentioned the IAFP document meant to assist risk managers in Risk Assessment that he had been working and which had featured in last years' PDG meeting (working title: "Procedures to Conduct a Risk Analysis in the Food Microbiology domain using a Decision-based Framework"). He mentioned that the IAFP Committee on Communicable Disease Affecting Man will look at it later this week. He called for interest from the PDG to be involved in future work on the document. Jean Kamanzi and Leon Gorris raised interest. Ewen asked others interested to make their interest known to him or Leon.

News of interest: The chair recalled the successful "Hands-on Course on Quantitative Microbial Risk Assessment by Don Schaffner and Richard Whiting", held preceding the annual meeting of IAFP 2003. He next mentioned the various relevant symposia scheduled at the Annual Meeting:

- Hazard identification in the fresh produce industry (Jennylynd James)
- Effective food worker hygiene interventions: a risk assessment approach (Ewen Todd)
- Risk/modeling session
- Risk/communication: putting food safety in perspective (Tony Flood)
- Risk modeling technical session: (Don Schaffner)
- ILSI-Symposium: Use of food safety objectives and other risk-based approaches to reduce foodborne listeriosis
- ILSI-Symposium: Science-based shelf-life dating of ready-to-eat refrigerated foods

Richard brought to the attention of the meeting the various FAO/WHO activities in Risk Analysis and Microbial Risk Assessment. The organizations are about to issue guidelines on Hazard Characterization, Exposure assessment and Risk Characterization. Several MRA studies have been undertaken. The one on *Salmonella* is concluded. MRAs on *Listeria*, *Campylobacter* and *Vibrio* are ongoing. Anna Lammerding mentioned that a call for data on *E. coli* O157:H7 is out, in preparation of a new MRA on this pathogen by FAO/WHO. More details can probably be found through: http://www.who.int/fsf.
The Chair noted that the PDG has a Web site at: http://www.foodprotection.org/about%20IAFP/committees/microbialrisk.htm.

Servé Notermans informed the meeting of a European Union sponsored research project on the use of Microbial Risk Assessment to guide the specification of Time Temperature Integrators. The project is in its second year, covers three commodities and runs under the 5th Framework program. More info can be obtained via Servé (notermans@voeding.tno.nl).

Nominations for vice-chairperson. The chair asked for nominations from the meeting. There were none. He informed the meeting that Aamir Fazil and Mark Tamplin, both PDG members, had expressed their willingness to fulfill the function. Shortly after the annual meeting an e-mail ballot will be initiated to involve all PDG members in the election. A short description of the nominees' areas of interest will be provided as requested by the meeting.

Ideas for symposia and workshops in 2004. Richard Whiting and Don Schaffner asked the meeting for their consent that they could submit the "Hands-on course on QMRA" to be re-run off-site (not in conjunction with the Annual meeting). Consent was given.

The chair mentioned that several lecture topics or symposia ideas were sent in before the meeting by a number of PDG members.

The meeting discussed these and many other proposals from the meeting at length. It was found advisable to limit the topics that would actually be submitted for consideration by the program committee. Small groups (members indicated in parenthesis) took the following topics further.

Lectures on the actual use of MRA results in practice for risk management and/or decision-making in different contexts: government, industry, developing countries (Leon Gorris, Richard Whiting, Jean Kamanzi, and Ewen Todd).

Lectures on "data in MRA", possibly covering use of industry data, sampling protocols, use of expert opinion. (Don Schaffner, John Bassett, and Michael Brodsky).

Lectures on the use of cutting-edge investigative molecular biology methods in MRA, e.g. use of genomics for sub-typing, characterizing virulence, etc. (Yuhuan Chen, Ruff Lowman, and Richard Hayes, Don Schaffner).

Together with the PDG "*Applied Laboratory Methods*" a symposium would be proposed on *E. sakazakii*. This could cover topics on methodology, physiology, ecology and risk assessment (Michael Brodsky PDG contact).

Next Meeting Date: August 8, 2004, Phoenix, AZ.

Meeting Adjourned: 11:45.

Chairperson: Richard Whiting.

Outreach Education PDG

Members Present: Veny Gapud.

New Members: Robert Brooks, Christine Bruhn, John Rupnow, Gordon Mowat and Bill Weissine.

Board Members Present: Jeff Farber.

Meeting Called to Order: 3:00 p.m.

Recording Secretary of Minutes: Robert Brooks.

Old Business: Two pamphlets updated since the last PDG meeting: "Before Disaster Strikes...A Guide to Food Safety in the Home" and "Food Safety at Temporary Events" were distributed and reviewed.

An agenda item suggested that additional outreach pamphlets be developed. This item was tabled for review in 2004.

Another agenda item proposed a modification of the mission statement for the PDG. The proposed statement was rejected. However, the PDG did adopt a modified mission statement. The mission statement now reads: The mission of this Professional Development Group is "To develop and disseminate outreach educational materials for consumers and educators."

PDG chairperson and vice-chairperson responsibilities were vacant as of this meeting. Robert Brooks agreed to chair the PDG while Gordon Mowat agreed to serve as vice chairperson. The membership wishes to recognize the contribution of Veny Gapud in service as chairperson and facilitator during this meeting

New Business:

The PDG decided to communicate via e-mail to incorporate the new membership's considerable experience from extension service and outreach into a cohesive plan to reach our target audience.

Operational paradigms were adopted. Our tactic is to identify our target audience (church organizations, science teacher organizations) and query them as the most effective mechanism to reach them. Secondly, we plan to assemble existing outreach materials as links for our PDG.

While various academicians and extension specialists have work to present, we decided to review the possibility of an outreach symposium for the 2004 meeting.

Recommendations to the Executive Board:

1. Convert the two updated pamphlets to PDF format and make them available on the IAFP Web site. Our feeling here is that printed copies are expensive to produce and expensive to purchase in this time of economic uncertainty. As our objective is dissemination, a PDF format enables dissemination while protecting IAFP from liability.
2. To accept a new PDG mission statement reading, "to develop and disseminate outreach educational materials for consumers and educators."

Next Meeting Date: August 8, 2004, Phoenix, AZ.

Meeting Adjourned: 5:00 p.m.

Chairperson: Robert Brooks.

Retail Food Safety and Quality PDG

Members Present: Joe Eifert, Carl Custer, Gordon Mowat, Al Fain, Pete Snyder, Tom McCaskey, Alex von Holy, Kathleen O'Donnell, Jena Roberts, Larry Mendes, Colleen Gemmill, Milinda Fortune, Fred Reimers, Tom Schwarz, and Frank Yiannas.

Board Members/Staff Present: Anna Lammerding and David Tharp.

New Members: Courtney Holbrook, Lynn Helmers, John Foster, Charles Otto, Faye Feldstein, Susan McKnight, Trevor States, Gloria Swick-Brown, Pam Metheny, Zeb Blanton, and Peter Kennedy.

Meeting Called to Order: 10:00 a.m.

Recording Secretary of Minutes: Joe Eifert.

Old Business:

1. Reviewed symposia developed last year #S04 Recipe for Food Safety at Retail.
2. Discussed International Food Safety Icons project.
3. Members provided several suggestions to IAFP Executive Board.
4. Suggestion to have the icons adopted by the Conference by Food Protection.
5. Suggestion to promote icons through Extension Educators via OSREES or IFT Extension Division.
6. Zeb Blanton and Larry Mendes volunteered to organize a Web site with links to other graphics/icons Web sites for food safety.

New Business:

1. Symposium proposal outlined for 2004 Annual Meeting. Tentative title: "Retail Food Safety Risks – Protecting Public Health and Changing Behaviors."
2. A second symposium proposal was discussed and will be submitted by Peter Snyder.
3. Elections were held for new Chairperson and Vice Chairperson. Four members were nominated. Election winners: Joe Eifert, chairperson and Al Fain, Vice Chairperson.
4. Members suggested more frequent or regular communication from this PDG prior to next year's annual meeting.
5. Suggestion to develop a 2005 meeting symposia on food safety at institutions (schools, prisons, and hospitals).
6. Pete Snyder requested volunteers to author chapters on several topics for a book (to be published by IFT) based on a document. "Retail Food Operations HACCP-TQM Technical Guidelines."
7. Pete Snyder requested volunteers to help write a paper for *Food Protection Trends* that will report HACCP validation studies for new retail foods.

Recommendations to Executive Board:

1. Take digital photos of PDG members at meetings and add to appropriate Web site.
2. International Food Safety Icons
   a. Add a higher resolution format (jpeg) to the IAFP Web site or provide a weblink to jpeg files. This will facilitate use by many groups and individuals.
   b. Provide a black and white only version of the icons for those who cannot print in color.
   c. Ask commercial label company to produce the icons as stick-on labels for purchase.
3. Approve Joe Eifert as Chairperson and Al Fain as vice chairperson.

Next Meeting Date: August 8, 2004, Phoenix, AZ.

Meeting Adjourned: 11:50 a.m.

Chairperson: Joe Eifert.

Seafood Safety and Quality PDG

Members Present: Brian Himelbloom, Peter Hibbard, Doug Marshall, and Linda Andrews.

Members Absent: All Others.

Board Members/Staff Present: Donna Bahun, Jim Dickson, and David Tharp.

Guests Present: Ron Case.

New Members: Marlene Janes, Greg Brun, and Kathleen O'Donnell.

Meeting Called Order: 1:10 p.m.

Recording Secretary of Minutes: Linda Andrews.

Introductions of members present.

Agenda approved. Linda Andrews moved, Marlene Janes seconded.

Old Business:

1. Minutes moved for approval by Peter Hibbard, Marlene Janes seconded. Approved.
2. Announcement of two symposia 2003
    a. Peter Hibbard announced that industry members he knows will attend meeting this year because of symposia topics.
    b. Of the three symposia that were submitted for approval, two of them were accepted by the program committee. Of the 48 symposia submitted to IAFP, 25 were accepted and two were seafood related.

New Business:

Workshop Proposal — One-day Workshop: "Best Practices for Quality Aquaculture Products" – Organizer: Doug Marshall.

Shellfish (crustacean and mollusks) – Instructor: Linda Andrews.

Finfish Warmwater – Instructor: Doug Marshall.

Finfish Coldwater – Instructor: Tom Gill.

What Works for Industry: Instructor to be identified.

Field Trip to Aquaculture Facility in Arizona.

Intended audience: Seafood retailers, processors, producers, regulatory officials (state and national).

What will the audience learn: Proven methods to control quality and safety problems associated with production and processing.

Next Meeting Date: August 8, 2004, Phoenix, AZ.

Symposium Title:

"Seafood Packaging" – Co-convenors/Organizers– Marlene Janes and Kathleen O'Donnell.

C. botulinum – Graham Fletcher.

Edible Films – Marlene Janes.

Industry Perspective "Balancing The Business" – Jeff Rhodehamel.

Regulatory Perspective – National Fisheries Institute, Roy Martin.

Modified Atmosphere Packaging (MAP) – Doug Marshall.

Active Packaging and Time-Temperature Integrators (TTIs) – Industry leader to be determined.

Intended audience: Seafood retailers, processors, producers, regulatory officials (state, national, international), academics.

Recommendations to Executive Board: We recommend that the Executive Board accept the symposium and workshop proposals from the Seafood Safety and Quality Professional Development Group.

Next Meeting Date: August 8, 2004, Phoenix, AZ.

Meeting Adjourned: 2:59 p.m.

Chairperson: Brian Himelbloom.

Student PDG

Members Present: Total present – 73, Total Members – 59, including Michelle Danyluk, Chair; Renee Raiden, Vice Chair; Justin Ransom, Treasurer; Yash Burgula, Secretary; and Manan Sharma, Outgoing Chairperson.

Meeting Called Order: 1:20 p.m.

Recording Secretary of Minutes: Yash Burgula.

Old Business: Session monitor summaries: published in the June 2002.

New Business: Session monitor sheet posted on the board. Third symposium is on Monday afternoon, August 11, 2003. Introduced the new officers for the SPDG. Renee talked about the t-shirt program. She encouraged everyone to buy a t-shirt and participate in the job fair.

The fundraiser money will be put towards the mixer (suggestion from Manan). Justin should also look at the mixer and organize it. Another fundraiser with golfing! (Challenge people to a contest.) Use the money raised from the lowered International student rate to contribute towards social causes. Manan talked about the role of SPDG, its objectives and the benefits to the student members. Michelle encouraged further inputs/thoughts about fundraising. Justin raised the possibility for setting up means to raise more interaction within the exhibitors. Something like the IFT's "Students as Exhibitors".

Michelle encouraged students to encourage other students from their respective universities to get involved with the IAFP's SPDG. Jeffrey Rhodehamel from Cryovac was the guest speaker at the SPDG luncheon. To discuss the speakers for next year's SPDG symposium "International Food Safety Opportunities" and "Challenges in the Developing World." Students would be encouraged to submit their resumes at the SPDG. Michelle talked about discussing the "Students as Exhibitors" idea with the companies.

Recommendations to Executive Board:

1. Current annual membership rates for international student members should be reassessed and possibly changed. Student members in the United States currently pay $47.50, and students from Canada and Mexico pay $62.50 with a subscription to *Journal of Food Protection*. However, students in other countries pay $92.00 for membership with subscription to *JFP* or $72.50 with a subscription to *Food Protection Trends*. While we are aware of the administrative costs of maintaining records of international members and the shipping costs of journals overseas, we find these membership costs prohibitively high and possibly exclusionary to those international students who are interested in joining IAFP. We would like to suggest an international student membership rate that is lower in price that would include secure access to the online version of *Journal of Food Protection*. If providing online access ONLY to the journal would reduce shipping costs of the journal overseas, then maybe international student membership rates could be reduced. We would appreciate the Board's interest into this matter.
2. The current name of the Student Professional Development Group should be changed. Although the Student Professional Development Group (SPDG) accurately describes our PDG, saying the name of this group is sometimes long and confusing to students new to IAFP. Therefore, we would like to change the name to the Student Association of the International Association for Food Protection. We would still like to be considered a PDG and would be governed by the rules and regulations associated with PDGs, but a simpler name may be less confusing them the current one.
3. Providing a partial travel stipend for the officers of the SPDG should be considered. The SPDG appreciates IAFP's efforts in the past to support student travel to the annual meeting through the session monitor program. Although it is understood that other PDG officers do not receive travel funds, we think that students are in a unique situation in their professional development compared to other members of IAFP. Providing a partial travel stipend for the officers would also encourage other student members to become involved in the SPDG leadership as well.

Next Meeting Date: August 8, 2004, Phoenix, AZ.

Meeting Adjourned: 1:45 p.m.

Chairperson: Michelle Danyluk.

Viral and Parasitic Foodborne Disease PDG

Members Present: Lee-Ann Jaykus, Nigel Cook, Yvon Trottier, Judy Greig, Gail Greening, Bart Bartleson, and Sabah Bidawid.

Members Absent: Charles Bartleson, Philip Blagoyevich, Rosana Cheng, Ma. Rocelle Clavero, Dean Cliver, Pete Cook, Theresa Cromeans, Custy Fernandes, Bruce Cords, Carl Custer, Pete Friedman, James Gary, Kristi Harkins, Kali Kniel, Jack Guzewich, James Hartman, Melvin Kramer, Lourdes Labrador, Howard Malberg, Joseph Meyer, Lydia Mota De La Garza, Ivan Linjacki, Dan Maxson, Christine Moe, Douglas Park, Sandra Poirier, Laura Reina, Mike Ryan, Nancy Reimer, Gary Richards, Parmesh Saini, Huw Smith, Pete Snyder, Bruce Stewart-Brown, Cha-Mei Tang, Jeanette Thurston-Enriquez, Mark Sobsey, Gloria Swick-Brown, Paula Tanner, Paul Uhler, Ahmed Yousef, and Wei Zhang.

Board Members/Staff Present: Jim Dickson.

New Members: Julie Jean, Alain Houde, Kristen Brown, Peter Tips, Doris D'Souza, and Franco Pagotto.

Meeting Called to Order: 1:00 p.m.

Recording Secretary of Minutes: Lee-Ann Jaykus.

Old Business: Unanimously passed minutes of 2002 meeting.

New Business: Sabah Bidawid presented the food and environmental virology network that is under development in Canada. Nigel Cook mentioned a similar network proposed in Europe. Both are

intended to be international in scope and provide a forum for collaboration communication, and exchange. This PDG can faciliate this. A proposal for a symposium next year was developed and presented to the PAC. Symposium title: "Impact of Environmental Viral and Parasitic Contamination on Food Safety."

Recommendations to Executive Board: None.

Next Meeting Date: August 8, 2004, Phoenix, AZ.

Meeting Adjourned: 11:00 a.m.

Chairperson: Lee-Ann Jaykus.

Water Safety and Quality PDG

Members Present: Susan McKnight, Michael Brodsky, K. T. Rajkowski, Jack Guzewich, Peter Kennedy, M. Nazarowec-White, Jeanette Thurston-Enriquez, and Isabel Walls.

Board Members/Staff Present: Frank Yiannas and Didi Loynachan.

New Members: Doug Park, Neil Webb, Louise Fielding, Adrian Peters, Louise Fielding, Jayne Drake, and Ken Malone.

Meeting Called to Order: 1:00 p.m.

Recording Secretary of Minutes: Susan McKnight.

Old Business: Review of symposium booklet for IAFP 2003 Symposium – Emerging issues in Water Quality for the Food Industry.

New Business:

1. Review of suggestions received from emails to PDG members in May and June for 2004 symposium. Two ideas were formulated and submitted to the Program Committee – a symposium on "Water's Role in Food Contamination" and a roundtable proposal.
2. Wiley and Sons interest in the PDG publishing a book on water quality and food safety was rejected at this time.

Recommendations to Executive Board:

1. Susan McKnight stay on as Chairperson another year.
2. The PDG would like to have the symposium (2003), put on its Web site with speaker's approval.

Next Meeting Date: August 8, 2004, Phoenix, AZ.

Meeting Adjourned: 3:00 p.m.

Chairperson: Susan McKnight.

Affiliate Council Minutes

IAFP 2003 – August 10, 2003

Held at the Hilton New Orleans Riverside
New Orleans, Louisiana

Affiliates Present:

Alabama	Tom McCaskey
Brazil	Maria Teresa Destro
British Columbia	Terry Peters
California	John Bruhn
Capital	Carl Custer
Carolina's	Jeff Rhodehamel
Florida	Peter Hibbard
Georgia	David Fry
Indiana	Helene Uhlman
Kentucky	Sue Jewell
Metropolitan	Fred Weber
Michigan	Becky Ouellette
Missouri	Linda Haywood
Nebraska	Tom Tieso
New York	Steve Murphy
Ohio	Gloria Swick-Brown
Ontario	Gail Evans Seed
Pennsylvania	Gene Frey
Southern California	Margaret Burton
Texas	Fred Reimers
United Kingdom	David Lloyd
Upper Midwest	Dan Erickson
Washington	Stephanie Olmsted
Wisconsin	Randy Daggs

Members Absent: Alberta, Quebec, Korea, Mexico, Connecticut, Idaho, Illinois, Iowa, Kansas, Mississippi, North Dakota, South Dakota, Tennessee, Wyoming.

Board Members/Staff Present: Anna Lammerding, Paul Hall, Kathy Glass, Jeff Farber, Jim Dickson, Frank Yiannas, David Tharp, Lisa Hovey, and Lucia Collison McPhedran.

Guests: Michelle Clark, Judy Greig, Shelly Rodrigo, Sid Camp, Zeb Blanton, and Charles Price.

Meeting Called to Order: 7:15 a.m.

Recording Secretary of Minutes: Steve Murphy.

Introduction and roll call.

Report from IAFP Executive Board: Anna Lammerding, IAFP president welcomed the affiliates with a special welcome to our newest affiliate from the United Kingdom. She also announced that the charter for the Portugal Association for Food Protection was just accepted by the Executive Board (member not present). David Lloyd commented on the nature of the UK affiliate with emphasis on intentions for outreach to the rest of Europe to spread the word on IAFP.

Anna continued by discussing the status of the IAFP journals (*JFP* and *FPT*) while noting the growth of manuscript submissions online and the over all appeal of the new name and cover designs for *FPT*. Anna stressed the importance of our Committees and Professional Development Groups, informing the affiliates of the exploration of a new PDG on Food Toxicology as well as the development of the International Food Safety Icons by the Retail Food Safety and Quality PDG. Frank Yiannas commented that these icons were developed and screened with a focus group of nearly 400, most of whom were non-English speaking individuals. Kathy Glass added to the PDG discussion, indicating that the Outreach Education PDG has developed materials on Crisis Response and Food Safety Procedures for Temporary Food Service Operations (e.g., church groups). Anna also indicated that the Student PDG was active and doing well. Anna closed her comments by informing the affiliates that this year's Annual Meeting will be dedicated to Harry Haverland who will be dearly missed by the organization and whose legacy will live on in the IAFP Foundation Fund.

Report from IAFP Staff: Executive Director, David Tharp welcomed the affiliate members with positive news about the IAFP membership, which is at approximately 3,000 with 9 Gold/Silver Sustaining Members. The IAFP Web site continues to improve and the use of online subscriptions to *JFP* is on the rise. The annual meeting appears set to break last years record with approximately 1,350 pre-registered. Over 420 abstracts were received and 46

symposia were submitted. With limited slots for presentations, these increases present challenges for the Program Committee. In addition to increased presentation submissions the number of exhibitors are up as well as the sponsorships, reflecting the growing interest and dedication to IAFP.

Lucia Collison McPhedran reminded the affiliate delegates of the services provided by IAFP, requesting that she be kept up-to-date on affiliate activities and that they provide materials for the newsletter. It was suggested (Tom McCaskey, AL) that affiliate programs be included in the newsletter or alternatively on the Web site. Peter Hibbard (FL) praised the quality and content of the newsletter.

Election of Affiliate Council Secretary: Chairperson Gene Frey reported that Stephanie Olmsted (WA) was selected by the nomination committee to serve as Incoming Affiliate Council Secretary. No further nominations were made and a motion was made to close the nominations by Carl Custer (Capital Area) and seconded by Jeff Rhodehamel (Carolinas). Stephanie was elected by unanimous vote. Stephanie accepted and also was welcomed by Anna and Gene, and indicated that she looked forward to serving.

Affiliate Reception: The members indicated that the reception went very well and it was stated that "they get better every year" (David Fry, GA). Fred Weber was thanked as a sponsor, with a reminder that sponsorship is needed for future receptions, which council expressed they would like to continue.

Affiliate Status: Gene welcomed again the new affiliates from the United Kingdom (present) and Portugal (not present). Delegates from our three newest affiliates, David Lloyd (UK), Margaret Burton (So. Cal.) and Maria Teresa Destro (Brazil) described the process of becoming an IAFP affiliate. Gene briefly discussed the compliance status of the affiliates, which he indicated was in good shape due to the hard work and dedication of the affiliates and the IAFP staff. Two former affiliates are no longer associated with IAFP. Massachusetts withdrew while Virginia had discontinued contact with IAFP.

Affiliate Awards: Gene recognized the accomplishments of all affiliates indicating that selecting award recipients has become a difficult process because of the range of activities and quality of the reports. Awards went to Ontario Food Protection Association (Shogren Memorial Award); Wyoming (Highest Percentage Increase); Southern California (Highest Number Increase); Wisconsin (Best Educational Conference); Kentucky (Best Annual Meeting); and New York (Best Communication Materials). A motion was made to drop the 2 existing membership awards and to replace these with a single Membership Achievement Award that recognized affiliates efforts and innovations at increasing membership within the affiliate with less emphasis on actual numbers. John Bruhn made the motion, which was seconded by Gloria Swick-Brown and accepted by the council. A "proposal" to not allow an affiliate to win an award two years in a row was discussed and rejected by the council.

New Business: Affiliates were reminded that "Fellows" award nominations could come from the affiliates. Certificate of Merit nominations were also encouraged. Paul Hall brought up a suggestion from the board to consider moving the Affiliate Council Meeting to Saturday afternoon in conjunction with the Affiliate Reception. This was to allow greater flexibility in board member schedules. Discussion leaned toward leaving the council meeting as a Sunday morning breakfast meeting and a show of hands confirmed this.

Affiliate Reports: Affiliate delegates present gave a brief synopsis of their activities over the past year reflecting membership, scholarships, educational and annual meetings, newsletters and Web sites and association with IAFP and other organizations.

Recommendations to Executive Board:

1. Randy Daggs indicated that it would be nice to have a date put on the awards so affiliates can keep track of which year(s) the award was won.
2. John Bruhn suggested (after the council meeting) that PDGs and other committees update their member lists to be current with active members.

Passing of Gavel: Chairperson, Gene Frey expressed his appreciation and enjoyment in serving as Affiliate Council Chairperson, thanking the affiliates, Lucia and David and the IAFP staff and board. He then passed the gavel to Steve Murphy signifying the beginning of his term as chairperson of the affiliate, who indicated that he was looking forward to his term and welcomed all input from the affiliate council.

Next Meeting Date: August 2004, Phoenix, AZ.

Meeting Adjourned: 10:15 a.m.

Chairperson: Gene Frey.

Committee and Professional Development Group

Executive Board's Response to the Committee Recommendations

New Orleans, Louisiana
August 10, 2003

AFFILIATE COUNCIL

Recommendations to the Executive Board:

1. Randy Daggs indicated that it would be nice to have a date put on the awards so affiliates can keep track of which year(s) the award was won.
Board Response: This has been addressed and is being done now.

2. John Bruhn suggested (after the council meeting) that PDGs and other committees update their member lists to be current with active members.
Board Response: Chairpersons have been asked to update all committee and PDG lists.

STANDING COMMITTEES

FOOD PROTECTION TRENDS

Recommendations to the Executive Board:

1. *FPT* to formulate a policy for enhanced review of articles that impact food safety and security.
Board Response: Agree. The Board asks *FPT* and *JFP* Scientific Editors along with the Chairperson and Vice Chairperson of both committees to prepare a policy addressing review of articles dealing with sensitive subject matters such as bioterrorism and homeland security for Board review and acceptance as soon as possible.

2. Bill LaGrange be reappointed for another four-year term as Scientific Editor.

Board Response: Agree.

JOURNAL OF FOOD PROTECTION

Recommendations to the Executive Board:

1. That the IAFP staff consider the financial implications of provision of a complementary electronic copy (PDF format) to the corresponding author of papers accepted for publication by *JFP*, and further that they consider whether or not provision would be open to all corresponding authors or just those that are IAFP members.
Board Response: Agree. Staff to review financial considerations and report to the Board at the January Board meeting.

2. That while the *JFP* Editorial Board has issues of security in mind when determining fitness of a paper for publication in *JFP*, a formal policy for articles relating to food security should be developed.
Board Response: Agree. The Board asks *JFP* and *FPT* Scientific Editors along with the Chairperson and Vice Chairperson of both committees to prepare a policy to address review of articles dealing with sensitive subject matters such as bioterrorism and homeland security for Board review and acceptance as soon as possible.

3. John Sofos has very kindly agreed to extend his term by four more years as Scientific Editor for *JFP*.
Board Response: Agree.

PROGRAM

Recommendations to the Executive Board:

1. The committee will draft a Proposed IAFP Policy on Non-presentation. This policy will affect poster and oral presenters who fail to present an accepted abstract at the Annual Meeting. It is recommended that upon acceptance by the Board, the policy take effect immediately.
Board Response: Agree. The Board asks the Program Committee to draft a policy for Board review and acceptance.

SPECIAL COMMITTEES

3-A COMMITTEE ON SANITARY PROCEDURES

Recommendations to the Executive Board:

1. While this was not a formal meeting (quorum not achieved), no formal recommendations are given. However, the committee asks for board support in the issues discussed previously.
   Board Response: The Board will review issues discussed and provide support where possible.

AUDIOVISUAL LIBRARY

Recommendations to the Executive Board:

1. The committee would like to ask permission to include the AV survey (to be written) in *Food Protection Trends* and on the IAFP Web site.
   Board Response: Agree. Once survey is written, provide to IAFP office for publication.

COMMUNICABLE DISEASES AFFECTING MAN

Recommendations to the Executive Board:

1. Symposium (2004) "Transfer and Spread of Pathogens in Food Environments"
   Board Response: Program Committee will review and notify you about its status.

2. Does Executive Board want CCDAM to revise the HACCP manual beginning in 2004?
   Board Response: Currently, it is felt that there is an abundance of HACCP materials available and that IAFP does not need to "reinvent" what is already available.

3. Write a draft of a risk assessment approach to food worker hygiene in 2004.
   Board Response: The Board needs additional information and to be able to compare it to the article currently being completed by the Committee.

CONSTITUTION AND BYLAWS

Recommendations to the Executive Board:

1. Reinstate C&B Committee membership of Charles Price and David Fry immediately.
   Board Response: Agree.

2. Add Zeb Blanton, current president of Florida Affiliate to committee (pending Frank Yiannas discussion with Zeb to confirm his willingness to serve);
   Board Response: Agree.

3. Add Steve Murphy incoming Chairperson of Affiliate Council as a committee member starting in 2004.
   Board Response: Agree.

4. Accept committee recommendations for extension of Michael Brodsky's term as Chairperson to 2004 and Ron Case's assumption of Chairperson after 2004.
   Board Response: Agree.

FOUNDATION FUND

Recommendations to the Executive Board:

That each of the motions passed by the committee (shown below) be approved and endorsed by the Board of Directors of IAFP (except motion 3, a prerogative of the Foundation Fund committee).

1. To include in the membership renewal form a line indicating a $10.00/member contribution to the Foundation Fund with the option for the member to strike out that amount from the form.
   Board Response: Agree.

2. To include on the application form for exhibitors a contribution of $100.00 to the Foundation Fund with the option to strike that amount from the form.
   Board Response: Agree. (Note: the application form for IAFP 2004 has already been printed so this will begin with IAFP 2005.)

3. To form a subcommittee to develop a plan for recognizing donors to the Foundation Fund. The sub-committee is Gale Prince (chair), Susan Sumner, and Stan Bailey.
   Board Response: Committee prerogative as indicated above.

4. That there be a mailing to IAFP members announcing that the Foundation Fund invites donations in memory of Harry Haverland the first and long-term Chairperson of the Foundation Fund Committee who passed away in June 2003.
   Board Response: Agree. Mailing to be conducted via E-mail.

5. That the IAFP Board considers naming the Foundation Fund as follows: The Harry Haverland and IAFP Foundation Fund.
   Board Response: The Board will discuss this recommendation at its next Board meeting.

6. Gale Prince was nominated and elected by the committee as Vice Chairperson of the Foundation Fund Committee.
   Board Response: Agree.

7. That efforts should be made to avoid conflicts between the times of the meeting of this committee and others on which the members serve.
   Board Response: Committee meeting scheduling on Sunday is very difficult. The board suggests meeting at 2:00 p.m. until 4:00 p.m. on Saturday.

NOMINATING

Recommendations to the Executive Board: None.

PAST PRESIDENTS'

Recommendations to the Executive Board:

1. That the Board considers developing a program for financial support for students in the finals of the Developing Scientist Competition.
   Board Response: Agree. The Board asks the Past Presidents' Committee to prepare a proposal for the Board to consider that outlines a proposed budget and potential ways to support the budget needs.

2. The Executive Board develops a policy for dealing with publication of presentation of food security-related information.
   Board Response: Agree. The Journal Management Committee Chairpersons and Vice Chairpersons along with the Journal Scientific Editors have been asked to write a policy for Board review and acceptance.

PROFESSIONAL DEVELOPMENT GROUPS

APPLIED LABORATORY METHODS

Recommendations to the Executive Board:

1. Propose Workshop for 2004: "Defensible Data: Quality System for Microbial Food Analysis," co-convenors Jeff Kornacki and Patricia Rule.
   Board Response: The Program Committee will review your proposal and make recommendation to the Board on workshops to present at IAFP 2004.

2. Propose Symposium for 2004: Evaluation and Implementation of New Methods, co-convenors Phillip Combs and Ruth Eden.
   Board Response: The Program Committee will review your proposal and notify you about its status.

3. Propose symposium in cooperation with Microbial Risk Analysis PDG for "Risk and Control of *Enterobacter sakazakii*" co-convenors Maria Nazarowec-White/Tim Jackson.
   Board Response: The Program Committee will review your proposal and notify you about its status.

4. Propose the development of a Web page for the Applied Laboratory Methods PDG on the IAFP Web site.
   Board Response: IAFP set up Web pages for each of the Professional Development Groups. Contact the IAFP office for further information on how to post information.

DAIRY QUALITY AND SAFETY

Recommendations to the Executive Board:

1. Review committee membership – many inactive people still listed as active.
   Board Response: The Board requests that each PDG Chair look closely at their roster of members and notify the office of inactive members listed.

2. Consider ways to advertise IAFP dairy symposia among constituency.
   Board Response: It is suggested that the PDG Chairperson and Vice Chairperson look at the program in March or April to identify sessions and presentations that are of interest to members with interest in dairy topics, then send to PDG members and IAFP Affiliates for further distribution.

3. Recommend Gaylord Smith as new PDG Chairperson.
   Board Response: Agree.

FOOD SAFETY NETWORK

Recommendations to the Executive Board:

1. Recommend accepting topic proposed by the Food Safety Network PDG, Emerging Technology and Applications in Food Safety and Security, as a mini, 2-hour symposia for next year's IAFP meeting.
   Board Response: The Program Committee will review your proposal and notify you about its status.

2. To accept new PDG mission statement reading: "to provide IAFP members with information on current trends and issues in food protection."
   Board Response: Agree.

FOOD SANITATION

Recommendations to the Executive Board:

1. Proposal to consider symposium entitled "Sanitation – Because You Have to Be Clean to be Safe."
   Board Response: The Program Committee will review your proposal and notify you about its status.

FRUIT AND VEGETABLE SAFETY AND QUALITY

Recommendations to the Executive Board: None.

MEAT AND POULTRY SAFETY AND QUALITY

Recommendations to the Executive Board: None.

MICROBIAL RISK ANALYSIS

Recommendations to the Executive Board: None.

OUTREACH EDUCATION

Recommendations to the Executive Board:

1. Convert the two updated pamphlets to PDF format and make them available on the IAFP Web site. Our feeling here is that printed copies are expensive to produce and expensive to purchase in this time of economic uncertainty. As our objective is dissemination, a PDF format enables dissemination while protecting IAFP from liability.
   Board Response: The Board will ask staff to review the revenue implications of this move and will discuss at a future Board meeting.

2. To accept new PDG mission statement reading: "to develop and disseminate outreach educational materials for consumers and educators."
   Board Response: Agree.

RETAIL FOOD SAFETY AND QUALITY

Recommendations to the Executive Board:

1. Take digital photos of PDG members at meetings and add to appropriate Web site.
   Board Response: Staff will work to achieve this.

2. **International Food Safety Icons**
   a. Add a higher resolution format (jpeg) to the IAFP Web site. This will facilitate use by many groups and individuals or provide a Web link to jpeg files.
      Board Response: Higher resolution files are available for purchase for $25 (includes all icons in jpeg, tif and eps file formats). Icons on the Web site are in gif format and are made available for quick, easy downloads (not for high quality reproductions).
   b. Provide a black and white only version of the icons for those who cannot print in color.
      Board Response: Icons presented in color can be printed in black and white.
   c. Ask commercial label company to produce the icons as stick-on labels for purchase.
      Board Response: This is being pursued.

3. Approve Joe Eifert as Chairperson and Al Fain as Vice Chairperson.
   Board Response: Agree.

SEAFOOD SAFETY AND QUALITY

Recommendations to the Executive Board:

1. We recommend that the Executive Board accept the symposium and workshop proposals from the Seafood Safety and Quality Professional Group.
   Board Response: The Program Committee will review your proposals and notify you about their status.

STUDENT

Recommendations to the Executive Board:

1. Current annual membership rates for international student members should be reassessed and possibly changed. Student members in the United States currently pay $47.50, and students from Canada and Mexico pay $62.50 with a subscription to *Journal of Food Protection*. However, students in other countries pay $92.00 for membership with subscription to *JFP* or $72.50 with a subscription to *Food Protection Trends*. While we are aware of the administrative costs of maintaining records of international members and the shipping costs of journals overseas, we find these membership costs prohibitively high and possibly exclusionary to those international students who are interested in joining IAFP. We would like to suggest an international student membership rate that is lower in price that would include secure access to the online version of *Journal of Food Protection*. If providing online access ONLY to the journal would reduce shipping costs of the journal overseas, then maybe international student membership rates could be reduced. We would appreciate the Board's interest into this matter.
   Board Response: Agree. The Board approved an Online Membership for Student Members at a rate of $48 per year for Student Members anywhere in the world. Student Members will be the only Members eligible for an Online Membership at this time.

2. The current name of the Student Professional Development Group should be changed. Although the Student Professional Development Group (SPDG) accurately describes our PDG, saying the name of this group is sometimes long and confusing to students new to IAFP. Therefore, we would like to change the name to the Student Association of the International Association for Food Protection. We would still like to be considered a PDG and would be governed by the rules and regulations associated with PDGs, but a simpler name may be less confusing them the current one.
   Board Response: The suggested name changes sounds more like an Affiliate name than that of a PDG. The Board suggests that the Student PDG officers consider whether to continue as a PDG or convert to an Affiliate status.

3. Providing a partial travel stipend for the officers of the SPDG should be considered. The SPDG appreciates IAFP's efforts in the past to support student travel to the annual meeting through the session monitor program. Although it is understood that other PDG officers do not receive travel funds, we think that students are in a unique situation in their professional development compared to other members of IAFP. Providing a partial travel stipend for the officers would also encourage other student members to become involved in the SPDG leadership as well.
Board Response: Agree. The Board approved up to $1,000 to be used for the Student PDG officers to travel to IAFP Annual Meetings. The current Chairperson of the PDG should communicate with the executive director prior to each Annual Meeting to obtain this support for the officers of the PDG.

VIRAL AND PARASITIC FOODBORNE DISEASE

Recommendations to the Executive Board: None.

WATER SAFETY AND QUALITY

Recommendations to the Executive Board:

1. Susan McKnight stay on as Chairperson another year.
Board Response: Agree.

2. The PDG would like to have the symposium (2003), put on its Web site with speaker's approval.
Board Response: Submit the presentations to the IAFP office along with speaker's written approval and the symposium will be posted.

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IAFP Foundation Fund Silent Auction Results

Item	Contributor	Highest Bidder
Foodborne Diseases, 2nd Edition	Academic Press, Elsevier London	LeeAnne Jackson
South Africa Wildlife Calendar	Alex von Holy	M. Murray
Food Microbiology: Fundamentals and Frontiers	American Society for Microbiology	Paul Ham
"Taste of Chicago" Gift Certificates	Illinois Affiliate	Fred Reimers
"Taste of Chicago" Gift Certificates	Illinois Affiliate	Indaue Mello
Caipirinha Kit	Brazil Affiliate	Paul Hall
Coffee Beans	Brazil Affiliate	Ed Donnell
2002 Beaujour Zinfandel	California Affiliate	Vickie Lewandowski
Barefoot Reserve Chardonnay	California Affiliate	Gloria Swick-Brown
Beringer 2002 Chenin Blanc	California Affiliate	Gloria Swick-Brown
Buena Vista Sauvignon Blanc	California Affiliate	Doug Johnson
Coastal Ridge 2000 Cabernet Sauvignon	California Affiliate	Joe Donnelly
Indian Spring 2000 Cabernet Sauvignon	California Affiliate	Fred Weber
Mont Pellier Chardonnay	California Affiliate	Larry Cohen
Montevina Sauvignon Blanc	California Affiliate	Dory Johnson
San Simeon Cabernet Sauvignon	California Affiliate	Fred Weber
Sonoma Creek 2000 Cabernet Sauvignon	California Affiliate	Fred Weber
Valley Oaks Cabernet Sauvignon	California Affiliate	Frank Leonardo
Valley of the Moon Pinot Blanc	California Affiliate	Joan Redder
U.S. Flag Flown over the U.S. Capital	Capital Area Affiliate	Frank Yiannas
Handbook of Fermented Functional Foods	CRC Press	Lynn McMullen
Natural Food Antimicrobial Systems	CRC Press	Jean Anderson
Pearl Necklace	David & Connie Tharp	Paul Hall
FAFP Shirt-Large	Florida Affiliate	Jenny Scott
FAFP Shirt-Medium	Florida Affiliate	Mel Kramer
FAFP Shirt-XL	Florida Affiliate	Sue Jewell
Florida Vineyards Wine	Florida Affiliate	Doug Johnson
Florida Vineyards Wine	Florida Affiliate	Fred Weber
Variety of Florida Products Gift Basket	Florida Affiliate	Fred Reimers
Variety of Florida Products Gift Basket	Florida Affiliate	Albert Espinoza
"Food Microbiology: The Laboratory" with FPI Carry-All	Food Processors Institute	Nobi Tanaka
Iowa State Collectables Box	Food Safety Research, Iowa State University	Dave Larson
Three Stooges	Food Safety Research, Iowa State University	Darlene Bengsch
Waterford Crystal Bowl	Food Safety Research, Iowa State University	Kathleen Rajkowski
Continuous Thermal Processing of Foods	Fred Weber	Indaue Mello
Fruit Processing: Nutrition, Products, and Quality Management	Fred Weber	Kathleen Rajkowski
Guidelines for Sensory Analysis in Food Product Development and Quality Control	Fred Weber	Pete Snyder
International Standards for Food Safety	Fred Weber	Gail Seed
Shelf-Life Evaluation of Foods	Fred Weber	Indaue Mello
Ty Beanie Baby - Wales	Gordon Hayburn	Vince Radke
Haagen Dazs Gift Certificates (6)	Harry Haverland	Charles Price
Haagen Dazs Gift Certificates (6)	Harry Haverland	Donna Garren

Item	Contributor	Highest Bidder
Miscellaneous Books	Henry Atherton	Steve Murphy
Hygiene for Management	Highland Publications	Gregory Phillips
Food Safety Icon CD	IAFP	Val Hillers
Food Safety Icon CD	IAFP	Gregory Phillips
IAFP 2004 Registration	IAFP	Pete Snyder
Waterborne/Foodborne Booklets	IAFP	Nobi Tanaka
Waterborne/Foodborne Booklets	IAFP	Susan James
Bundy Duck Decoy	Indiana Affiliate	Peter Slade
Food Safety Handbook	John Wiley & Sons	Paul Hall
Kansas Artifacts Glass Etching	Kansas Affiliate	Kristina Barlow
A Taste of Ohio Cookbook	Kathy Haverland Jones	Shelagh McDonagh
Bourbon Balls	Kentucky Affiliate	Steve Murphy
Maker's Mark Bourbon Whiskey	Kentucky Affiliate	Brian Heldt
Maker's Mark Gourmet Sauce	Kentucky Affiliate	Christina Collins
Testing and Food Safety Management	Kluwer Academic Publishers	Howard Popoola
Oscar Mayer Weiner Mobile	Kraft Foods	Frank Leonardo
Oscar Mayer Weiner Mobile	Kraft Foods	Dave Larson
Oscar Mayer Weiner Mobile	Kraft Foods	Dave Larson
IAFP New Orleans Towels	Margaret Burton	Nobi Tanaka
IAFP New Orleans Towels	Margaret Burton	Henry Atherton
Ultimate Garden State Gift Basket	Metropolitan Affiliate	Wilbur Feagan
Copper Sculpture of Michigan Wildflower	Michigan Affiliate	Ewen Todd
Country Cured Ham Basket	Missouri Affiliate	Wilbur Feagan
Cornell Cow with Coffee Mugs	New York State Affiliate	Kathy Bernard
Cornell University Dairy Shirt	New York State Affiliate	Kathleen O'Donnell
Tranquil Sounds Stress Relief Clock	Ohio Affiliate	Tim Larson
LaserEtchWorks	Ontario Affiliate	Jimmy Young
Ontario Ice Wine	Ontario Affiliate	Paul Hall
Ontario Ice Wine	Ontario Affiliate	Indaue Mello
Penn State Sweatshirt	Pennsylvania Affiliate	Jack Guzewich
Inniskillin Ice Wine	Schneider Foods Canada	Vickie Lewandowski
Thirty Bench Ice Wine	Schneider Foods Canada	Indaue Mello
McCormick's Spice Rack	Southern California Affiliate	Deborah Hoyt
5 TAP Series' Food Safety Manager Certification Training	TAP Series	Fred Reimers
5 Tap Series' NSF International HACCP Manager Training Programs	TAP Series	Ryan Galasso
Texas Wine from HEB Central Market	Texas Affiliate	Mike Doyle
Six Nation Rugby Shirt	United Kingdom Affiliate	Ewen Todd
4 – One-day Theme Park Tickets	Walt Disney World Co.	Joe Furuike
3-Month "Cheese of the Month" Membership	Washington Affiliate	Lori Ledenbach
Breyer Holstein Cow Model 402	Weber Scientific	Kathy Bernard
Chia Cow	Weber Scientific	Dawn Birt
Divco 1950 Milk Delivery Truck Bank	Weber Scientific	Robert Smith
2-Harley Davidson Beer Mugs, 1 "Wisconsin 6-Pack"	Wisconsin Affiliate	Brian Heldt
Harley Davidson 100th Anniversary T-Shirt	Wisconsin Affiliate	Tom Schwarz
Harley Davidson 100th Anniversary Visor	Wisconsin Affiliate	Don Breiner
Harley Davidson Coffee Mugs, Biker Brew Coffee Canister	Wisconsin Affiliate	Anna Lammerding
Inspector T-Shirt	Wyoming Affiliate	Gordon Mowat
Lionel Electric Train	Zep Manufacturing	Nick Nickelson

Raised $4,605.50

International Association for Food Protection®

Award Nominations

The International Association for Food Protection welcomes your nominations for our Association Awards. Nominate your colleagues for one of the Awards listed below. You do not have to be an IAFP Member to nominate a deserving professional. To request nomination criteria, contact:

International Association for Food Protection
6200 Aurora Ave., Suite 200W
Des Moines, Iowa 50322-2864
Phone: 800.369.6337; 515.276.3344
Fax: 515.276.8655
Web site: www.foodprotection.org
E-mail: info@foodprotection.org

Nominations deadline is March 15, 2004. You may make multiple nominations. All nominations must be received at the IAFP office by March 15, 2004.

- Persons nominated for individual awards must be current IAFP Members. Black Pearl Award nominees must be companies employing current IAFP Members. NFPA Food Safety Award nominees do not have to be IAFP Members.
- Previous award winners are not eligible for the same award.
- Executive Board Members and Awards Committee Members are not eligible for nomination.
- Presentation of awards will be during the Awards Banquet at IAFP 2004 – the Association's 91st Annual Meeting in Phoenix, Arizona on August 11, 2004.

Nominations will be accepted for the following Awards:

Black Pearl Award — Award Showcasing the Black Pearl

Presented in recognition of a company's outstanding achievement in corporate excellence in food safety and quality.

Sponsored by Wilbur Feagan and F&H Food Equipment Company

Fellow Award — Distinguished Plaque

Presented to Member(s) who have contributed to IAFP and its Affiliates with quiet distinction over an extended period of time.

Honorary Life Membership Award — Plaque and Lifetime Membership in IAFP

Presented to Member(s) for their devotion to the high ideals and objectives of IAFP and for their service to the Association.

Harry Haverland Citation Award — Plaque and $1,000 Honorarium

Presented to an individual for years of devotion to the ideals and objectives of IAFP.

Sponsored by Silliker Inc.

Harold Barnum Industry Award — Plaque and $1,000 Honorarium

Presented to an individual for outstanding service to the public, IAFP and the food industry.

Sponsored by Nasco International, Inc.

Educator Award — Plaque and $1,000 Honorarium

Presented to an individual for outstanding service to the public, IAFP and the arena of education in food safety and food protection.

Sponsored by Nelson-Jameson, Inc.

Sanitarian Award — Plaque and $1,000 Honorarium

Presented to an individual for outstanding service to the public, IAFP and the profession of the Sanitarian.

Sponsored by Ecolab, Inc., Food and Beverage Division

Maurice Weber Laboratorian Award — Plaque and $1,000 Honorarium

Presented to an individual for outstanding contributions in the laboratory, recognizing a commitment to the development of innovative and practical analytical approches in support of food safety.

Sponsored by Weber Scientific

International Leadership Award — Plaque, $1,000 Honorarium and Reimbursement to attend IAFP 2004

Presented to an individual for dedication to the high ideals and objectives of IAFP and for promotion of the mission of the Association in countries outside of the United States and Canada.

Sponsored by Unilever, Safety and Environmental Assurance Centre

NFPA Food Safety Award — Plaque and $3,000 Honorarium

This Award alternates between individuals and groups or organizations. In 2004, the award will be presented to a group or organization in recognition of a long history of outstanding contributions to food safety research and education.

Sponsored by National Food Processors Association

Call for Abstracts

IAFP 2004

The Association's 91st Annual Meeting

August 8–11, 2004

Phoenix, Arizona

General Information

1. Complete the Abstract Submission Form.
2. All presenters must register for the Annual Meeting and assume responsibility for their own transportation, lodging, and registration fees.
3. There is no limit on the number of abstracts registrants may submit. However, presenters must present their presentations.
4. Accepted abstracts will be published in the Program and Abstract Book. Editorial changes will be made to accepted abstracts at the discretion of the Program Committee.
5. Photocopies of the abstract form may be used.
6. Membership in the Association is not required for presenting a paper at IAFP 2004.

Presentation Format

1. Technical — Oral presentations will be scheduled with a maximum of 15 minutes, including a two to four minute discussion. LCD projectors will be available.
2. Poster — Freestanding boards will be provided for presenting posters. Poster presentation surface area is 4′ high by 8′ wide. Handouts may be used, but audiovisual equipment will not be available. The presenter will be responsible for bringing pins and velcro.

Note: The Program Committee will make the final decision on presentation format.

Instructions for Preparing Abstracts

1. Title — The title should be short but descriptive. The first letter in each word in the title and proper nouns should be capitalized.
2. Authors — List all authors using the following style: first name followed by the surname.
3. Presenter Name & Title — List the full name and title of the person who will present the paper.
4. Presenter Address — List the name of the department, institution and full postal address (including zip/postal code and country).
5. Phone Number — List the phone number, including area, country, and city codes of the presenter.
6. Fax Number — List the fax number, including area, country, and city codes of the presenter.
7. E-mail — List the E-mail address for the presenter.
8. Format preferred — Check the box to indicate oral or poster format. The Program Committee makes the final decision on the format of the abstract.
9. Category — Check the box to indicate which category best fits the subject of the abstract.
10. Developing Scientist Awards Competitions — Check the box to indicate if the paper is to be presented by a student in this competition. A signature and date is required from the major professor or department head. See "Call for Entrants in the Developing Scientist Awards Competitions."
11. Abstract — Type abstract, double-spaced, in the space provided or on a separate sheet of paper, using a 12-point font size. Use no more than 250 words.

Abstract Submission

Abstracts submitted for IAFP 2004 will be evaluated for acceptance by the Program Committee. Please be sure to follow the format instructions above carefully; failure to do so may result in rejection. Information in the abstract data must not have been previously published in a copyrighted journal.

Abstracts must be received no later than January 5, 2004. Return the completed abstract form through one of the following methods:

1. Online: Use the online abstract submission form located at www.foodprotection.org. You will receive an E-mail confirming receipt of your submission.
2. E-mail: Submit via E-mail as an attached text or MS Word™ document to abstracts@foodprotection.org.

Selection Criteria

1. Abstracts must accurately and briefly describe:
   (a) the problem studied and/or objectives;
   (b) methodology;
   (c) essential results; and
   (d) conclusions and/or significant implications.
2. Abstracts must report the results of original research pertinent to the subject matter. Papers should report the results of applied research on: food, dairy and environmental sanitation; foodborne pathogens; food and dairy microbiology; food and dairy engineering; food and dairy chemistry; food additives and residues; food and dairy technology; food service and food administration; quality assurance/control; mastitis; environmental health; waste management and water quality. Papers may also report subject matter of an educational and/or nontechnical nature.
3. Research must be based on accepted scientific practices.
4. Research should not have been previously presented nor intended for presentation at another scientific meeting. Papers should not appear in print prior to the Annual Meeting.
5. Results should be summarized. Do not use tables or graphs.

Rejection Reasons

1. Abstract was not prepared according to the "Instructions for Preparing Abstracts."
2. Abstract does not contain essential elements as described in "Selection Criteria."
3. Abstract reports inappropriate or unacceptable subject matter or is not based on accepted scientific practices, or the quality of the research or scientific approach is inadequate.
4. Work reported appears to be incomplete and/or data are not presented. Indication that data will be presented is not acceptable.
5. Abstract was poorly written or prepared. This includes spelling and grammatical errors.
6. Results have been presented/published previously.
7. Abstract was received after the deadline for submission.
8. Abstract contains information that is in violation of the International Association for Food Protection Policy on Commercialism.

Projected Deadlines/Notification

Abstract Submission Deadline: January 5, 2004. Submission Confirmations: On or before January 6, 2004. Acceptance/Rejection Notification: February 13, 2004.

Contact Information

Questions regarding abstract submission can be directed to Bev Brannen, 515.276.3344 or 800.369.6337; E-mail: bbrannen@foodprotection.org.

Program Chairperson

Gary Acuff
Texas A & M University
Department of Animal Science
2471 TAMU
College Station, TX 77843-2471
Phone: 979.845.4402
Fax: 979.845.9354
E-mail: gacuff@tamu.edu

Abstract Form

DEADLINE: Must be Received by January 5, 2004

(1) Title of Paper _____

_____

(2) Authors _____

_____

(3) Full Name and Title of Presenter _____

_____

(4) Institution and Address of Presenter _____

_____

(5) Phone Number _____

(6) Fax Number _____

(7) E-mail _____

(8) Format preferred: ☐ Oral ☐ Poster ☐ No Preference

The Program Committee will make the final decision on presentation format.

(9) Category: ☐ Produce ☐ Foods of Animal Origin ☐ Seafood ☐ Other Food Commodities

☐ Risk Assessment ☐ Education ☐ General Microbiology and Sanitation

☐ Antimicrobials ☐ Pathogens

(10) Developing Scientist Awards Competition ☐ Yes Graduation date _____

Major Professor/Department Head approval (signature and date) _____

(11) TYPE abstract, DOUBLE-SPACED, in the space provided or on a separate sheet of paper, using a 12-point font size. Use no more than 250 words.

Call for Entrants in the Developing Scientist Awards Competitions

Supported by the International Association for Food Protection Foundation

The International Association for Food Protection is pleased to announce the continuation of its program to encourage and recognize the work of students and recent graduates in the field of food safety research. Qualified individuals may enter either the oral or poster competition.

Purpose

1. To encourage students and recent graduates to present their original research at the Annual Meeting.
2. To foster professionalism in students and recent graduates through contact with peers and professional Members of the Association.
3. To encourage participation by students and recent graduates in the Association and the Annual Meeting.

Presentation Format

Oral Competition – The Developing Scientist Oral Awards Competition is open to graduate students (enrolled or recent graduates) from M.S. or Ph.D. programs or undergraduate students at accredited univesities or colleges. Presentations are limited to 15 minutes, which includes two to four minutes for discussion.

Poster Competition – The Developing Scientist Poster Awards Competition is open to students (enrolled or recent graduates) from undergraduate or graduate programs at accredited universities or colleges. The presenter must be present to answer questions for a specified time (approximately two hours) during the assigned session. Specific requirements for presentations will be provided at a later date.

General Information

1. Competition entrants cannot have graduated more than a year prior to the deadline for submitting abstracts.
2. Accredited universities or colleges must deal with environmental, food or dairy sanitation, protection or safety research.
3. The work must represent original research completed and presented by the entrant.
4. Entrants may enter only one paper in either the oral or poster competition.
5. All entrants must register for the Annual Meeting and assume responsibility for their own transportation, lodging, and registration fees.
6. Acceptance of your abstract for presentation is independent of acceptance as a competition finalist. Competition entrants who are chosen as finalists will be notified of their status by the chairperson by May 28, 2004.
7. All entrants with accepted abstracts will receive a complimentary, one-year Student Membership. This membership will entitle you to receive *JFP* Online.
8. In addition to adhering to the instruction in the "Call for Abstracts," competition entrants must check the box to indicate if the paper is to be presented by a student in this competition. A signature and date is required from the major professor or department head.

Judging Criteria

A panel of judges will evaluate abstracts and presentations. Selection of up to five finalists for each competition will be based on evaluations of the abstracts and the scientific quality of the work. All entrants will be advised of the results by May 28, 2004. Only competition finalists will be judged at the Annual Meeting and will be eligible for the awards.

All other entrants with accepted abstracts will be expected to be present as part of the regular Annual Meeting. Their presentations will not be judged and they will not be eligible for the awards.

Judging criteria will be based on the following:

1. Abstract – clarity, comprehensiveness and conciseness.
2. Scientific Quality – Adequacy of experimental design (methodology, replication, controls), extent to which objectives were met, difficulty and thoroughness of research, validity of conclusions based upon data, technical merit and contribution to science.
3. Presentation – Organization (clarity of introduction, objectives, methods, results and conclusions), quality of visuals, quality and poise of presentation, answering questions, and knowledge of subject.

Finalists

Awards will be presented at the International Association for Food Protection Annual Meeting Awards Banquet to the top three presenters (first, second and third places) in both the oral and poster competitions. All finalists are expected to be present at the banquet where the awards winners will be announced and recognized.

Awards

First Place – $500 and an engraved plaque
Second Place – $ 300 and a framed certificate
Third Place – $100 and a framed certificate

Award winners will receive a complimentary, one-year Student Membership including *Food Protection Trends, Journal of Food Protection,* and *JFP* Online.

Policy on Commercialism

for Annual Meeting Presentations

1. INTRODUCTION

No printed media, technical sessions, symposia, posters, seminars, short courses, and/or other related types of forums and discussions offered under the auspices of the International Association for Food Protection (hereafter referred to as to Association forums) are to be used as platforms for commercial sales or presentations by authors and/or presenters (hereafter referred to as authors) without the express permission of the staff or Executive Board. The Association enforces this policy in order to restrict commercialism in technical manuscripts, graphics, oral presentations, poster presentations, panel discussions, symposia papers, and all other type submissions and presentations (here-after referred to as submissions and presentations), so that scientific merit is not diluted by proprietary secrecy.

Excessive use of brand names, product names or logos, failure to substantiate performance claims, and failure to objectively discuss alternative methods, processes, and equipment are indicators of sales pitches. Restricting commercialism benefits both the authors and recipients of submissions and presentations.

This policy has been written to serve as the basis for identifying commercialism in submissions and presentations prepared for the Association forums.

2. TECHNICAL CONTENT OF SUBMISSIONS AND PRESENTATIONS

2.1 Original Work

The presentation of new technical information is to be encouraged. In addition to the commercialism evaluation, all submissions and presentations will be individually evaluated by the Program Committee chairperson, technical reviewers selected by the Program Committee chairperson, session convenor, and/or staff on the basis of originality before inclusion in the program.

2.2 Substantiating Data

Submissions and presentations should present technical conclusions derived from technical data. If products or services are described, all reported capabilities, features or benefits, and performance parameters must be substantiated by data or by an acceptable explanation as to why the data are unavailable (e.g., incomplete, not collected, etc.) and, if it will become available, when. The explanation for unavailable data will be considered by the Program Committee chairperson and/or technical reviewers selected by the Program Committee chairperson to ascertain if the presentation is acceptable without the data. Serious consideration should be given to withholding submissions and presentations until the data are available, as only those conclusions that might be reasonably drawn from the data may be presented. Claims of benefit and/or technical conclusions not supported by the presented data are prohibited.

2.3 Trade Names

Excessive use of brand names, product names, trade names, and/or trademarks is forbidden. A general guideline is to use proprietary names once and thereafter to use generic descriptors or neutral designations. Where this would make the submission or presentation significantly more difficult to understand, the Program Committee chairperson, technical reviewers selected by the Program Committee chairperson, session convenor, and/or staff, will judge whether the use of trade names, etc., is necessary and acceptable.

2.4 "Industry Practice" Statements

It may be useful to report the extent of application of technologies, products, or services; however, such statements should review the extent of application of all generically similar technologies, products, or services in the field. Specific commercial installations may be cited to the extent that their data are discussed in the submission or presentation.

2.5 Ranking

Although general comparisons of products and services are prohibited, specific generic comparisons that are substantiated by the reported data are allowed.

2.6 Proprietary Information (See also 2.2.)

Some information about products or services may not be publishable because it is proprietary to the author's agency or company or to the user. However, the scientific principles and validation of performance parameters must be described for such products or services. Conclusions and/or comparisons may be made only on the basis of reported data.

2.7 Capabilities

Discussion of corporate capabilities or experiences are prohibited unless they pertain to the specific presented data.

3. GRAPHICS

3.1 Purpose

Slides, photographs, videos, illustrations, art work, and any other type visual aids appearing with the printed text in submissions or used in presentations (hereafter referred to as graphics) should be included only to clarify technical points. Graphics which primarily promote a product or service will not be allowed. (See also 4.6.)

3.2 Source

Graphics should relate specifically to the technical presentation. General graphics regularly shown in, or intended for, sales presentations cannot be used.

3.3 Company Identification

Names or logos of agencies or companies supplying goods or services must not be the focal point of the slide. Names or logos may be shown on each slide so long as they are not distracting from the overall presentation.

3.4 Copies

Graphics that are not included in the preprint may be shown during the presentation only if they have been reviewed in advance by the Program Committee chairperson, session convenor, and/or staff, and have been determined to comply with this policy. Copies of these additional graphics must be available from the author on request by individual attendees. It is the responsibility of the session convenor to verify that all graphics to be shown have been cleared by Program Committee chairperson, session convenor, staff, or other reviewers designated by the Program Committee chairperson.

4. INTERPRETATION AND ENFORCEMENT

4.1 Distribution

This policy will be sent to all authors of submissions and presentations in the Association forums.

4.2 Assessment Process

Reviewers of submissions and presentations will accept only those that comply with this policy. Drafts of submissions and presentations will be reviewed for commercialism concurrently by both staff and technical reviewers selected by the Program Committee chairperson. All reviewer comments shall be sent to and coordinated by either the Program Committee chairperson or the designated staff. If any submissions are found to violate this policy, authors will be informed and invited to resubmit their materials in revised form before the designated deadline.

4.3 Author Awareness

In addition to receiving a printed copy of this policy, all authors presenting in a forum will be reminded of this policy by the Program Committee chairperson, their session convenor, or the staff, whichever is appropriate.

4.4 Monitoring

Session convenors are responsible for ensuring that presentations comply with this policy. If it is determined by the session convenor that a violation or violations have occurred or are occurring, he or she will publicly request that the author immediately discontinue any and all presentations (oral, visual, audio, etc.) and will notify the Program Committee chairperson and staff of the action taken.

4.5 Enforcement

While technical reviewers, session convenors, and/or staff may all check submissions and presentations for commercialism, ultimately it is the responsibility of the Program Committee chairperson to enforce this policy through the session convenors and staff.

4.6 Penalties

If the author of a submission or presentation violates this policy, the Program Committee chairperson will notify the author and the author's agency or company of the violation in writing. If an additional violation or violations occur after a written warning has been issued to an author and his agency or company, the Association reserves the right to ban the author and the author's agency or company from making presentations in the Association forums for a period of up to two (2) years following the violation or violations.

Thank you for your support of the Foundation Fund!

- Ulf Ahlin
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- Constantinos Piroccas
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- Charles Price
- Gale Prince
- Kailash S. Purohit
- Vincent J. Radke
- K. T. Rajkowski
- Agustin M. Ramos Piza
- Joan C. Redder
- Fred Reimers
- Gerald P. Ruth
- Hidetoshi Sakai
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- Allen R. Sayler
- Thomas L. Schwarz
- Jenny Scott
- Gail C. Seed
- Shlomo Sela
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- Robert W. Smith
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- Katherine Swanson
- Gloria I. Swick-Brown
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- Nobumasa Tanaka
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- Donald W. Thayer
- Ewen Todd
- R. B. Tompkin
- Leon Townsend
- Fred Weber
- Richard C. Whiting
- Frank Yiannas
- Shan Young
- Palmer D. Zottola

- Florida Association for Food Protection
- Kraft Foods, Inc.

International Association for Food Protection.

The above list represents individual contributors to the Association Foundation Fund during the period August 1, 2002 through August 31, 2003. In addition, a portion of the Sustaining Member dues are allocated to support this Fund. Your contribution is welcome. Call the Association office at 800.369.6337 or 515.276.3344 for more information on how you can support the Foundation.

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Barbara Dunlap
CCI, Vernon

Patricia L. White
USDA/FSIS
Sacramento

CONNECTICUT

Gladys R. Correa
Bratus Analytical
Manchester

DISTRICT OF COLUMBIA

Faye T. Bresler
USDA/FSIS
Washington

ILLINOIS

Armando Melendez
Nestlé
Franklin Park

Charles A. Kennett
Kraft Foods, Inc., Glenview

IOWA

Sam E. Beattie
Iowa State University, Ames

MINNESOTA

Scott Morrison
Provesta, Hutchinson

MISSOURI

Robert L. Brooks
Willow Brook Foods
Springfield

NEW YORK

Howard J. VanBuren
Chr. Hansen, Inc.
Canandaigua

NORTH CAROLINA

Bryn Adams
University of North Carolina
Charlotte

Bart Campbell
NC Dept. of Environment
& Natural Resources
Raleigh

Glenda G. Smith
The Wizard's Cauldron
Yanceyville

OHIO

Joe L. Evans
Richland County Health
Mansfield

PENNSYLVANIA

Kira J. Batorski
Berks Packing Co., Inc.
Reading

VIRGINIA

Stephen G. Campano
Protein Sales, Inc.
Ashland

WASHINGTON

Joe Frazier
National Food Processors Association
Seattle

UPDATES

3-A Sanitary Standards Announces New Director, Technical Affairs

3-A Sanitary Standards, Inc. announces the appointment of Mr. Nathaniel (Nate) Wall to serve as director, technical affairs for 3-A SSI. Nate will be responsible for overseeing the modernization of the 3-A Standards development process and managing the technical affairs of 3-A SSI.

In his new position, Nate will play a key role in managing the vital new services and programs of 3-A SSI. These activities include liaison to the 3-A SSI standards committees/task groups, supervision of the new Third Party Verification (TPV) program and related support for the 3-A symbol program. Nate will also maintain liaison with food industry regulatory agencies including USDA, FDA, state regulatory bodies and other standards development organizations.

Prior to joining 3-A SSI, Nate served as director, technical services for the Outdoor Power Equipment Institute (OPEI) in Alexandria, VA where he directed technical programs and safety standards development for the outdoor power equipment industry. He managed the ANSI Committees that develop outdoor power equipment safety standards using the ANSI canvass method and he managed member voting for the US position on draft ISO (international) standards. Nate also directed the publishing of technical documentation and reports, wrote technical articles for the newsletter, represented the association in public forums and at technical conferences, and developed technical conference programs and educational sessions.

Before joining OPEI, Nate was manager, technical programs, for the Environmental Industry Associations (EIA), the association for the waste and recycling industry. He managed development of ANSI equipment safety and design compatibility standards, published technical documentation and reports, wrote technical articles for the newsletter, developed industry consensus positions and comments on regulatory proceedings and developed budgets for the technical program.

Nate brings other broad, high quality experience in standards development under various ANSI processes, technology expertise, and a substantial background in the development of equipment standards to the mission of 3-A SSI. He holds a B.S. degree in operations research from George Mason University in Fairfax, VA.

Wilcox Joins IDFA as Senior Director of Legislative Affairs

Kristin Pearson Wilcox recently joined the International Dairy Foods Association (IDFA) as senior director of legislative affairs. In her new post, Kristin will manage IDFA's government relationships and help develop federal legislation affecting dairy. She has many years of experience in this field, having led her own political consulting operation, Pearson Consulting, and having served as the director of federal legislative affairs for the National Food Processors Association (NFPA). At NFPA, Kristin was the primary legislative analyst on such issues as biotechnology, nutrition, biosecurity, food safety and labeling.

Stone Elected IFT President-Elect

Herbert Stone, Ph.D., president of the food marketing research and consulting firm Tragon Corp., has been elected president-elect of the Institute of Food Technologists (IFT) as determined by a vote of its members.

Stone succeeds Ann Hollingsworth, Ph.D., as president-elect. Hollingsworth, president of Better Built Foods of Carrollton, GA, assumed the responsibilities of IFT president on Sept. 2, 2003, the conclusion of her one-year term as president-elect. Stone will follow Hollingsworth as IFT president beginning September, 2004.

Stone earned his bachelor's and master's degrees from University of Massachusetts and doctorate from the University of California at Davis. He has served as department chair of Stanford Research Institute and was co-founder and president of Etel Inc.

Joseph O'Donnell Named President of ADSA Board

Joseph O'Donnell, executive director of the California Dairy Research Foundation was elected president of the American Dairy Science Association's (ADSA) board of directors at their annual meeting in Phoenix, AZ.

O'Donnell will serve as president for the 2003-04 term. He will work with the ADSA executive team of vice president, Mike Hutjens of the University of Illinois and past president Dave Beede of Michigan State University.

O'Donnell said his goals during his tenure include reaching out to non-traditional members and expanding the relevancy of the association to the industry.

International Association for Food Protection® NEWS

Murano Announces Office of New Technology at Food Inspection Agency

US Department of Agriculture Under Secretary for Food Safety Dr. Elsa Murano has announced the establishment of the New Technology Office to be based within the Food Safety and Inspection Service (FSIS). FSIS reviews new technologies that companies employ to ensure that their use is consistent with Agency regulations and that they will not adversely affect product safety, inspection procedures, or the safety of FSIS inspectors. Although companies are not required to submit new technologies for FSIS review, Murano said that companies would benefit from doing so because they can avoid delays to their operations.

Murano said that one of the reasons that the New Technology Office was created was to streamline the implementation of new technologies in a plant's operations and reduce the amount time it takes the agency to review safe new technologies. "The combination of science and new technologies offers endless possibilities for success in our fight against foodborne illness. The New Technology Office will place greater emphasis on encouraging the use of new technologies that can help reduce pathogens on meat and poultry products," said Murano. The New Technology Office will incorporate the functions of FSIS' Technology Program Development Staff. The New Technology Office will manage the review process for experimental protocols for studies conducted by industry, in addition to handling the assessments related to new uses of approved substances and labeling considerations for these technologies.

To increase the pool of new technology submissions, the New Technology Office will also work closely with academic researchers who are affiliated with USDA's Cooperative State Research, Education and Extension Service. In Fiscal Year 2003, $500,000 was allocated in order to facilitate the adaptation of new technologies in small meat and poultry plants.

In addition, the New Technology Office will soon launch a Web site that will provide summaries of the new technologies under review along with their approval status and allow interested groups to learn more about how to have their products or ideas considered.

In the interim, FSIS has established an e-mail address, www.FSIS-Technology@fsis.usda.gov, to encourage the expanded use of new technologies by allowing interested parties to submit their information on-line. New technologies have resulted in significant improvements in the safety of meat and poultry in recent years. Steam vacuums, steam pasteurization and antimicrobials are all examples of advances in food safety technology that have occurred.

The document, which is available www.fsis.usda.gov, identifies several strategies to improve the safety of the US food supply including programs to improve workforce training, best management practices and risk analysis coordination as well as a comprehensive food safety research agenda.

Bray to Depart IAFIS; Board to Conduct Search for New President

The IAFIS Board of Directors is launching a search for a new association president in light of IAFIS President Charlie Bray's recent announcement that he will leave the association on November 7 for another opportunity.

Bray, who will become the head of a new non-profit consulting arm at the business consulting firm of RSM McGladrey, says "I have enjoyed a marvelous six years at IAFIS and have had the privilege of working with some truly outstanding people. I have experienced success and challenge during my tenure here and have grown both personally and professionally as a result of it. For that, I am truly grateful. However, I leave now for an opportunity that uniquely fits my wants and needs at this stage in my career that, quite simply, is too good to pass up."

During his six-year tenure, Bray oversaw a period of great change at IAFIS, including the implementation of the IAFIS Board of Directors' 1997 strategic plan, which redirected the association's efforts toward bringing food industry buyers and sellers together; the expansion of the Worldwide Food Expo trade show, including building relationships with key trade association partners and the recruitment of new partners to expand the show's attendance base; and the successful formation and launch of 3-A Sanitary Standards, Inc., as an independent entity.

Lactoferrin Considered Safe to Fight *E. coli*

FDA has announced that aLF Ventures, Salt Lake City, UT, has consulted with the agency about aLF Ventures' plans to market lactoferrin, a component of an antimicrobial spray. This spray can be applied to uncooked beef carcasses to fight *E. coli* O157:H7, an organism that can cause severe gastrointesti-

nal disease in humans. FDA informed aLf Ventures that it does not question their decision to market lactoferrin, an antimicrobial protein found in cow's milk and beef.

Although aLF Ventures was not required to seek approval from FDA before it marketed lactoferrin, aLF Ventures provided FDA scientific data supporting the firm's conclusion that lactoferrin is "generally recognized as safe" (GRAS) and safe for the general population as well as for individuals who are allergic to milk.

"Innovative technology is a critical building block in preserving the strong foundation of the US food supply," said Dr. Lester Crawford, deputy commissioner of the Food and Drug Administration. "We must continue to encourage scientific research and new technology to maintain this nation's safe food supply."

A substance used in food can be GRAS if its safety has been established by generally available scientific data and information that lead qualified experts to conclude that the use of the ingredient is safe for its proposed use.

In its notice submitted to FDA, aLF Ventures noted that the amount of added lactoferrin that remains on the beef after spraying is comparable to the amount of lactoferrin that is naturally occurring in the beef. aLF Ventures also submitted data to the US Department of Agriculture (USDA) regarding the effectiveness of lactoferrin against *E. coli* O157:H7. USDA is the agency responsible for addressing labeling issues with lactoferrin-treated beef.

The Joy of Giving Food Safely

When the holidays roll around, people often enjoy sending home-prepared food gifts to loved ones and friends. Many time-crunched consumers opt for the convenience of mail order food items. Whichever is the case, the same rules apply for safely sending perishable food items through the mail. Whenever possible, send foods that do not require refrigeration, such as hard salami, hard cheese or country ham. When sending perishable foods, transit time and a cold source are key factors. The Food Safety Inspection Service (FSIS) offers the following guidelines for mailing perishable foods.

Make sure that perishable items, like meat or poultry, are sent cold or frozen and packed with a cold source, such as frozen gel packs. If dry ice is used, warn the recipient by writing "Contains Dry Ice" on the outside of the box. Both the item and the outer package should be labeled "Keep Refrigerated" to alert the recipient.

Items should be packed in a sturdy box, sealed with recommended packing tape and clearly labeled with a permanent marker, making sure the address is complete and correct.

It is best to specify overnight delivery and notify the recipient of its expected arrival. Do not send packages to business addresses or where there will not be adequate refrigerator storage.

Send packages early in the week, so they do not sit in the post office or mailing facility over the weekend. When receiving a perishable food item, open it immediately and check its temperature. The food should arrive frozen or partially frozen with ice crystals still visible. Even if a product is smoked, cured and/or fully cooked, it still is a perishable product and must be kept cold. If perishable food arrives warm, notify the company. Do not consume the food. Do not even taste suspect food.

A very useful chart that outlines the length of time perishable foods can safely be stored, based on the condition of the food item upon arrival, can be downloaded from the FSIS Web site.

Additionally, a consumer flyer with tips for safely mailing and receiving perishable food gifts is available online. One may contact the USDA Meat and Poultry Hotline at 800.535.4555 for questions regarding meat, poultry and egg products. The FDA Outreach and Information Center can be contacted at 888.723.3366 regarding any foods other than meat, poultry and egg products.

FSIS Pathogen Reduction and HACCP Programs

FSIS is providing training to reinforce the understanding of how to perform food safety duties. The training — Food Safety Regulatory Essentials Training (FSRE) — is based on the recently issued FSIS Directive 5000.1, Revision 1, Verifying an Establishment's Food Safety System. The directive outlines the full range of inspection responsibilities in relation to the HACCP/ Pathogen Reduction regulation. In addition, it incorporates all recent Agency issuances (Directives, notices) related to these topics.

Unlike the initial HACCP training, the FSRE training is tailored to an inspector's assignment. All persons receiving the training get the foundation training and customized training. The foundation training covers the Rules of Practice; Sanitation Performance Standards; and Sanitation Standard Operating Procedures. The customized training covers HACCP verification; Pathogen Reduction; and food safety sampling. Inspectors assigned to establishments producing products

in the 03B, C and J HACCP processing categories receive HACCP training focused on raw products.

Inspectors in establishments producing products in the 03G, H and I HACCP processing categories receive HACCP training focused on not shelf stable, ready-to-eat and not ready-to-eat products. Inspectors at establishments producing products in the 03D, E and F HACCP processing categories receive HACCP training focused on shelf stable products. (Note: The HACCP training for shelf-stable products will not begin until 2004.) All material available at: http://www.fsis.usda.gov/OFO/HRDS/PATHOGEN/haccp.htm.

An Outbreak of *Campylobacter jejuni* Infection among Conference Delegates

Campylobacter infection is one of the most commonly reported foodborne diseases in Australia; however, reported *Campylobacter* outbreaks are rare. This report describes such an outbreak among delegates attending a 10-day international academic meeting in South Australia during May 2001. A retrospective cohort study of the 29 delegates who attended the conference was conducted. A questionnaire was sent by email with a response rate of 93 percent. Ten cases (onset of diarrhea while attending the conference) were identified. Two were culture positive for *Campylobacter jejuni.* There was a significant association between the illness and eating a number of food items from two restaurants; however, environmental investigation of the two venues did not identify a definitive source for the outbreak. This investigation demonstrates the usefulness of email in the distribution of questionnaires among specific cohorts.

Campylobacter infection is one of the most commonly reported foodborne diseases in Australia and overseas. The majority of cases are reported to be sporadic, with outbreaks rarely detected. Factors contributing to the relative infrequency of *Campylobacter* outbreaks have been discussed elsewhere and include the nature of the organism and its epidemiology, lack of follow-up of *Campylobacter* infections and lack of detailed strain characterization. Reported outbreaks have been associated with a point source such as contaminated drinking water, raw milk and chicken. This article describes the epidemiological, microbiological and environmental investigation of an outbreak of *Campylobacter jejuni* among delegates attending an international meeting in South Australia during May 2001.

Spanish *Listeria* Video and Booklet Available

The Department of Food Science at Pennsylvania State University is pleased to announce the availability of a Spanish video and accompanying booklet entitled Control de *Listeria monocytogenes* en pequenas planta procesadoras de carnes y aves?

This 26-minute video and 24-page booklet address a variety of issues facing meat processors who must meet revised regulations concerning *Listeria monocytogenes* in ready-to-eat meats. The topics covered in the video and booklet include personal hygiene, sanitation, biofilms, cross contamination, in-plant sampling, and microbiological testing.

If you are an educator interested in purchasing the video, please contact Dr. Catherine Cutter directly (see information below). Meat processors should contact American Association of Meat Processors (www.aamp.com) for a copy of the materials.

For more information concerning the video or booklet, please contact: Dr. Catherine Cutter, Food Safety Extension Specialist–Muscle Foods, Department of Food Science, Penn State University, phone 814. 865.8862; E-mail: cnc3@psu.edu.

Increase in *Salmonella* Enteritidis Outbreaks in England and Wales

Twenty two outbreaks of *Salmonella* Enteritidis in England and Wales have been reported to the Health Protection Agency's Communicable Disease Surveillance Centre (CDSC) between June 1 and August 27, 2003, compared with 14 in the same period in 2002. A variety of *S.* Enteritidis phage types is involved: PT 1 resistant to nalidixic acid and low level susceptibility to ciprofloxacin (Nx, CpL) three outbreaks; PT 1e one outbreak; PT3 (Nx, CpL) one outbreak; PT4 three outbreaks; PT6 three outbreaks; PT6a one outbreak; PT6a (Nx, CpL) one outbreak; PT8 two outbreaks; PT12 one outbreak; PT14b one national outbreak including three local outbreaks; PT21 (Nx, CpL) one outbreak; PT24 resistant to tetracycline (T) one outbreak; PT53 one outbreak; PT56 one outbreak. In total 356 people are known to have been affected. The largest outbreak is a national outbreak of *S.* Enteritidis PT14b so far affecting 117 people and an analytical study is underway to identify a contaminated food vehicle(s). In seven outbreaks, microbiological evidence of contaminated food vehicles has been found. Twelve outbreaks have been linked to Chinese restaurants, three to bakeries, and one has occurred in a hospital. In response to the recent outbreaks and increased incidence of *S.* Enteritidis, food items such as raw shell eggs, raw chicken, raw duck should be considered for

sampling as part of the local outbreak investigations. In addition, a public health investigation of eggs has been initiated.

Between September and December 2002, 23 outbreaks of *S.* Enteritidis were reported to CDSC, compared with 36 in the whole of 2001. In these outbreaks over 1,000 people were affected and 17 people infected with *S.* Enteritidis died, although most of the deaths were not attributed directly to *Salmonella* infection. Three outbreaks, affecting over 450 people, were national.

Based on the epidemiological evidence two investigations into eggs in use in the catering trade were initiated. As part of a public health investigation in late 2002, 8,501 shell eggs were sampled. *Salmonella* spp. was isolated from 5.1% of imported Spanish eggs used in catering premises, which compares unfavorably with *Salmonella* levels of 0.3% found in eggs (mostly produced in the United Kingdom) tested in a study of eggs 34,296 used in catering premises during April to May 2003.

Advice issued by the UK Food Standards Agency reiterating the need for proper cooking of raw shell eggs, especially for vulnerable groups, and suggesting that all importers and wholesalers heat treat eggs imported from Spain are still in force.

USDA Consumer Alert: Keeping Food Safe during an Emergency

The US Department of Agriculture has provided recommendations in advance of weather emergencies in an effort to help minimize the potential for foodborne illness.

Steps to follow to prepare for a possible weather emergency: Keep an appliance thermometer in the refrigerator and freezer. An appliance thermometer will indicate the temperature in the refrigerator and freezer in case of a power outage and help determine the safety of the food. Make sure the freezer is at or below 0°F and the refrigerator is at or below 40°F. Freeze containers of water for ice to help keep food cold in the freezer, refrigerator or coolers after the power is out.

Freeze refrigerated items such as leftovers, milk and fresh meat and poultry that you may not need immediately — this helps keep them at a safe temperature longer. Plan ahead and know where dry ice and block ice can be purchased. Store food on shelves that will be safely out of the way of contaminated water in case of flooding.

Have coolers on hand to keep refrigerator food cold if the power will be out for more than four hours. Purchase or make ice cubes and store in the freezer for use in the refrigerator or in a cooler. Freeze gel packs ahead of time for use in coolers.

Group food together in the freezer – this helps the food stay cold longer. Steps to follow after the weather emergency: Keep the refrigerator and freezer doors closed as much as possible to maintain the cold temperature. The refrigerator will keep food safely cold for about 4 hours if it is unopened. A full freezer will hold the temperature for approximately 48 hours (24 hours if it is half full and the door remains closed.) Food may be safely refrozen if it still contains ice crystals or is at 40°F or below. Never taste a food to determine its safety!

Obtain dry or block ice to keep your refrigerator and freezer as cold as possible if the power is going to be out for a prolonged period of time. Fifty pounds of dry ice should hold an 18-cubic-foot full freezer for 2 days. If the power has been out for several days, check the temperature of the freezer with an appliance thermometer or food thermometer. If the food still contains ice crystals or is at 40°F or below, the food is safe.

If a thermometer has not been kept in the freezer, check each package of food to determine its safety. If the food still contains ice crystals, the food is safe.

Discard refrigerated perishable food such as meat, poultry, fish, soft cheeses, milk, eggs, leftovers and deli items after 4 hours without power. Drink only bottled water if flooding has occurred. Discard all food that came in contact with flood waters including canned goods. Discard wooden cutting boards, plastic utensils, baby bottle nipples and pacifiers.

Thoroughly wash all metal pans, ceramic dishes and utensils that came in contact with flood water with hot soapy water and sanitize by boiling them in clean water or by immersing them for 15 minutes in a solution of 1 teaspoon of chlorine bleach per quart of water.

When in Doubt, Throw It Out! For additional information on food safety during an emergency, call the toll-free USDA Meat and Poultry Hotline at 888.MPHotline (888.674.6854); for the hearing-impaired (TTY) 800.256.7072. The Hotline is staffed by food safety experts weekdays from 10 a.m. to 4 p.m. Eastern time. Food safety recordings can be heard 24 hours a day using a touch-tone phone. The media may contact the USDA Meat and Poultry Hotline at 301.504.6258. Information is also available from the FSIS Web site: http://www.fsis.usda.gov.

Researchers Develop Faster, More Accurate Test for Mad Cow Disease

As US consumers seek reassurance that their hamburgers and steaks are free of deadly mad cow disease, researchers at the University of California-San Francisco say they may have found a promising solution. They've developed a faster, more reliable test for identifying the disease, possibly even in living cows. Current tests can only detect the disease after the cow dies.

The test was described at the 226th national meeting of the American Chemical Society, the world's largest scientific society. Critics argue that the standard immunoassay tests used to identify the infectious prion proteins that cause mad cow disease are inadequate for large scale screening of cattle. The tests can produce false readings and may take a week to yield results. A better test is needed, they say.

The new test, which has already undergone animal studies, seems to fit the bill. Called the conformation-dependent immunoassay (CDI), it can detect prion proteins with 100 percent accuracy at much smaller levels than conventional tests and only takes about five hours to produce results, according to the UCSF researchers.

Like conventional tests, the new test is designed for detecting prions in the brain tissue of cows only upon autopsy. Unlike other tests, however, the new test also shows promise for detecting the proteins in muscle tissue and even blood while the animal is still alive. If so, it could be used to identify precisely which animals are infected before they show symptoms and could help end the current practice of slaughtering whole herds, the scientists say.

"This represents a new generation of prion tests. It is the most promising test to date for accurately detecting prion proteins," says project leader Dr. Jiri G. Safar, M.D., an associate adjunct professor at UCSF, a member of the school's Institute of Neurodegenerative Diseases. He says the test has been used in a field trial to check for signs of the disease in the brains of 11,000 slaughtered cows in Spain, the United Kingdom and Germany. Results were compared to those from standard immunoassays performed on the same animals. There were no discrepancies between the tests, he says. "We had a perfect score. There were no false positives and no false negatives. We can't afford incorrect conclusions, and we didn't see that in our tests," says Safar.

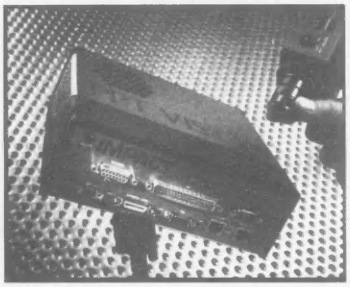
He says that the research group plans to use the test on an even larger scale among European cattle herds within the next year, checking them for signs of the disease upon autopsy. If further tests prove successful, he hopes it will eventually be used to evaluate dead cows in this country for mad cow disease, also known as bovine spongiform encephelopathy, or BSE.

Despite the fact that the CDI test is currently being done in dead cattle, Safar says the same test could eventually be used on live animals to determine the presence of prions. In lab tests, the researcher has used the CDI test to detect prions in the muscles of living mice. The live test could eventually be used to screen patients for the human form of mad cow disease, known as variant Creutzfeldt-Jakob disease, which is thought to be acquired from eating infected beef. A tissue or blood test for live animals could be available in a year, says Safar. "We're not quite there yet," he adds. "We still need to validate the effectiveness of CDI in live farm animals."

CDI has other advantages. It is automated, allowing larger numbers of animals to be screened in a short period. The test can detect up to eight different strains of prions, including those that cause scrapie in sheep and chronic wasting disease in deer.

With the recent detection of mad cow disease in neighboring Canada and the temporary ban on beef imported from that country, critics have stepped up their call for better testing. To date, there has never been a case of mad cow disease detected in the US. Given the flaws of current testing, however, some experts believe it could be just a matter of time. Safar's coauthor in this study is Dr. Stanley Prusiner, M.D., a professor of neurology and biochemistry at the university and director of its Institute for Neurodegenerative Diseases. Prusiner was the first to discover that abnormal prion proteins can cause disease, an accomplishment that won him the 1997 Nobel Prize in Physiology or Medicine. CDI technology is now licensed to InPro Biotechnology, Inc., of San Francisco, a company founded by Prusiner.

INDUSTRY PRODUCTS



PPV Vision, Inc.

PPT Vision's New Low-cost Impact CL™, Vision Micro-System

PPT Vision, Inc. has introduced Impact CL™, a new extension to the Impact™ machine vision micro-system product line that provides connectivity to digital cameras from all major camera suppliers. Impact CL combines the power of PPT Vision's machine vision micro-system technology with Camera Link™, the global standard for industrial camera communications, to eliminate the closed architecture and limited camera selection associated with smart cameras and self-contained vision systems.

"Previously, users of low-priced machine vision have been limited by systems that only support a few basic cameras. With Impact CL, vision system users can leverage the Camera Link open standard, and now have the flexibility to choose from a broad range of camera formats and vendors, including linescan, color, and high-resolution cameras," stated Joe Christenson, president of PPT Vision, Inc.

Camera Link is an open digital camera standard for machine vision applications, previously available only for high-cost, heavily-customized framegrabber-based applications. The Automated Imaging Association (AIA) sponsors the Camera Link certification program including the oversight Camera Link Committee and product registry. All major industrial camera suppliers have obtained certification for a range of digital Camera Link cameras. Impact CL is available for immediate shipment.

PPT Vision, Inc., Eden Prairie, MN

READER SERVICE NO. 314

BD Diagnostic Systems' BBL™ CHROMagar™ Orientation Medium Identifies *E. coli* and *Enterococcus*

BD Diagnostic Systems has announced the release of BBL™ CHROMagar™ Orientation medium, a chromogenic medium with an enzymatic reaction that enables identification of *E. coli* and *Enterococcus* without additional confirmatory testing from urine specimens. This non-selective, nutritive medium isolates and identifies both gram-positive and gram-negative pathogens with a single plate BBL™.

CHROMagar™ Orientation medium can substantially increase laboratory efficiency by reducing the number of plates to label, inoculate, incubate and read. This allows the microbiology laboratory to more effectively utilize limited labor resources, reduce the costs associated with confirmatory identification procedures and report results earlier.

BBL™ CHROMagar™ Orientation medium offers fast identification of common urinary pathogens and contains a unique formulation to inhibit the swarming of *Proteus* spp. This medium also enables more efficient screening of suspect urine samples because it provides presumptive identification of *Staphylococcus saprophyticus* and *Streptococcus agalactiae*, as well as the *Klebsiella-Enterobacter-Serratia* and the *Proteus-Morganella-Providencia* groups. This provides improved detection of mixed urine cultures for quicker assessment of contaminated samples. Since the medium reduces the time required to subculture mixed infections, susceptibility testing can be set up earlier.

BD Diagnostic Systems, Sparks, MD

READER SERVICE NO. 315

Carmina Technologies Launches PestAssur™ Solution for Pest Management Industry

Carmina Technologies Inc. has launched PestAssur™, a performance monitoring solution for the pest management industry. PestAssur™ is the first in a family of monitoring solutions that brings an easy-to-use, established technology to industries and processes that still rely largely on manual data collection and management.

The PestAssur™ solution consists of readily available hand-held mobile computers and a multi-level bar-code system connected to centralized serv-

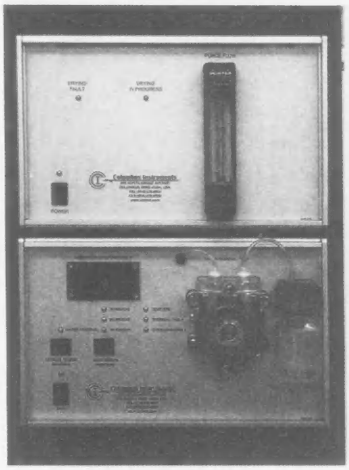
ers via a variety of wired and wireless technologies. By placing bar-codes on traps and in inspection areas, the hand-held unit identifies the services and protocols to be carried out at each location on the contracted premises. The hand-held units are able to monitor a variety of variables regarding each inspection item including time of inspection, duration of inspection and time between inspection points. In addition, the hand-held units halt inspections until specified services have been carried out or the reasons for incompletion have been documented.

According to John Alston, president and CEO of Carmina Technologies, "The PestAssur™ solution is the epitome of the Carmina model. Pest management is about the toughest service package to systemize and accommodate all its inherent variables. We look to partner with industry players to develop standards and protocols to embed into our solutions. But we also look to target industries and processes that typically have not utilized technology intensively and are ripe for technology adoption. We estimate there are some 3,000 significantly sized pest management companies in North America that can utilize PestAssur™."

Alston said that Carmina will target the field of municipal health inspection with Assur-H&S™ and Food Quality Protection with AssurFQP™, which are scheduled for launch later this year. "These are large markets in their own right. However, with increasing concern over bioterrorism and homeland security, as well as a groundswell of demand for managed safety and quality systems, we believe the monitoring of inspections that influence public health and safety will assume a higher priority, and that the market for these services may experience exponential growth."

Carmina Technologies, Calgary, Alberta, Canada

READER SERVICE NO. 316



Columbus Instruments, Inc.

Columbus Instruments New Universal Air Dryer

The Universal Dryer contains two main parts: the condenser and the dryer. Air first enters the condenser where the dew point of the sample gas is lowered well below ambient; this removes most of the moisture. Condensed water is immediately drawn off by a peristaltic pump, which minimizes sample gas contact with the condensate. Once the air has passed through the condenser, it reaches the tube dryer. The drying tube is constructed as one tube inside another. The gas sample travels through the inner tube made of hydrophilic Nafion (selectively absorbs water only); the outer air to create a moisture differential. The Nafion tube allows moisure to cross through the tube, in one direction only, into the dryer purge air. Sample gas leaves the dryer at a very low dew point temperature (-25°C) and never comes in contact with any chemical drying agents. Features a very low dead volume, digital temperature controller (condenser), and can handle a maximum flow rate of 2 LPM.

Columbus Instruments, Inc., Columbus, OH

READER SERVICE NO. 317

A-T Controls, Inc. New Direct-mount, Two-piece Flanged Ball Valve, Packaged with Actuator, Makes Automation "One Stop" Easy

Make valve automation easy with the new TRIAC Series D9 direct-mount 150# and 300# ANSI class flanged ball valves from A-T Controls. Available in pre-assembled valve/actuator packages, the high-performance D9 units feature two-piece investment cast bodies with direct-mount ISO5211 automation pad and choice of electric or pneumatic actuator. Unique "pyramid power" live-loaded packing system features a patented 45° pyramidal primary stem seal with Belleville washers and V ring packing, protecting against stem leaks experienced with ordinary ball valves. One-stop order capability simplifies valve/actuator selection and setup, especially for organizations with limited engineering staffs. The D9 ball valves come in nine sizes from 1/2" to 6" and 316SST or WCB body material. Extensive stocking inventories permit quick configuration and delivery.

Direct-mount construction provides a compact, robust assembly that is faster and simpler to install, while eliminating the hassles of sourcing, installing and aligning brackets and couplers. Full port design with fully machined bore provides smooth flow. Reinforced RTFE seats come standard, with other seat materials optionally available, including 50SS/50 TFE for higher temperature and difficult applications, such as steam. D9 units come standard with anti-static device and can be specified with traceable capability.

A-T Controls, Cincinnati OH

READER SERVICE NO. 318

Onset Computer Corporation

Onset Computer Corp. Introduces Complete Solution for IAQ Monitoring

Onset Computer Corporation has introduced a complete Indoor Air Quality (IAQ) monitoring solution that combines the company's HOBO® data loggers with the Telaire® 7001 Carbon Dioxide (CO_2) Monitor.

Now, HVAC contractors, facilities' managers, and others can measure and record CO_2 along with temperature and relative humidity in a broad range of IAQ applications. Examples include monitoring the performance of ventilation systems in office buildings, locating the presence of combustion byproducts in manufacturing plants, and identifying IAQ problems in schools.

Like HOBO data loggers, the Telaire 7001 monitor is an easy-to-use, battery-powered device that can be used in a broad range of commercial and residential environments. It measures and outputs CO_2 levels over the range of 0 to 2500 ppm with 10 ppm resolution to HOBO loggers, calculates and displays ventilation rates based on outside CO_2 concentrations, and provides stable, high-accuracy CO_2 readings.

The Telaire 7001 CO_2 monitor is available immediately, and can be used with a broad range of HOBO data loggers, including the company's new high-resolution, direct-USB HOBO U12 family loggers.

Onset Computer Corporation, Bourne, MA

READER SERVICE NO. 319

Labconco's WaterPro® RO Station Features Fast Delivery and Timed Dispensing

Labconco Corporation offers the WaterPro RO Station for point of use production of laboratory grade reverse osmosis water.

The WaterPro RO Station's large capacity filters and membrane produce high-quality reverse osmosis (RO) purified water at a rate faster than any other laboratory system available. Water is produced on demand and may be dispensed at a typical rate of 1 liter per minute (at inlet water at 25°C). RO purified water is ideal for reagent preparation, basic life science work, and glassware rinsing. Water may be dispensed manually from a valve or an optional gun. The timed dispense feature allows unattended operation. Set the timer up to 99.9 minutes, press the dispense button and the valve dispenses until set time expires.

The integral 17-liter tank and an outlet port for connection to Labconco's SteamScrubber® or FlaskScrubber® Laboratory Glassware Washer holds ample volume to supply pure water for final rinse cycles.

The WaterPro RO may also be used to produce laboratory grade feedwater for final purification by a polishing system such as the WaterPro PS Polishing Station and to allow dispensing of both RO-purified and Type I water.

Labconco Corporation, Kansas City, MO

READER SERVICE NO. 320

Viking's New Mag Drive® Magnum™ Sealless Gear Pump Series Offers Short-term Run-dry Capability

Viking Pumps' new line of Mag Drive® Magnum™ sealless pumps features a thrust-controlled design that allows short-term run dry capabilities. This design all but eliminates damage resulting from priming and accidental empty tank situations. These cast iron, reversible-direction-of-flow pumps are ideal for hazardous or hard-to-seal liquids, or for applications where very low maintenance is a requirement. The adjustable rotor clearance enables high volumetric efficiency, whether pumping thin or viscous liquids.

Extended pump life is made possible thanks to Viking's in-canister bushing and hollow shaft design; the pump's construction allows for positive cooling flow that minimizes the potential for thermal product degradation. A patent pending barrier fluid option is also available. This feature allows a fluid flush or barrier fluid to remove heat and keep pumped fluid out of the canister.

Additional features of Viking's Mag Drive Magnum series include a close-couple motor flange option and the ability to run at synchronous motor speeds. This series of pumps offers flow rates of up to 200 gpm, with pressures to 200 PSI and at temperatures ranging from -60° to 500°F (-51° to 260°C).

Viking Pump Inc., Cedar Falls, IA

READER SERVICE NO. 321

Eriez Magnet Removes Metal Contaminants from Pneumatic Conveying Lines

Eriez' RF (radial field) Cartridge Magnets remove contaminants from dry, free-flowing dry, granular products conveyed in pneumatic pipelines. Material enters the housing and is distributed by a solid stainless cone then passes in close proximity to the magnetic cartridge. Ferrous contamination is attracted and held by the magnet while the separated product continues past of the housing. The ferrous contamination remains on the magnet until the cartridge is removed and cleaned.

The RF Cartridge Magnetic Separator contains high strength, permanent tapered-step magnetic elements. These independent magnetic elements have built-in handles for convenient removal and cleaning. Standard units are constructed of stainless steel, use typical pneumatic conveyor couplings for a positive seal and are designed for applications up to 25 psig (1.7 bar).

Eriez also offers models for high-pressure operations and with Super Strength Erium® 3000 Rare Earth magnet material for applications requiring the highest levels of product purity.

Eriez Magnetics, Erie, PA

READER SERVICE NO. 322

Spiroflow Systems Handles Cohesive Powder

Spiroflow introduces a complete handling system ideal for cohesive powder such as titanium dioxide. Often, these powders will have difficult characteristics when used in conveyors or bulk containers such as Bulk Bags. These characteristics include bridging, ratholing or flushing. Bridging occurs when the powder compacts itself over the outlet and will not flow. Ratholing produces a small inner core of powder that will readily flow, leaving an immovable, larger outer core of powder resistant to discharge. The opposite of these actions is a total "flushing" of powder characterized by an uncontrollable discharging.

The Spiroflow Type 3 Bulk Bag Discharger, fitted with a Hogan Bin Discharger and Aero-Mechanical Conveyor, dramatically improves powder flow by incorporating flow aid technology. By using pneumatic massage paddles and a bag tensioning device, Spiroflow's Type 3 improves material flow out of the Bulk Bag with no dramatic degradation.

The Hogan Bin Discharger, fitted between the Type 3 Discharger and Aero-Mechanical Conveyor, acts as a flow promoter by using a suspended series of blades controlled by a vibrator to gently vibrate the powder into the Aero-Mechanical Conveyor. The blades are free to rotate to 90 degrees from horizontal. Not only can the blades be vibrated for easier material discharging, but electric actuators can also be attached to the housing.

The Aero-Mechanical, also known as a "rope and disk" conveyor, uses a continuous rope and travels through a tube with a series of equally spaced disks secured to it. The unit creates a moving current of air in which the powder is conveyed, similar to the effect of a vacuum or pneumatic system. However, the Aero Mechanical Conveyor does not need a cyclone or filter to separate the product from the air. This type of conveyor is applicable to horizontal or vertical conveying up to 20–25 m.

Spiroflow, Inc., Monroe, NC

READER SERVICE NO. 323

Balston® Steam Filters That Permit Direct Steam Contact with Food are Now Available from Parker Hannifin Corp.

Balston Steam Filters remove 98+% of 0.1 micron particles and 100% of all visible particles from steam. Liquid condensate is removed at the same efficiency as for solid particles. Models are available to handle flow rates of up to 3,000 lbs/hr.

Other benefits of Balston Steam Filters include: Reduction in steam condensate mixing with the food products when steam is used for agitating, mixing or cooking; significant reduction in carryover of boiler feedwater chemicals into the food product, causing taste and odor problems; greatly reduced maintenance requirements for valves, cookers, heat exchangers, and other equipment.

Balston Steam Filters are in full compliance with the requirements of the US Food, Drug and Cosmetic Act. They meet the regulations for Indirect Food Additives used as Basic Components for Repeated Use Food Contact Surfaces as specified in 21 CFR Part 177, and Current Good Manufacturing Practices, 21 CFR Part 110. Balston Steam Filters have also been accepted by the USDA for use in federally inspected meat and poultry plants. They are also in full compliance with the 3-A Accepted Practices (Number 609-00) for producing steam of culinary quality, and they are in full compliance with the requirements of the Health Protection Branch of Health and Welfare Canada.

Parker Hannifin Corporation, Tewksbury, MA

READER SERVICE NO. 324

3-A® Sanitary Standards for Tubular Heat Exchangers, Number 12-07

Standards Developing Organizations
3-A Sanitary Standards, Inc. (3-A SSI)
in collaboration with
United States Public Health Service (USPHS)
United States Department of Agriculture (USDA)
European Hygienic Engineering & Design Group (EHEDG)

Adopted November 08, 2003

12-07

Disclaimers

3-A Sanitary Standards, Inc. (3-A SSI) and collaborating organizations do not assume or undertake to discharge all or any responsibilities of manufacturers or any other user of 3-A Sanitary Standards or 3-A Accepted Practices. 3-A SSI is not responsible to any individual, organization or entity for the use of 3-A Standards and 3-A Accepted Practices. It is the science-based opinions, professional findings of volunteer experts and consensus that provides the sanitary (hygienic) criteria included in 3-A documents.

3-A Standards and 3-A Practices do not include provisions for mechanical and electrical safety. Mechanical and electrical safety criteria are established by government regulations and other standards development organizations (SDOs). Other SDO standards may be referenced.

3-A Sanitary Standards, Inc., its employees and its volunteer committees shall not incur any obligation or liability for damages, including consequential damages, arising out of or in connection with the development, use, interpretation of, and reliance upon this 3-A Standards.

Drawings and illustrations contained herein are to assist in understanding the criteria in this 3-A Standard. Drawings and illustrations are not intended to show all variations of the equipment or system nor are they (a) to exclude alternate methods meeting this standard. Drawings and illustrations are non-normative.

Foreword

This 3-A Standard is to establish minimum sanitary (hygienic) requirements for Tubular Heat Exchangers. Standard English is the official language of 3-A Sanitary Standards and 3-A Accepted Practices.

This 3-A Standard is for voluntary use by directly and materially affected organizations such as equipment and machinery fabricators, processors, regulatory agencies and by 3-A Sanitary Standards, Inc. to assure adequate public health protection exist for the devices and covered products. 3-A Sanitary Standards, Inc. use these documents as the source for sanitary criteria as part of 3-A Symbol authorization.

This 3-A Standard was developed jointly by 3-A Sanitary Standards, Inc. (3-A SSI), the United States Public Health Service (USPHS), the United States Department of Agriculture – Dairy Programs (USDA), and the European Hygienic Engineering & Design Group (EHEDG).

It is our purpose to encourage inventive genius and provide a forum to discuss new developments. Suggestions for improvement and new technology are welcome any time for consideration by the 3-A Sanitary Standards Committees. Please forward comments to the 3-A SSI, 1451 Dolley Madison Boulevard, Suite 210, McLean, VA 22101-3850, USA. By fax: 703-761-4334. By e-mail to: trughie@3-a.org.

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A SCOPE

A1 These standards cover the sanitary aspects of tubular heat exchangers without agitators. Tubular heat exchangers may have tube cross-sectional profile modifications or removable devices for promotion of desired flow characteristics. The standards do not cover high-pressure (greater than 250 psig or 1724 kPa product pressure) tubular heat exchangers which require special tubing and/or fittings.

A2 In order to conform to these 3-A Sanitary Standards, tubular heat exchangers shall conform to the following design, material, and fabrication criteria.[1]

B DEFINITIONS

B1 *Product:* Shall mean milk and milk products or other comestibles.

B2 *Tubular Heat Exchangers:* Shall mean heat exchangers having one continuous tube, two or more concentric tubes, or two or more tubes in parallel flow.

B3 Surfaces

B3.1 *Product Contact Surfaces:* Shall mean all surfaces which are exposed to the product, and surfaces from which liquids may drain, drop, or be drawn into the product.

B3.2 *Nonproduct Contact Surfaces:* Shall mean all other exposed surfaces.

B4 Cleaning

B4.1 *Mechanical Cleaning or Mechanically Cleaned:* Shall mean soil removal by impingement, circulation, or flowing chemical detergent solutions and water rinses onto and over the surfaces to be cleaned by mechanical means in equipment or systems specifically designed for this purpose.

B4.1.1 *Cleaned In Place (CIP):* Shall mean mechanical cleaning of equipment, the cleanability of which has been sufficiently established such that all product or solution contact surfaces do not have to be readily accessible for inspection.

[1] Use current revisions or editions of all referenced documents cited herein.

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B4.2 *Manual (COP) Cleaning:* Shall mean soil removal when the equipment is partially or totally disassembled. Soil removal is effected with chemical solutions and water rinses with the assistance of one or a combination of brushes, nonmetallic scouring pads and scrapers, high or low pressure hoses and tank(s) which may be fitted with recirculating pump(s), and with all cleaning aids manipulated by hand.

B5 *Bond:* Shall mean the adhesive or cohesive forces holding materials together. This definition excludes press and shrink fits.

B6 *Corrosion Resistant:* Shall mean the surface has the property to maintain its original surface characteristics for its predicted service period when exposed to the conditions encountered in the environment of intended use, including expected contact with product and cleaning, sanitizing, or sterilization compounds or solutions.

B7 *Easily or Readily Accessible:* Shall mean a location, which can be safely reached by personnel from the floor, platform, or other permanent work area.

B8 *Easily or Readily Removable:* Shall mean quickly separated from the equipment with the use of simple hand tools if necessary.

B9 *Nontoxic Materials:* Shall mean those substances, which under the conditions of their use are in conformance to applicable requirements of the Food and Drug Administration.

B10 *Sanitizing or Sanitization:* Shall mean a process applied to a cleaned surface which is capable of reducing the numbers of the most resistant human pathogens by at least 5 $\log_{10}$ reductions (99.999%) to 7 $\log_{10}$ reductions (99.99999%) by applying accumulated hot water, hot air, or steam, or by applying an EPA-registered sanitizer according to label directions. Sanitizing may be effected by mechanical or manual methods.

B11 *Simple Hand Tools:* Shall mean implements normally used by operating and cleaning personnel such as a screwdriver, wrench, or mallet.

B12 *Sterilization:* Shall mean a process effected by heat, chemicals, or other mechanical means that destroys all vegetative bacteria and inactivates relevant bacterial spores.

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C MATERIALS

C1 Metals

C1.1 Product contact surfaces shall be of stainless steel of the American Iron and Steel Institute (AISI) 300 Series[2], (except 301 and 302), or at least equally corrosion-resistant metal that is nontoxic and nonabsorbent. (See Appendix, Section F.)

C2 Nonmetals

C2.1 Rubber and rubber-like materials may be used for gaskets, seals, and parts having the same functional properties.

C2.1.1 Rubber and rubber-like materials, when used for the above-specified application(s), shall conform to the applicable provisions of the 3-A Sanitary Standards for Multiple-Use Rubber and Rubber-Like, Number 18-.

C2.2 Plastic materials may be used for gaskets, seals, and parts having the same functional purposes.

C2.2.1 Plastic materials, when used for the above-specified application(s), shall conform to the applicable provisions of the 3-A Sanitary Standards for Multiple-Use Plastic Materials, Number 20-.

C2.3 Bonded rubber and rubber-like materials and bonded plastic materials having product contact surfaces shall be of such composition as to retain their surface and conformational characteristics when exposed to the conditions encountered in the environment of intended use and in cleaning and bactericidal treatment or sterilization.

C2.4 The adhesive, if used, on bonded rubber and rubber-like materials and bonded plastic materials shall be nontoxic.[3]

C3 Nonproduct Contact Surfaces

C3.1 All nonproduct contact surfaces shall be corrosion-resistant material or material that rendered corrosion resistant. If coated, the co used shall adhere. All nonproduct contact sur shall be relatively nonabsorbent, durable, cleanable. Parts removable for cleaning he both product and nonproduct contact surfaces not be painted.

C4 High Temperature Materials

C4.1 In a processing system to be sterilized by hea operated at a temperature of 250°F (121°C higher, all materials having product co surface(s) used in the construction of tubular exchangers and nonmetallic component parts be such that they can be (1) sterilized by satu steam or water under pressure (at least 15.3 ps 106 kPa) at a temperature of at least 250°F (12 and (2) operated at the temperature require processing.

D FABRICATION

D1 Surface Texture

D1.1 Product contact surfaces shall have a finish at as smooth as 32 µin. or 0.8 µm R_a finish on stai steel sheets and be free of imperfections sur pits, folds and crevices in the final fabricated f (See Appendix, Section F.)

D2 Permanent Joints

D2.1 All permanent joints in metallic product co surfaces shall be continuously welded. W joining two tubes shall be made in conforman the applicable provisions of the 3-A Acce Practices for Permanently Installed Product Solution Pipelines and Cleaning Systems, Nu 605-.[4]

[2] The data for this series are contained in the *AISI Steel Products Manual, Stainless & Heat Resisting Steels*, Table 2-I. Available from the American Iron and Steel Society, 410 Commonwealth Drive, Warrendale, PA 15086.

[3] Adhesives shall comply with 21 CFR 175 – Indirect Food Additives: Adhesives and Components of Coatings. Document for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

[4] Criteria for hygienic welds may be found in AWS/ANSI D1 *Specification for Welding of Austenitic Stainless Steel Tube an Systems in Sanitary (Hygienic) Applications*. Available fro American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33 mail: info@amweld.org. EHEDG Doc. 9 – Welding Stainless S Meet Hygienic Requirements. Available from the European Hy Equipment Design Group, Effie Morris, Avenue Grand Champ 160 Brussels, Belgium.

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D3 Bonded Materials

D3.1 Bonded rubber and rubber-like materials and bonded plastic materials having product contact surfaces shall be bonded in a manner that the bond is continuous and mechanically sound, so that when exposed to the conditions encountered in the environment of intended use and in cleaning, bactericidal treatment or sterilization, the rubber and rubber-like material or the plastic material does not separate from the base material to which it is bonded.

D4 Cleaning and Inspectability

D4.1 If the tubular heat exchanger has two or more tubes in parallel flow, the product contact surfaces shall be easily accessible for cleaning and inspection. Demountable parts shall be readily removable.

D4.2 A tubular heat exchanger that is to be mechanically cleaned shall be designed so that the product contact surfaces of the tubular heat exchanger and all nonremoved appurtenances thereto can be mechanically cleaned and are easily accessible, readily removable, and inspectable, except that:

D4.2.1 A tubular heat exchanger that is one or more continuous coiled tubes without profile modifications, and that is to be CIP cleaned, shall have representative product contact surfaces easily accessible for inspection. Access to the product inlet and outlet heat exchange surfaces shall be considered to meet these inspection requirements.

D4.3 Product contact surfaces not designed to be mechanically cleaned shall be easily accessible for manual cleaning and inspection either when in an installed position or when removed. Demountable parts shall be readily removable.

D4.4 Appurtenances having product contact surfaces shall be readily removable, or they shall be readily cleanable when assembled or installed, and shall be easily accessible for inspection.

D4.5 Tubes shall be supported in a manner that will prevent sagging.

D4.6 In a heat exchanger designed to be mechanically cleaned of the type that incorporates two or more concentric tubes, means shall be provided to keep the tubes equally spaced. The means provided to keep tubes equally spaced shall not interfere with mechanical cleaning.

D4.7 Removable devices for promotion of desired flow characteristics, if provided, shall be readily removable for cleaning and inspection.

D5 Fittings

D5.1 All sanitary fittings and connections shall conform to the applicable provisions of the 3-A Sanitary Standards for Sanitary Fittings, Number 63-.

D6 Sensors and Sensor Fittings

D6.1 All instrument connections having product contact surfaces shall conform to the applicable provisions of the 3-A Sanitary Standards for Sensors and Sensor Fittings and Connections Used on Equipment, Number 74-.

D7 Sanitary Metal Tubing

D7.1 Metal tubing with a continuous circular cross-section shall conform to the 3-A Sanitary Standards for Polished Metal Tubing, Number 33-, except that:

D7.1.1 Metal tubing may have cross-sectional profile modifications provided that surface texture conforms to Section D1.1 and that any tube-to-tube welding is made at a round cross-section portion with welding in conformance to Section D2.1.

D7.2 The minimum diameter of circular heat exchange tubing shall be 0.902 in (22.9 mm) I.D. except that circular cross-section heat exchange tubing used in a heat exchanger may be of smaller diameter if the heat exchanger is designed for mechanical cleaning.

D8 Gaskets and Gasket Retaining Grooves

D8.1 Gaskets shall be removable or bonded.

D8.2 Grooves in gaskets shall be no deeper than their width.

D8.3 Gasket retaining grooves in product contact surfaces for removable gaskets shall not exceed 1/4 in. (6.35 mm) in depth or be less than 1/4 in. (6.35 mm) wide except those for standard O-rings smaller than 1/4 in. (6.35 mm), and those provided for in Section D5.1 and D6.1.

D9 **Radii**

D9.1 All internal angles of less than 135° on product contact surfaces shall have minimum radii of 1/4 in. (6.35 mm), except that:

D9.1.1 The radii in grooves in gaskets or in gasket retaining grooves shall be not less than 1/8 in. (3.18 mm), except for those for standard 1/4 in. (6.35 mm) and smaller O-rings, and those provided for in D5.1 and D6.1.

D9.1.2 Radii in standard O-ring grooves shall be as specified in Appendix G.

D9.1.3 Radii in nonstandard O-ring grooves shall be those radii closest to a standard O-ring as specified in Appendix G.

D9.1.4 When the thickness of one or both parts joined is less than 3/16 in. (4.76 mm), the minimum radii for fillets of welds on product contact surfaces shall be not less than 1/8 in. (3.18 mm).

D9.1.5 Smaller radii may be used for tube spacers, tube spacer weldments, tube cross-sectional profile modifications, and weldments on removable devices for promotion of desired flow characteristics. In no case shall the radii be less than 1/16 in. (0.397 mm.)

D10 **Threads**

D10.1 There shall be no threads on product contact surfaces.

D11 **Draining**

D11.1 Tubular heat exchangers including those with cross-sectional profile modifications, shall be drainable by:

D11.1.1 Sloping to drain point(s),

D11.1.2 Air purging (See Appendix H.),

D11.1.3 Disassembly, or

D11.1.4 Any other effective means.

D11.2 The selected method of draining shall remove all liquid, including liquid which would otherwise be held up in cross-section profile modifications, except for normal adherence.

D11.3 The inlet fitting for air purging shall be designed for sanitary connection to air under pressure, or alternatively, there shall be means for attaching a removable fitting such as an elbow, tee, or cap which can be replaced with an air inlet connection during the purging operation.

D11.4 A valve or removable fitting shall be provided as a drain point at the end of the tubular heat exchanger or downstream from it. The selected drain point may be lower or higher than the product discharge level from the tubular heat exchanger. (Also see Appendix H.)

D12 **Nonproduct Contact Surfaces**

D12.1 Nonproduct contact surfaces shall have a relatively smooth finish, and be relatively free of pockets and crevices, and be readily cleanable and those surfaces to be coated shall be effectively prepared for coating.

D12.2 Riveted nameplates or appendages shall not be used. Socket head cap screws shall not be used. Knurled surfaces shall not be used. Nameplates shall be welded or effectively sealed to the equipment. External lap joints for sheathing over insulated areas shall be overlapped downward. Overlapped joints shall be sealed between the mating surfaces with a suitable sealant. Supporting structures, braces, catwalks, stairs, handrails and guards are not considered as nonproduct contact surfaces of the equipment and are considered as part of the building structure.

D12.3 **Supports**

D12.3.1 If legs are used, they shall be smooth with rounded ends or with a flat, load-bearing foot suitable for sealing to the floor, and have no exposed threads. Legs made of hollow stock shall be sealed. Legs shall provide a minimum clearance between the lowest part of the base and the floor of not less than 6 in. (152.4 mm).

D12.3.2 If mounted on a wall or column, the point of attachment of a tubular heat exchanger to its mounting shall be designed for sealing. The mounting, if supplied by the manufacturer, shall be designed for sealing to the wall or column. The design of a tubular heat exchanger to be mounted on a wall or column shall be such that there will be at least a 4 in. (101.6 mm) clearance between the outside of the tubular heat exchanger and the wall or

TABLE 2 - OPTIONAL METAL ALLOYS

Optional metal alloys having the following compositions are examples considered in conformance to Section C be (Percentages are maximum unless range is given.)

	UNS N08367	UNS R30809	UNS S20161	UNS N26055	UNS N26455	UNS S17400	UNS S15500	UNS S32900	UNS R20500	UNS R50400
	ASTM A743 Grade CN-3MN	ASTM A743 Grade CF-10 SMnN		ASTM A494 Grade CY55nBM	ASTM A494 Grade CW-2M	ASTM A747 Grade CB7Cu-1	ASTM A747 Grade CB7Cu-2		ASTM A560 Grade 50Cr-50Ni	ASTM B67 Grade C-2
C	0.03	0.10	0.15	0.05	0.02	0.07	0.07	0.20	0.10	0.10
Mn	2.00	7.00-9.00	4.00-6.00	1.5	1.00	0.70	0.70	1.00	0.50	
Si	1.00	3.50-4.50	3.00-4.00	0.5	0.80	1.00	1.00	0.75	1.00	
P	0.040	0.040	0.040	0.03	0.03	0.035	0.035	0.040	0.02	
S	0.010	0.030	0.040	0.03	0.03	0.03	0.03	0.030	0.02	
Cr	20.0-22.0	16.00-18.00	15.0-18.0	11.0-14.0	15.0-17.5	15.50-17.5	14.0-15.50	23.0-28.0	48.0-52.0	
Ni	23.5-25.5	8.00-9.00	4.00-6.00	Balance	Balance	3.60-4.60	3.50-5.50	2.50-5.00	Balance	
Mo	6.0-7.0			2.0-3.5	15.0-17.5			1.00-2.00		
Cb						0.15-0.35	0.15-0.35			
Cu	0.75					2.50-3.20	2.50-3.20			
N	0.18-0.26	0.08-0.18	0.08-0.20			0.05	0.05		0.50	
Fe	Balance	Balance	Balance	2.00	2.00	Balance	Balance	Balance	1.00	0.30
Sn				3.0-5.0						
Bi				3.0-5.0						
W					1.0					
Ti									0.50	Balance
Al									0.25	
Other										Ti - 0.01 N - 0.03 O - 0.25

E3 Metal alloys or metals other than the above may be as corrosion resistant as 300 Series Stainless steel. This m shown when metal alloys or metals are tested in accordance with ASTM G31 Laboratory Immersion Corrosion Te of Metals and have a corrosion rate of less than 10 mil per year. The test parameters such as the type of chemic their concentration(s), and temperature(s) should be representative of cleaning and sanitizing conditions used in equipment. Alloys containing lead, leachable copper, or other toxic metals should not be used.

E4 The minimum criteria for metals in section C 1.1 are based on experience with the processing of milk and conven dairy products. More corrosion-resistant metals may be appropriate when tubular heat exchangers are used to pr modified dairy products or other non-dairy food products, especially those containing salts or having high acidit pH or both, and processed at high temperatures. The corrosive effect of galvanic currents should also be consi when choosing suitable materials, particularly when different metals are used in the same system.

column.

D12.3.3 When a tubular heat exchanger is suspended from a ceiling, the means of suspension shall be smooth and cleanable.

APPENDIX

E **STAINLESS STEEL MATERIALS**

E1 Stainless steel conforming to the applicable chemical composition ranges established by AISI[2] for wrought products (Table 1) should be considered in conformance to the requirements of Section C1 herein. Where welding is involved, the carbon content of the stainless steel should not exceed 0.08%.

E2 **Table 1**

WROUGHT PRODUCTS TYPICALLY USED			
UNS#	ASTM[3]	AISI/ SAE[2]	Common Names
S30300	A-582	303	Free-Machining S.S.; Austenitic
S30400	A-276 A-666	304	Austenitic S.S.
S30403	A-276 A-666	304L	Low Carbon Austenitic S.S.
S31600	A-276 A-666	316	Austenitic S.S. plus Mo*
S31603	A-276 A-666	316L	Low Carbon Austenitic S.S. plus Mo*

*Molybdenum

[3] Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

F **PRODUCT CONTACT SURFACE FINISH**

Surface finish equivalent to 150 grit or better as obtained with silicon carbide, properly applied on stainless steel sheets, is considered in conformance to the requirements of Section D1 herein. A maximum R_a of 32 µin. (0.8 µm), when measured according to the recommendations in American National Standards Institute (ANSI)/American Society of Mechanical Engineers (ASME)[6] B46.1 - *Surface Texture, Waviness and Lay* is considered to be equivalent to a No. 4 finish.

G **O-RING GROOVE RADII**

TABLE 3 - Minimum Groove Radii Dimensions for Standard O-Rings

O-Ring Cross Section, Nominal (AS 568[7])	O-Ring Cross Section, Actual (AS 568)	O-Ring Cross Section, Actual (ISO 3601-1[8])	Minimum Groove Radius
1/16 in.	0.070 in.	1.80 mm	0.0160 in. (0.406 mm)
3/32 in.	0.103 in.	2.65 mm	0.0310 in. (0.787 mm)
1/8 in.	0.139 in.	3.55 mm	0.0310 in. (0.787 mm)
3/16 in.	0.210 in.	5.30 mm	0.0620 in. (1.575 mm)
1/4 in.	0.275 in.	7.00 mm	0.0940 in. (2.39 mm)

H **AIR PURGING**

H1 When air is used for purging the tubular heat exchanger, the air shall be produced in conformance to 3-A Accepted Practices for Supplying Air Under Pressure in Contact with Milk, Milk Products, and Product Contact Surfaces, Number 604-.

H2 The user is responsible for supplying air inlet and draining provisions which are not part of the tubular heat exchanger because of their location (See Section D11.)

I **MOUNTING**

I1 When the tubular heat exchanger is mounted on ceiling supports, means should be provided to facilitate inspection and manual cleaning, if necessary.

J **ENGINEERING DESIGN AND TECHNICAL CONSTRUCTION FILE**

The following is an example of an engineering design and technical construction file (EDTCF) to be maintained by the fabricator as evidence of conforming to 3-A Sanitary Standards or 3-A Accepted Practices. (The file may contain more or less information as applicable to the equipment or system.)

J1 **PURPOSE**

J1.1 To establish and document the material, fabrication, and installation (where appropriate) requirements for the engineering design and technical construction files for all products, assemblies, and sub-assemblies supplied by the manufacturer thereof to be in conformance to the sanitary criteria found in 3-A Sanitary Standards or 3-A Accepted Practices. It is recommended that the engineering and construction file or files be submitted with applications for 3-A Symbol use authorization.

J2 **Scope**

J2.1 This EDTCF applies to equipment specified by:

J2.1.1 3-A Sanitary Standards for Tubular Heat Exchangers, Number 12-07.

J3 **Responsibilities**

J3.1 This EDTCF is maintained by: The Engineering Manager (or other company official) **[name and title of responsible official]** is responsible for maintaining, publishing, and distributing this EDTCF.

J3.2 Implementation: All divisions, specifically development engineering, standards engineering, sales engineering, and product departments are responsible for implementing this EDTCF.

[6] Available from the American Society of Mechanical Engineers, 345 East 47th Street, New York, NY 10017-2392.

[7] The document establishing these standard dimensions is Aerospace Standard (AS) 568, published by SAE, 400 Commonwealth Drive, Warrendale, PA 15086.

[8] The document establishing these standard dimensions is ISO 3601-1, published by the International Organization for Standardization (ISO), 1 Rue de Varembe, Case Postale 56, CH-1211, Geneva, Switzerland

J4 **Applicability**

J4.1 The 3-A Sanitary Standards and 3-A Accepted Practices are voluntarily applied as suitable sanitary criteria for dairy and food processing equipment. 3-A Sanitary Standards are referenced in the Grade A Pasteurized Milk Ordinance: "Equipment manufactured in conformity to 3-A Sanitary Standards conforms to the sanitary design and construction standards of this Ordinance."

J5 **References**

J5.1 List any additional regulations that apply to the equipment or system covered by this EDTCF.

J5.2 Date of conformity or 3-A Symbol Authorization and certificate number, if authorized.

J6 **Design and Technical Construction File**

J6.1 The Engineering Design and Technical Construction File may consist of the following:

a. an overall drawing of the subject equipment;
b. full detailed drawings, accompanied by any calculations, notes, test results, etc. required to check the conformity of the equipment to the 3-A Standards or 3-A Practices;
c. a list of:
   (1) the essential requirements of the standards or practices;
   (2) other technical specifications, which were used when the equipment was designed;
d. a description of methods adopted;
e. if essential, any technical report or certificate obtained from a competent testing body or laboratory;
f. any technical report giving the results of tests carried out internally by Engineering or others;
g. documentation and test reports on any research or tests on components, assemblies and/or the complete product to determine and demonstrate that by its design and construction the product is capable of being installed, put into service, and operated in a sanitary manner (optional);
h. a determination of the foreseeable lifetime of the product (optional);
i. a copy of the instructions for the product (Instruction Manuals/Instruction Books);
j. for serial manufacturing, the internal measures that will be implemented to insure that the equipment will continue to be manufactured in conformity to the provisions of the 3-A Sanitary Standards or 3-A Accepted Practices;
k. engineering reports;
l. laboratory reports;
m. bills of material;
n. wiring diagrams, if applicable;
o. sales order engineering files;
p. hazard evaluation committee reports, if executed;
q. change records;
r. customer specifications;
s. any notified body technical reports and certification tests;
t. copy of the 3-A Symbol authorization, if applicable.

J6.2 The file does not have to include detailed plans or any other specific information regarding the sub-assemblies, tooling, or fixtures used for the manufacture of the product unless a knowledge of them is essential for verification of conformity to the basic sanitary requirements found in 3-A documents.

J6.3 The documentation referred to in J6.1 above need not permanently exist in a material manner in the EDTCF, but it must be possible to assemble them and make them available within a period of time commensurate with its importance (one week is considered reasonable time). As a minimum, each product EDTCF must physically contain an index of the applicable document of J6.1 above.

J6.4 The EDTCF may be in hard copy or software form.

J7 **Confidentiality**

J7.1 The EDTCF is the property of the manufacturer and is shown at their discretion, except that all or part of this file will be available to the 3-A SSI or a regulatory agency for cause and upon request.

J8 **File Location**

J8.1 The EDTCF shall be maintained at the manufacturer's address.

J9 **File Retention**

J9.1 The EDTCF (including all documentation referred to in J6.1) shall be retained and kept available for 12 years following the date of placing the product in use or from the last unit produced in the case of series manufacture.

3-A® Sanitary Standards for Farm Milk Cooling and Holding Tanks, Number 13-10

Standards Developing Organizations
3-A Sanitary Standards, Inc. (3-A SSI)
in collaboration with
United States Public Health Service (USPHS)
United States Department of Agriculture (USDA)
European Hygienic Engineering & Design Group (EHEDG)

Adopted November 16, 2003

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Disclaimers

3-A Sanitary Standards, Inc. (3-A SSI) and collaborating organizations do not assume or undertake to discharge all or any responsibilities of manufacturers or any other user of 3-A Sanitary Standards or 3-A Accepted Practices. 3-A SSI is not responsible to any individual, organization or entity for the use of 3-A Standards and 3-A Accepted Practices. It is the science-based opinions, professional findings of volunteer experts and consensus that provides the sanitary (hygienic) criteria included in 3-A documents.

3-A Standards and 3-A Practices do not include provisions for mechanical and electrical safety. Mechanical and electrical safety criteria are established by government regulations and other standards development organizations (SDOs). Other SDO standards may be referenced.

3-A Sanitary Standards, Inc., its employees and its volunteer committees shall not incur any obligation or liability for damages, including consequential damages, arising out of or in connection with the development, use, interpretation of, and reliance upon this 3-A Standards.

Drawings and illustrations contained herein are to assist in understanding the criteria in this 3-A Standard. Drawings and illustrations are not intended to show all variations of the equipment or system nor are they (it) to exclude alternate methods meeting this standard. Drawings and illustrations are non-normative.

Foreword

This 3-A Standard is to establish minimum sanitary (hygienic) requirements for Farm Milk Cooling and Holding Tanks. Standard English is the official language of 3-A Sanitary Standards and 3-A Accepted Practices.

This 3-A Standard is for voluntary use by directly and materially affected organizations such as equipment and machinery fabricators, processors, regulatory agencies and by 3-A Sanitary Standards, Inc. to assure adequate public health protection exist for the devices and covered products. 3-A Sanitary Standards, Inc. use these documents as the means for sanitary criteria as part of 3-A Symbol authorization.

This 3-A Standard was developed jointly by 3-A Sanitary Standards, Inc. (3-A SSI), the United States Public Health Service (USPHS), the United States Department of Agriculture – Dairy Programs (USDA), and the European Hygienic Engineering & Design Group (EHEDG).

It is our purpose to encourage inventive genius and provide a forum to discuss new developments. Suggestions for improvement and new technology are welcome any time for consideration by the 3-A Sanitary Standards Committees. Please forward comments to the 3-A SSI, 1451 Dolley Madison Boulevard, Suite 210, McLean, VA 22101-3850, USA. By fax: 703-761-4334. By e-mail to: trush@3-a.org.

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A **SCOPE**

A1 These standards cover the sanitary aspects of tanks in which bulk milk is cooled and stored on dairy farms.

A2 Tanks made in conformance to these standards shall provide a means for cooling the milk.

A3 The milk tank will consist of the following components: Lining, jacket and rail, personnel access openings and covers, outlet valve, vent, agitation, refrigeration, measuring device and internal solution piping.

A3.1 Other components may include: external solution piping, cleaning controls, temperature indication thermometer, recording thermometer, and weather protective cover and sanitary seals for agitator.

A4 In order to conform to these 3-A Sanitary Standards, farm milk cooling and holding tanks shall conform to the following design, material, fabrication, and cooling criteria.[1]

B **DEFINITIONS**

B1 *Product:* Shall mean milk.

B2 *Farm Milk Cooling and Holding Tank:* Shall mean a vertical or horizontal cylindrical, rectangular, oval or other equally satisfactorily shaped tank.

B3 **Surfaces**

B3.1 *Product Contact Surfaces:* Shall mean all surfaces which are exposed to the product and surfaces from which liquids may drain, drop, or be drawn into the product.

B3.2 *Nonproduct Contact Surfaces:* Shall mean all other exposed surfaces.

B3.3 *Lining:* Shall mean all surfaces used to contain the product, including the ends, sides, bottom, and top.

B3.4 *Shell:* Shall mean the material covering the exterior of the insulation and/or heat exchange jacket.

B3.5 *Rail:* Shall mean that portion of the metal used to join the lining to the shell.

[1] Use current revisions or editions of all referenced documents cited herein.

B3.6 *Bridge:* Shall mean a cover on an open top type tank which is open on both sides and is permanently attached to the lining on opposite sides of the tank. It may be used to support a removable or nonremovable main cover(s) and accessories.

B4 **Openings**

B4.1 *Outlet:* Shall mean the opening in the lining and the passage for milk to the exterior of the tank. The outlet passage starts at the opening in the lining and terminates at the connection for the outlet valve.

B4.2 *Inlet:* Shall mean the opening that allows milk to enter the tank.

B4.3 *Vent:* Shall mean an opening into the tank for maintaining atmospheric pressure within a farm cooling and holding tank during filling, emptying and cleaning.

B4.4 *Vent Cover:* Shall mean a device for protecting the vent against entrance of contaminants into the tank.

B5 **Cleaning**

B5.1 *Mechanical Cleaning or Mechanically Cleaned:* Shall mean soil removal by impingement, circulation, or flowing chemical detergent solutions and water rinses onto and over the surfaces to be cleaned by mechanical means in equipment specifically designed for this purpose.

B5.2 *Manual (COP) Cleaning:* Shall mean soil removal when the equipment is partially or totally disassembled. Soil removal is effected with chemical solutions and water rinses with the assistance of one or a combination of brushes, nonmetallic scouring pads and scrapers, high or low pressure hoses and tank(s) which may be fitted with recirculating pump(s), and with all cleaning aids manipulated by hand.

B6 *Easily or Readily Removable:* Shall mean quickly separated from the equipment with the use of simple hand tools if necessary.

B7 *Easily or Readily Accessible:* Shall mean a location which can be safely reached by personnel from the floor, platform (fixed or movable), or other permanent work area.

B8 *Inspectable:* Shall mean all product contact surfaces can be made available for close visual observation.

B9 *Simple Hand Tools:* Shall mean implements normally used by operating and cleaning personnel such as a screwdriver, wrench, or mallet.

B10 *Nontoxic Materials:* Shall mean those substances which under the conditions of their use are in compliance with applicable requirements of the Food and Drug Administration.

B11 *Corrosion Resistant:* Shall mean the surface has the property to maintain its original surface characteristics for its predicted service period when exposed to the conditions encountered in the environment of intended use, including expected contact with product and cleaning, sanitizing, or sterilization compounds or solutions.

B12 *Sanitizing or Sanitization:* Shall mean a process applied to a cleaned surface which is capable of reducing the numbers of the most resistant human pathogens by at least 5 $\log_{10}$ reductions (99.999%) to 7 $\log_{10}$ reductions (99.99999%) by applying accumulated hot water, hot air, or steam, or by applying an EPA-registered sanitizer according to label directions. Sanitizing may be effected by mechanical or manual methods.

C MATERIALS

C1 Metals

C1.1 Product contact surfaces shall be of stainless steel of the American Iron and Steel Institute (AISI) 300 Series[2], (except 301 and 302) or corresponding Alloy Cast Institute (ACI) types[3] (See Appendix, Section F.), or metal which under conditions of intended use is at least as corrosion resistant as stainless steel of the foregoing types, and is nontoxic and nonabsorbent. The metal used for the lining shall not be less than 18 U.S. standard gauge thickness or 0.0480 in. (1.22 mm) thick.

[2] The data for this series are contained in the *AISI Steel Products Manual: Stainless & Heat Resisting Steels*, Table 2-1. Available from the American Iron and Steel Society, 410 Commonwealth Drive, Warrendale, PA 15086.

[3] Steel Founders Society of America, Cast Metal Federation Building, 455 State Street, Des Plaines, IL 60016.

C2 Nonmetals

C2.1 Rubber and rubber-like materials may be used for slingers, drip shields, O-rings, seals, gaskets, parts having the same functional purpose or protective caps for sanitary tubing, fittings or v

C2.1.1 Rubber and rubber-like materials when used for above-specified applications shall conform to applicable provisions of the 3-A Sanitary Stand for Multiple-Use Rubber and Rubber-Materials, Number 18-.

C2.2 Plastic materials may be used for slingers, shields, O-rings, seals, gaskets, sight and/or openings, spray devices, direct reading gauge h and parts having the same functional purpose o protective caps for sanitary tubing, fittings or v

C2.2.1 Plastic materials when used for the above-spec applications shall conform to the applic provisions of 3-A Sanitary Standards for Mult Use Plastic Materials, Number 20-.

C2.3 Glass may be used in sight and/or light open and as direct reading gauge tubes, and when u shall be of a clear, heat-resistant type.

C4 Nonproduct Contact Surfaces

C4.1 Nonproduct contact surfaces shall be of corros resistant material or material that is rend corrosion resistant. If coated, the coating used adhere. Nonproduct contact surfaces shal relatively nonabsorbent, durable and cleana Parts removable for cleaning having both pro contact and nonproduct contact surfaces shall n painted.

D FABRICATION

D1 Surface Texture

D1.1 All product contact surfaces shall have a textu least as smooth as a 32 µin. (0.8µm) on stan steel sheets and be free of imperfections suc pits, folds, and crevices in the final fabricated f (See Appendix, Section G.) except that:

D1.1.1 The measuring rod of an immersion type measu device may have a 2B finish free of imperfect such as pits, folds, and crevices to facilitate rea

D2 Permanent Joints

D2.1 All permanent joints in metallic product contact surfaces shall be continuously welded.

D2.2 Welded seams of product contact surfaces shall be at least as smooth as a No. 4 ground-finish [32 µin. (0.8µm)] on stainless steel sheets and which are free of imperfections such as pits, folds, and crevices.

D3 Cleaning and Inspectability

D3.1 Farm milk cooling and holding tanks that are to be mechanically cleaned shall be designed so that the product contact surfaces of the farm milk cooling and holding tanks and all nonremoved appurtenances thereto can be mechanically cleaned and are easily accessible, readily removable, and inspectable.

D3.2 Product contact surfaces not designed to be mechanically cleaned shall be easily accessible for cleaning and inspection either when in an installed position or when removed. Demountable parts shall be readily removable.

D4 Draining

D4.1 Product contact surfaces shall be self-draining except for normal adherence.

D4.2 The lining shall be so constructed that it will not sag, buckle, or become distorted in normal use.

D4.3 When the tank is level or when it is in the position in which it was calibrated, or when it is in position to be calibrated, the bottom shall slope to the outlet to effect complete drainage.

D4.4 The bottom of the lining shall have a slope of not less than 1.00 in. in 100 in. (10.0 mm per m) except that:

D4.4.1 If the tank is designed for mechanical cleaning, the bottom of the lining shall slope (1) at least ¼ in. per ft (21.0 mm per m) toward the outlet in a horizontal tank, or (2) at least ¾ in. per ft (63.0 mm per m) toward the outlet in a vertical tank.

D5 Gaskets

D5.1 Gaskets shall be removable. Any gasket groove or gasket retaining groove shall not exceed 1/4 in. (6.35 mm) in depth or be less than 1/4 in. (6.35 mm) wide except those for standard O-rings smaller than 1/4 in. (6.35 mm).

D5.2 Grooves in gaskets shall be no deeper than their width unless the gasket is readily removable and reversible for cleaning.

D6 Radii

D6.1 All internal angles of less than 135° on product contact surfaces shall have minimum radii of ¼ in (6.35 mm), except that:

D6.1.1 Minimum radii where head(s) and the side wall(s) of tanks join shall not be less than ¾ in. (19.1 mm).

D6.1.2 Minimum radii for fillets of welds in product contact surfaces may be 1/8 in. (3.18 mm) where the thickness of one or both parts joined is less than 3/16 in. (4.76 mm).

D6.1.3 The radii in gasket retaining grooves shall be not less than 1/8 in. (3.18 mm), except for those for standard 1/4 in. (6.35 mm) and smaller O-rings, and those provided for in Section D6.1.4 and D6.1.5 and 3-A Standards referenced in D8 and D12.5.1.

D6.1.4 Radii in standard O-ring grooves shall be as specified in Appendix, Section O.

D6.1.5 Radii in nonstandard O-ring grooves shall be those radii closest to those specified in Appendix Section O.

D7 Threads

D7.1 There shall be no threads on product contact surfaces.

D8 Fittings and Valves

D8.1 Sanitary fittings and valve shall conform to the applicable fabrication provisions of 3-A Sanitary Standards for Sanitary Fittings, Number 63- or 3-A Sanitary Standards for Tank Outlet Valves, Number 57-, except that materials conforming to C2.1.1 or C2.2.1 may be used for caps of sanitary design for the protection of terminal ends of sanitary tubing, fittings, or vents.

D9 Sanitary Tubing

D9.1 Sanitary tubing, if provided, shall conform to the 3-A Sanitary Standards for Polished Metal Tubing, Number 33-.

D10 Rail and Liner

D10.1 The rail shall be integral with or continuously welded to the lining and shall be sloped so that drainage is away from the lining. The junction of the rail and the shell shall be continuously welded.

D11 Covers

D11.1 **Main Covers for Open Top-type Tanks**
Main covers (1) shall be sufficiently rigid to prevent buckling, (2) shall be self-draining, (3) shall be provided with an adequate, conveniently located and durable handle(s) of sanitary design welded in place or formed into the cover materials, (4) unless gasketed, shall have downward flanges not less than 3/8 in. (9.52 mm) along all edges and (5) shall be close fitting. If the cover is not gasketed, the clearance between the surface of the cover and the surface of the tank it is designed to contact shall not exceed 3/32 in. (2.38 mm). Covers not exceeding 24.0 x 30.0 in. (610 x 762 mm) or 30.0 in. (762 mm) in diameter may be removable and shall be designed to be self-draining in the closed position.

D11.2 **Nonremovable Covers for Open Top-type Tanks**
Nonremovable covers (1) shall be of a type that can be opened and maintained in an open position, (2) shall be designed to be self-draining when in the closed position, (3) shall be designed so that when the covers are in any open position liquid from the exterior surface will not drain onto the lining and (4) shall be designed so that when in their fully opened position, condensation on the underside will not drain into the tank. Covers of openings that will be held in place by gravity may be of the lift-off type and may be provided with a clamp(s) or other device(s) to maintain them in position.

D11.3 **Bridges and Fixed Covers for Open Top-type Tanks**
Bridges and fixed covers shall slope to the outside edge(s) of the tank for complete drainage, and shall have a raised flange not less than 3/8 in. (9.52 mm) in height where the edge(s) meets the main cover(s). Bridges and fixed covers shall be integral or welded to the lining and shall be installed so the underside is accessible for cleaning and inspection without completely entering the tank. Bridges shall not exceed 24.0 in. (610 mm) in width.

D11.4 **Personnel Access Covers for Closed-type Tanks**
Covers for access ports in sidewalls and/or ends shall be either of the inside or outside swing type. If the cover swings inside, it shall also swing outside away from the opening. Threads or ball joints employed to attach the access port cover(s) and its appendages shall not be located within the lining. Covers for access ports in the top of tanks shall be of the outside swing type or be of a removable type.

D11.5 All openings in the lining or in fixed covers or in bridges, or main covers of open top-type tanks, except those for agitators, all openings with permanently attached sanitary pipeline fittings, and thermometers or immersion-type measuring devices that remain in place while the product is in the tank, shall be provided with removable covers, which are designed to make close contact with the upper edges of the opening or cover surface. When the openings are in the main cover the removable cover(s) shall remain in position when the main cover is in an open position.

D11.6 The water compartment of a tank designed for refrigerated water cooling shall have a cover. The clearance between the surface of the cover and the surface of the water compartment it is designed to contact shall not exceed 1/16 in. (1.59 mm).

D12 Openings
The edges of all openings into the lining that are upward or horizontal shall extend upward or outward at least 3/8 in. (9.52 mm) above or beyond the shell as the exterior surface or be fitted with a permanently installed sanitary pipeline fitting.

D12.1 The main openings of tanks shall be of sufficient number, adequate in size, and so located that all product contact surfaces are easily accessible and, except for the product contact surfaces of parts removable for cleaning, can be inspected visually without entering the tank, except that:

D12.1.1 For closed-type tanks, having product contact surfaces that cannot be manually cleaned and inspected without entering the tank, the minimum inside height of this closed-type tank shall be 36.0 in. (914.4 mm). If the inside height exceeds 96.0 in. (244 cm), means shall be provided that will facilitate manual cleaning and inspection of all

product contact surfaces (See Appendix, Section H.) or means shall be provided for mechanically cleaning the product contact surfaces of the tank and all nonremovable appurtenances thereto. This type of tank shall have a personnel access port opening(s) conforming to the provisions of D12.3.

D12.2 All openings shall terminate in the milk room, except those for agitators, which may terminate outside the milk room. (See Section D15.)

D12.3 **Personnel Openings**
A personnel access port opening, if provided, shall be located at the outlet end or side of the tank or the top of the tank. The inside dimensions of the personnel access port opening shall not be less than 15.0 x 20.0 in. (381 x 508 mm) oval, or 18.0 in. (457 mm) diameter.

D12.4 **Sight and Light Openings**
Sight and light openings shall be provided when no other opening is available for viewing the surface of the milk and shall conform to the applicable provisions of the 3-A Sanitary Standard, Number 65- and be of such design and construction that the inner surfaces drain inwardly; and if the tank is designed for mechanical cleaning, the inner surface of the opening shall be relatively flush with the inner surface of the lining. The inside diameter of the opening, if only one is provided, shall be at least 5 3/4 in. (146 mm). If two openings are provided, the inside diameter of each shall be at least 3 3/4 in. (95.3 mm). The external flare of the opening shall be pitched so that liquid cannot accumulate.

D12.5 **Thermometer Connections**
A connection(s) or opening(s) which will accommodate a temperature sensing element(s) of a thermometer(s) shall be provided. The connection(s) and/or opening(s) shall be located in the top enclosure, cover, bridge or through an end or sidewall. Thermometer wells may be used. The bulb of the temperature sensing element shall be located so as to permit registering the product temperature when the tank contains no more product than 20% of its capacity and shall be located so that the sensing element is not influenced by the cooling medium. Connections and/or openings shall conform to one of the following:

D12.5.1 The applicable fittings found in the 3-A Sanitary Standards for Sensors and Sensor Fittings and Connections Equipment, Number 74-.

D12.5.2 Fittings for temperature sensing devices which do not pierce the tank lining, but which have temperature sensing element receptacles securely attached to the exterior of the lining.

D13 Outlet and Inlet Connections

D13.1 **Outlet**
The outlet shall provide complete drainage of the tank. The outside diameter of the outlet passage shall conform to that of 3-A sanitary tubing and shall be not less than that of 2.00 in. (50.80 mm) tubing. The terminal end of the outlet passage shall have a welded sanitary pipeline ferrule or flange. The ferrule or flange shall not be below the bottom of the shell. The distance between the nearest point on the shell to the face of the ferrule or flange on the terminal end of a horizontal type outlet shall be not more than the smallest of (1) twice the nominal diameter of the outlet passage or (2) 5.00 in. (127 mm). The outlet shall be one of the following types:

D13.1.1 **Horizontal Type**
The bottom of the outlet passage shall be at least as low as the low point of the lining at the outlet. The outlet passage shall be sloped downward toward the terminal end.

D13.1.2 **Vertical Type**
The vertical centerline of the outlet passage shall be as close as practical to a sidewall of the tank. The outlet passage shall be a generally horizontal extension of an elbow which is a part of or is welded to the lining. The outlet passage shall not pass through the bottom of the shell if product will be held in the passage.

D13.2 **Inlet**
The inlet connection, if provided, shall have an outside diameter of not less than 1 1/2 in. (38.1 mm). The inlet passage shall have a welded sanitary pipeline ferrule, sanitary threaded connection or flange. The distance between the nearest point on the shell to the face of the ferrule or flange on the terminal end shall be not more than the smaller of (1) twice the nominal diameter of the inlet passage or (2) 5.00 in. (127 mm). Outlets conforming to D13.1 may also be used as inlets.

D13.3 **Inlet Passage**
The inlet passage on the upper section above the maximum fill line shall be not less than 1 1/2 in (38.10 mm) and the passage shall have a raised

flange of not less than 3/8 in. (9.52 mm) above the surface of the outer liner or the personnel access opening, and a sanitary cap shall be provided to seal the passageway when the milk pipeline is removed.

D14 **Outlet Valves/Inlet Valves**
Valves, when provided, shall conform to D8. A cap conforming to D8 shall be provided for the outlet end of the valves furnished with tanks.

D15 **Agitators**
Means for mechanical and/or air agitation shall be provided that will result in a variation in milk fat content of the product in the tank of not more than ±0.1 % as determined by an Official AOAC Milk Fat Test[4], when the tank is filled to (1) 100% of its capacity with product and the agitator has been in operation for 5 minutes if the capacity of the tank is less than 1500 gal (5700 L) or (2) 100% of its capacity with product and the agitator has been in operation for 10 minutes if the capacity of the tank is 1500 gal (5700 L) or as designated by manufacturer.

D15.1 Agitators shall conform to the applicable provisions of 3-A Standards for Shear Mixers, Mixers and Agitators, Number 73-, except that:

D15.1.1 Agitators, if not designed for mechanical cleaning, shall be readily accessible for manual cleaning and inspection either in an assembled position or when removed. An umbrella or drip shield shall be provided for a vertical agitator located inside the milk room.

D15.1.2 For all agitator openings located outside the milk room, a drainable weatherproof shield shall be provided to protect against the entrance of dust, oil, insects, and other contaminants through the annular space around the agitator shaft.

D15.1.3 A sanitary seal for the agitator shaft shall be provided for a horizontal agitator and a vertical agitator when it is specified that the tank is located so that the portion of the shaft outside of the tank is not in the milk house or milk room.

[4] The method of making these tests will be found in the following reference: Official Methods of Analysis. Available from the AOAC International, 481 Frederick Ave., Ste. 500, Gaithersburg, MD 20877-2417.

D16 **Agitation**

D16.1 **Air Agitation**
The means for air agitation shall conform applicable provisions of D15.

D16.2 **Air for Agitation of Movement of Product**
Means for applying air under pressure shall co to the applicable provisions of the 3-A Acc Practices for Supplying Air Under Press Contact with Products and Product C Surfaces, Number 604-, and the following:

D16.3 Tubing and related connections within the shall be of sanitary design and be r demountable for cleaning outside the tank designed for mechanical cleaning. If design mechanical cleaning, the tubing and all r fittings shall be self-draining.

D16.4 Permanently mounted air tubing shal constructed and installed so that it will no buckle, vibrate or prevent complete drainage tank or tubing and shall be located so th distance from the outside of the tubing to the shall be at least 2.00 in. (50.8 mm), except point of entrance.

D17 **Thermometers**
Each tank shall be provided with an indi thermometer, and also may be supplied v recording thermometer conforming to the appl specifications for indicating and reco thermometers in Appendix, Section I. thermometer or the temperature sensing elem the thermometer shall fit one of the connecti openings provided for in D12.5. The indi thermometer may be analog or digital. Eac shall be provided with a means for add recording thermometer.

D18 **Vents**
A vent(s), if provided, shall be so design prevent damage from back pressure during and to prevent vacuum during emptying of th (See Appendix, Sections L and M.) It shall the front head near the top of the tank, or in t of the tank, or in a personnel access cover vent(s) shall terminate in the milk house o room. The air vent shall be provided with a or be fabricated to protect the vent from ingr liquids. Perforations may be provided on th and/or the bottom of the vent. Perforation have openings not greater than 1/16 in. (1.5

diameter, or slots not more than 1/32 in. (0.794 mm) wide. Woven wire mesh shall not be used for this purpose. It shall be so designed that parts are secure during mechanical cleaning and readily demountable for manual cleaning and inspection.

D19 **Cleaning**
Tanks having an inside height of more than 96.0 in. (244 cm) shall be provided with means that will facilitate manual cleaning and inspection of all product contact surfaces (See Appendix, Section H.) or means shall be provided for mechanically cleaning the product contact surfaces of the tank and all nonremovable appurtenances thereto.

D19.1 **Permanently Mounted Spray Cleaning Devices**
The spray device shall be of sanitary design and be readily removable for inspection and shall be made of materials conforming to Section C. The tubing to which the spray device is connected shall be stainless steel conforming to Section C. The portion extending from the opening in the lining shall conform to Section D. All piping mounted between the shell and the lining shall be self-draining. A means shall be provided to disconnect the cleaning chemicals, cleaning solution and/or water supply when milk is in the tank. A protective cap or cover of sanitary design, constructed of materials specified in C1, or C2 shall be provided to cover all openings into the tank after the cleaning solution and/or water supply lines have been disconnected.

D19.2 The spray device shall conform to the applicable provisions of the 3-A Sanitary Standards for Spray Devices to Remain in Place, Number 78-.

D20 **Sampling**
A means for sanitary sampling shall be provided when a sample cannot be readily obtained from a top opening or a sample port opening in the tank. It shall be of sanitary design and be of a type that has its sealing surface relatively flush with the product contact surface of the tank and have an inside diameter no less than that of 1.00 in. (25.4 mm) 3-A sanitary tubing.

D21 **Tank Supports**
The means of supporting a tank designed to be installed wholly within the milk house or milk room or the means of supporting the portion of a tank that will be in the milk house or milk room shall be:

D21.1 **With Legs**
Adjustable legs shall be of sufficient number and strength, and so spaced that the filled tank will be adequately supported. Legs shall be smooth with rounded ends and have no exposed threads. Legs made of hollow stock shall be sealed. Legs shall be of a length that will provide (1) a distance between lowest interior surface of the outlet connection and the floor of not less than 4.00 in. (102 mm) and (2) a clearance of at least 6.00 in. (152 mm) between the floor and the bottom of a tank 72.0 in. (183 cm) or less in diameter or width, except in the case of a V-bottom or a rounded bottom tank of which the outer shell slopes continually upward from the outlet centerline, in which case the minimum clearance may be 4.00 in. (102 mm) if it increases to 6.00 in. (152 mm) within a horizontal distance of not more than 12.0 in. (305 mm) on each side of this centerline. On a tank more than 72.0 in. (183 cm) in diameter or width, the clearance shall be at least 8.00 in. (203.2 mm). Where Weights and Measures Codes require that a seal be placed on the legs to detect height adjustment after the tank has been leveled or calibrated, the holes for seals shall be designed and located, or sealed, to prevent entrance of moisture into the legs.

D21.2 A farm tank installed partially outside the milk house of milk room, shall be effectively sealed to the wall or ceiling.

D22 **Insulation**
Insulation material shall be of a nature and installed in a manner that will prevent shifting or settling. It shall be capable of preventing, in 12 hours, a product temperature increase greater than 5.0°F (2.8°C) in a tank filled to 100% of its capacity with product when there is a difference of 50.0°F (28.0°C) between ambient temperature and the average temperature of the product in the tank. For test purposes, water may be substituted for product and refrigeration shall not be activated.

D23 **Measuring Devices**
A measuring device of the immersion type or of the direct reading gauge type, if provided, shall conform to D23.1 or D23.2.

D23.1 **Immersion Type**
An immersion measuring device shall conform to the applicable provisions of the National Institute of Standards and Technology Handbook 44 - Sec. 4.42 Farm Milk Tanks, S. Specifications S.3.7, Graduations.[5] The measuring rod shall have

graduation marks not less than 0.0050 in. (0.100 mm) in width and not exceeding 0.0080 in. (0.200 mm) in depth. The measuring rod consists of a graduated portion, seat to engage the measuring rod supporting bracket or other supporting means and a handle. It does not include the supporting bracket or other supporting means. The measuring rod may be two or more parts welded together or may be one piece. The handle shall extend above the bridge or main cover on open type tanks, or shall be above the milk overflow level in closed type tanks. The tank serial number stamped or etched on the rod shall be located as high on the rod as practical. The opening through which the measuring rod extends shall be protected against liquids or other contaminants entering the tank from that portion of the measuring rod outside the tank.

D23.2 **Direct reading gauge**
A direct reading gauge shall be of the glass or plastic tube type and shall be sanitary in design and construction and shall be readily accessible for cleaning or shall be designed for mechanical cleaning. The gauge shall conform to the applicable provisions of the code entitled National Institute of Standards and Technology Handbook 44 - Sec. 4.42 Farm Milk Tanks, S Specification: S.3.6, External Gauge Assemblies.[5] If designed for mechanical cleaning, the inside diameter of the gauge parts shall be sufficiently uniform that all product contact surfaces will be cleaned. It shall be designed and constructed so that all product in the gauge will be discarded. Means to accomplish this shall be provided at the lowest point and in such a manner that product in the gauge will not enter the tank outlet nor re-enter the tank. The valve shall be close coupled. The distance, measured along the passage for the product in the tank to the gauge valve, from the nearest point on the shell to the ferrule or flange for the valve shall not be more than the smaller of (1) twice the nominal diameter of the passage or (2) 5.00 in. (127 mm).

D23.3 **External Ladder/Platform**
A ladder/platform shall be provided for tanks that have personnel access openings over 65 in. (165 cm) in height for the purpose of inspection, sampling and measuring product.

[5] National Conference on Weights and Measures, P.O. Box 4025, Gaithersburg, MD 20885.

D24 **Nonproduct Contact Surfaces**
Nonproduct contact surfaces shall conform to th following:

D24.1 They shall be cleanable, relatively smooth an relatively free of pockets and crevices.

D24.2 Surfaces to be coated shall be effectively prepar for coating.

D24.3 The shell shall be effectively sealed again moisture and vermin at all joints and at junctio with the rail, personnel access openings, outlets an other openings.

D24.4 Vents or weep hole(s), if provided in the shell, sh be located in a position that will provide drainag from the shell and shall be vermin proof.

D24.5 Outside welds need not be ground.

E **COOLING**

E1 **Cooling Requirements for Milk Cooling Syste**
The milk cooling tank shall be provided wi sufficient cooling capacity to accomplish th following:

E1.1 Cool the product to 50°F (10°C) or less within hours or less of the commencement of the fir milking and to 40°F (4.40°C) or less within 2 hou after the completion of milking. *Provided*, that th blend temperature after the first milking af subsequent milkings does not exceed 10°C (50°F

E1.2 For every day pick-up, the tank shall be rated 50% of tank capacity.

E1.3 For every other day pick-up, the tank shall be rat at 25% of tank capacity.

E2 **Cooling Information**
The tank shall have an information or data plate permanently attached to it giving the following information. (See Section E2.2 and Appendix, Section K.)

E2.1 The information on the data plate shall be rated as if the tank is the only source of cooling.

E2.2 This tank is designed for [everyday or every other day] pick-up. Maximum rate at which milk can enter this tank and meet the cooling requirements of the current 3-A Sanitary Standards for Farm Milk Cooling and Holding Tanks, Number 13-, is _____ U.S. Gallons per hour (_____ liters per hour). When milk enters the tank at the maximum rate, the minimum condensing unit capacity is *_____ BTU/hr at *_____°F (*_____ kJoules/hr at _____°C) suction temperature.

*The BTU (kJoule) capacity specified is to be at the saturated suction temperature designated by the manufacturer.

E2.3 In determining cooling capacity, the ambient temperature shall be 90.0°F (32.0°C) and when water cooled condensers are used, the refrigerant condensing temperature shall be not less than 103.1°F (39.0°C).

E2.4 The tank shall be provided with an automatic refrigeration control capable of functioning on a change in product temperature of not more than ±2°F at 37.0°F (±1.1°C at 2.80°C).

E2.5 The tank shall be provided with automatic, intermittent, timed agitation which operates at a minimum of 5 minutes each hour milk is in the tank.

APPENDIX

F **STAINLESS STEEL MATERIALS**
Stainless steel conforming to the applicable chemical composition ranges established by AISI[2] for wrought products (Table 1), or by ACI[1] for cast products (Table 2), should be considered in conformance to the requirements of Section C1 herein. Where welding is involved, the carbon content of the stainless steel should not exceed 0.080%. The first reference cited in C1 sets forth the chemical ranges and limits of acceptable stainless steel of the 300 Series.

TABLE 1

WROUGHT PRODUCTS TYPICALLY USED			
UNS #	ASTM[6]	AISI/ SAE[2]	Common Names
S30300	A-582	303	Free-Machining S.S.; Austenitic
S30400	A-276 A-666	304	Austenitic S.S.
S30403	A-276 A-666	304L	Low Carbon Austenitic S.S.
S31600	A-276 A-666	316	Austenitic S.S. plus Mo*
S31603	A-276 A-666	316L	Low Carbon Austenitic S.S. plus Mo*

*Molybdenum

TABLE 2

CAST PRODUCTS			
UNS#	ASTM[6]	ACI[1]	Common Names
J92500	A-351 A-743 A-744	CF-3	Cast 304L
J92800	A-351 A-743 A-744	CF-3M	Cast 316L
J92600	A-351 A-743 A-744	CF-8	Cast 304
J92900	A-351 A-743 A-744	CF-8M	Cast 316
J92180	A-747	CB7 Cu-1	Cast 17-4 PH
J92110	A-747	CB7 Cu-2	Cast 15-5 PH
N26055	A-494	CY 55n BiM	Waukesha 88
J92701	A-743	CF-16F	Free Machining Austenitic S.S.

G **PRODUCT CONTACT SURFACE FINISH**

G1 Surface finish equivalent to 150 grit or better as obtained with silicon carbide properly applied on stainless steel sheets is considered in conformance to the requirements of Section D1 herein. A maximum R_a of 32 µin. (0.8 µm), when measured

[1] Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

according to the recommendations in American National Standards Institute (ANSI)/ American Society of Mechanical Engineers (ASME)[7] B46.1 - *Surface Texture, Waviness and Lay* is considered to be equivalent to a No. 4 finish.

G2 Sheets of 2B (cold rolled) stainless steel, inspected and selected to be free of pits, folds and crevices are generally found to be as smooth as or smoother than stainless steel sheets with a No. 4 ($R_a \leq 32$ µin. or ≤ 0.8 µm) finish and are acceptable for the fabrication of equipment if free of imperfections.

H **MANUAL CLEANING**
If the inside height of a tank exceeds 96.0 in. (2440 mm), one means for manual cleaning is to weld a sanitary stainless steel rung on each end of the tank to support a removable platform at a height which will facilitate cleaning and inspection.

I **THERMOMETERS**

I1 **Indicating Thermometers** The scale range should have a span not less than 50.0°F (28.0°C) including normal storage temperatures ±5.0°F (3.0°C) with extension of scale on either side permitted; graduated in not more than 2.0°F (1.0°C) divisions. Digital thermometers should display to the nearest 1.0°F or 0.1°C. Temperature scale divisions should be spaced not less than 1/16 in. (2 mm) apart between 35.0°F (2.0°C) and 55.0°F (13.0°C). Digital thermometers should have 0.30 in. (8.0 mm) digits as a minimum. Accuracy should be within ±2.0°F (1.0°C), throughout the specified scale range. The stem fitting should conform to the 3-A Sanitary Standards for Sensors and Sensor Fittings and Connections, Number 74-, or should be a stem fitting that does not pierce the lining or means shall be provided to permit securely fastening the temperature sensing element to the outer surface of the lining.

I2 **Recording Thermometers**

I2.1 Farm bulk milk tanks should be installed with an approved temperature recording device.

I2.2 The scale should have scale span of not less than 50.0°F (28.0°C), including normal storage temperature ±5.0°F (3.0°C), graduated in not more

[7] Available from the American Society of Mechanical Engineers, 345 East 47th Street, New York, NY 10017-2392.

than 2.0°F (1.0°C). Divisions spaced not l 0.040 in. (1.00 mm) apart are permitted w ink line is thin enough so be easily distin from the printed line and graduated so tur division of not more than 1.0 hr, having a straight-line length of not less than 0.125 in at 40°F (5°C). Chart must be capable of re temperatures up to 180°F (83.0°C). specifications do not apply to extensions 100°F (38.0°C).

I2.3 The temperature accuracy shall be within (±1.0°C) between the specified range limit

I2.4 The pen-arm setting device shall be accessible and simple to adjust.

I2.5 The pen and chart paper shall be designed t line of ≤ 0.0250 in. (≤ 0.0635 mm) thic properly adjusted and shall be easy to mair

I2.6 The temperature sensor shall be protected damage at 212°F (100°C).

I2.7 Stem fitting should conform to the curr Sanitary Standards for Sensors and Sensor and Connections, Number 74- or should b fitting that does not pierce the lining or mea be provided to permit securely fasten temperature sensing element to the outer su the lining.

I2.8 The circular chart should make one revol not more than seven days and should be gr for a maximum record of seven days. Sh should move not less than 1.00 in. (25.4 r hour and may be used continuously for one month. Electronic data acquisition should at least the same information as provided by recording thermometers.

J **DETERMINATION OF CO CAPABILITY**
In determining the capability of a farm cool to meet the cooling requirements specified at the maximum rate at which milk can c tank given on the information plate:

J1 Water at 100°F (38.0°C) may be substit milk, and before the addition of the sec subsequent milkings, the water or milk in be cooled to 37.0°F (3.00°C) and the coo unit should be allowed to operate and autom shut off.

K **SUPPLEMENTAL DATA PLATE INFORMATION**

K1 The data plate of the tank should also include the time the agitator was designed to be in operation to obtain the homogeneity required in D15.

K2 **Example of a data plate legend**
The agitator of this tank is designed so that it must be in continuous operation *_____ minutes before removing a product sample.

*i.e. specify whether 5 or 10 minutes or as designated by the manufacturer

K3 The agitator of this farm tank is designed so that the portion of agitator shaft outside of the farm tank **_____ in the milk room.

**Insert one of the following:
(a) does not have to be
(b) must be

L **AIR VENTING**
The free vent opening should be sized to protect the tank from internal pressure or vacuum damage during normal operation. The critical relationship between minimum vent size and maximum filling or emptying rates should be observed. A perforated vent cover, if used, should have a free opening area equal to at least 1 ½ times the area of the minimum vent opening in the tank. The venting system is intended to provide for venting during filling and emptying; however, if the venting system is not adequate during mechanical cleaning the tanks should be vented adequately by opening the manhole door to prevent vacuum or pressure buildup due to sudden changes in temperature of very large volumes of air.[8] Means should be provided to prevent excess loss of cleaning solution through the personnel access opening. The use of tempered water of about 95°F (35°C) for both pre-rinsing and post-rinsing may be used to reduce the effect of flash heating and cooling. Provisions should be made to prevent overfilling with resultant vacuum or pressure damage to the tank.

[8] For example, when a 6,000 gal tank (with 800 cu ft of 135°F hot air after cleaning) is suddenly flash cooled by 50°F water sprayed at 100 gpm, the following takes place. Within one second, the 800 cu ft of hot air shrinks approximately 54 cu ft in volume. This is the equivalent in occupied space of approximately 382 gal of product. The shrinkage creates a vacuum sufficient to collapse the tank unless the vent, manhole, or other openings allows the air to enter the tank at approximately the same rate as it shrinks. It is obvious, therefore, that a very large air vent such as the manhole opening is required to accommodate this air flow.

M **VENTING REQUIREMENTS DURING MECHANICAL CLEANING**

M1 Inventive genius may provide a vent and tank design that is adequate to permit cleaning without damage to the tank with the personnel access opening cover in place. However, if the design is not adequate to permit cleaning with a cover in place, a label permanently affixed to the personnel access opening cover(s) instructing user to open during mechanical cleaning should be provided as shown in the example below:

Door is to be opened during cleaning.

Except that:

M1.1 When venting is provided according to the following formula: 0.0050 sq. in. vent area x total tank capacity in gal (0.085 sq. mm vent area x total tank capacity in L).

N **LOCATION, INSTALLATION AND PROTECTION OF REFRIGERATION UNITS**
Refrigeration units should be located and installed in accordance with the manufacturer's recommendations to provide protection against adverse weather and environmental conditions.

O **O-RING GROOVE RADII**
TABLE 3 - Minimum Groove Radii Dimensions for Standard O-Rings

O-Ring Cross Section, Nominal (AS 568[9])	O-Ring Cross Section, Actual (AS 568)	O-Ring Cross Section, Actual (ISO 3601-1[10])	Minimum Groove Radius
1/16 in.	0.070 in.	1.80 mm	0.0160 in. (0.406 mm)
3/32 in.	0.103 in.	2.65 mm	0.0310 in. (0.787 mm)
1/8 in.	0.139 in.	3.55 mm	0.0310 in. (0.787 mm)
3/16 in.	0.210 in.	5.30 mm	0.0620 in. (1.575 mm)
1/4 in.	0.275 in.	7.00 mm	0.0940 in. (2.39 mm)

P **ENGINEERING DESIGN AND TECHNICAL CONSTRUCTION FILE**
The following is an example of an engineering design and technical construction file (EDTCF) to be maintained by the fabricator as evidence of conforming to 3-A Sanitary Standards or 3-A Accepted Practices. (The file may contain more or less information as applicable to the equipment or system.)

P1 **Purpose**

P1.1 To establish and document the material, fabrication and installation (where appropriate) requirements for the engineering design and technical construction files for all products, assemblies, and sub-assemblies supplied by the manufacturer thereof to be in conformance to the sanitary criteria found in 3-A Sanitary Standards or 3-A Accepted Practices. It is recommended that the engineering and construction file or files be submitted with applications for 3-A Symbol use authorization.

[9] The document establishing these standard dimensions is Aerospace Standard (AS) 568, published by SAE, 400 Commonwealth Drive, Warrendale, PA 15086.

[10] The document establishing these standard dimensions is ISO 3601-1 published by the International Organization for Standardization (ISO), 1 Rue de Varembe, Case Postale 56, CH 1211, Geneva, Switzerland.

P2 **Scope**

P2.1 This EDTCF applies to equipment specified b

P2.1.1 3-A Sanitary Standards for Farm Milk Cooling Holding Tanks, Number 13-10.

P3 **Responsibilities**

P3.1 This EDTCF is maintained by: The Engine Manager (or other company official) **[name title of responsible official]** is responsibl maintaining, publishing, and distributing EDTCF.

P3.2 Implementation: All divisions, specifi development engineering, standards enginee sales engineering, and product departments responsible for implementing this EDTCF.

P4 **Applicability**

P4.1 The 3-A Sanitary Standards and 3-A Acce Practices are voluntarily applied as suitable san criteria for dairy and food processing equipmen A Sanitary Standards are referenced in the Gra Pasteurized Milk Ordinance: "Equip manufactured in conformity to 3-A San Standards conforms to the sanitary design construction standards of this Ordinance."

P5 **References**

P5.1 List any additional regulations that apply t equipment or system covered by this EDTCF:

P5.2 Date of conformity or 3-A Symbol Authoriz and certificate number, if authorized.

P6 **Design and Technical Construction File**

P6.1 The Engineering Design and Tech Construction File may consist of the following

a. an overall drawing of the sui equipment;
b. full detailed drawings, accompanie any calculations, notes, test results, required to check the conformity o equipment with the 3-A Standards or Practices;
c. a list of:
(1) the essential requirements o standards or practices;

(2) other technical specifications, which were used when the equipment was designed;
d. a description of methods adopted;
e. if essential, any technical report or certificate obtained from a competent testing body or laboratory;
f. any technical report giving the results of tests carried out internally by Engineering or others;
g. documentation and test reports on any research or tests on components, assemblies and/or the complete product to determine and demonstrate that by its design and construction, the product is capable of being installed, put into service, and operated in a sanitary manner (optional);
h. a determination of the foreseeable lifetime of the product (optional);
i. a copy of the instructions for the product (Instruction Manuals/Instruction Books);
j. for serial manufacturing, the internal measures that will be implemented to ensure that the equipment will continue to be manufactured in conformity to the provisions of the 3-A Sanitary Standards or 3-A Accepted Practices;
k. engineering reports;
l. laboratory reports;
m. bills of material;
n. wiring diagrams, if applicable;
o. sales order engineering files;
p. hazard evaluation committee reports, if executed;
q. change records;
r. customer specifications;
s. any notified body technical reports and certification tests;
t. copy of the 3-A Symbol authorization, if applicable.

P6.2 The file does not have to include detailed plans or any other specific information regarding the sub-assemblies, tooling, or fixtures used for the manufacture of the product unless a knowledge of them is essential for verification of conformity to the basic sanitary requirements found in 3-A documents.

P6.3 The documentation referred to in P6.1 above need not permanently exist in a material manner in the EDTCF, but it must be possible to assemble them and make them available within a period of time commensurate with its importance (one week is considered reasonable time). As a minimum, each product EDTCF must physically contain an index of the applicable document of P6.1 above.

P6.4 The EDTCF may be in hard copy or software form.

P7 **Confidentiality**

P7.1 The EDTCF is the property of the manufacturer and as shown at their discretion, except that all or part of this file will be available to the 3-A SSB or a regulatory agency for cause and upon request.

P8 **File Location**

P8.1 The EDTCF shall be maintained at **[location]**.

P9 **File Retention**

P9.1 The EDTCF (including all documentation referred to in P6.1) shall be retained and kept available for 12 years following the date of placing the product in use or from the last unit produced in the case of series manufacture.

3-A Sanitary Standards for Pneumatic Conveyors for Dry Milk and Dry Milk Products, Number 39-01

Standards Developing Organizations
3-A Sanitary Standards, Inc. (3-A SSI)
in collaboration with
United States Public Health Service (USPHS)
United States Department of Agriculture (USDA)
European Hygienic Engineering & Design Group (EHEDG)

Adopted November 06, 2003

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Drawings and illustrations contained herein are to assist in understanding the criteria in this 3-A Standard. Drawings and illustrations are not intended to show all variations of the equipment or system nor are they (it) to exclude alternate methods meeting this standard. Drawings and illustrations are non-normative.

Foreword

This 3-A Standard is to establish minimum sanitary (hygienic) requirements for Pneumatic Conveyors for Dry Milk and Dry Milk Products. Standard English is the official language of 3-A Sanitary Standards and 3-A Accepted Practices.

This 3-A Standard is for voluntary use by directly and materially affected organizations such as equipment and machinery fabricators, processors, regulatory agencies and by 3-A Sanitary Standards, Inc. to assure adequate public health protection exist for the devices and covered products. 3-A Sanitary Standards, Inc. use these documents as the source for sanitary criteria as part of 3-A Symbol authorization.

This 3-A Standard was developed jointly by 3-A Sanitary Standards, Inc. (3-A SSI), the United States Public Health Service (USPHS), the United States Department of Agriculture – Dairy Programs (USDA), and the European Hygienic Engineering & Design Group (EHEDG).

It is our purpose to encourage inventive genius and provide a forum to discuss new developments. Suggestions for improvement and new technology are welcome any time for consideration by the 3-A Sanitary Standards Committees. Please forward comments to the 3-A SSI, 1451 Dolley Madison Boulevard, Suite 210, McLean, VA 22101-3850, USA. By fax: 703-761-4334. By e-mail to: trugh@3-a.org.

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A SCOPE

A1 These standards cover the sanitary aspects of equipment used in systems solely for the pneumatic conveying of dry milk, dry milk products, or other dry comestibles utilizing air flow which is caused by either a pressure or vacuum differential. These standards are not intended to cover pneumatic conveying equipment or systems that are an integral part of a spray drying or instantizing system unless specifically referenced for that purpose in the applicable 3-A Sanitary Standard or 3-A Accepted Practice. The equipment begins at the point at which product enters the conveyor and ends at the point(s) where product is discharged from the conveyor. With respect to air, the equipment begins at the point where conveying air leaves the final filter and ends at the entrance of the air/product separator equipment. These standards also include any required product accumulation, conditioning and metering equipment which are located before product introduction into the conveying air pipeline and which are provided by the equipment manufacturer.

These standards do not cover the use of:

1. Air slide type conveyors which convey product using air flow through a permeable membrane type media or perforated plate.
2. Wand type pneumatic conveying equipment from open containers or bags where ambient air can be introduced to convey product.
3. Product storage bins, hoppers, silos that are part of the air/product separation equipment.
4. Bag collectors, when used as air/product separators, which are covered by 3-A Sanitary Standards for Bag Collectors, No. 40-.

A2 In order to conform to these 3-A Sanitary Standards, pneumatic dry milk conveyors shall conform to the following design, material and fabrication criteria.[1]

A3 Normative references

A3.1

Doc. No.	Title (3-A Sanitary Standard for:)
18-	Multiple-Use Rubber and Rubber-Like Materials
20-	Multiple-Use Plastic Materials

[1] Use current revisions or editions of all referenced documents cited herein.

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50-	Level Sensing Devices for Dry Products
53-	Compression-Type Valves
62-	Hose Assemblies
65-	Sight and/or Light Windows and Sight Indicators in Contact with Product
66-	Caged-Ball Valves
68-	Ball-Type Valves
74-	Sensors and Sensor Fittings and Connections Used on Equipment
78-	Spray Devices to Remain in Place

A3.2

Doc. No.	Title (3-A Accepted Practice for:)
604-	Supplying Air Under Pressure in Contact with Product, and Product Contact Surfaces
605-	Permanently Installed Product and Solution Pipelines and Cleaning Systems

B DEFINITIONS

B1 *Product:* Shall mean the dry milk, dry milk products or other dry comestibles which are conveyed pneumatically in this equipment.

B2 *Dry Milk Conveyors* (Referred hereinafter as "conveyors"): Shall mean equipment in which product is conveyed pneumatically.

B3 *Conveying Air:* Shall mean air in contact with and used to convey product.

B3.1 *Air Under Positive Pressure:* Shall mean air, the pressure of which has been increased by mechanical means to exceed atmospheric pressure by one of the following methods:

B3.1.1 *Compressors:* Shall mean equipment such as rotary screw and reciprocating piston type which compresses air to a maximum of 150 psig.

B3.1.2 *Fans and Blowers:* Shall mean equipment such as centrifugal fans, regenerative vane and positive displacement type blowers which increases air pressure to a maximum of 15 psig.

B3.2 *Air Under Negative Pressure:* Shall mean air, the pressure of which has been decreased by mechanical means to below atmospheric pressure by one of the following methods:

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B3.2.1 *Vacuum Pumps:* Shall mean equipment such as; rotary screw, air operated ejector and vane type which decreases air pressure to a maximum vacuum of 29 in.-Hg (737 mm-Hg).

B3.2.2 *Vacuum Fans and Vacuum Blowers:* Shall mean equipment such as centrifugal fans, regenerative and positive displacement type blowers which decreases air pressure to a maximum vacuum of 15 in. (381 mm) Hg.

B4 *Fluidizing Conditioning:* Shall mean utilizing the introduction of air to improve product flowability or homogeneity.

B5 **Surfaces**

B5.1 *Product Contact Surfaces:*

B5.1.1 Shall mean all surfaces that are exposed to the product and surfaces from which liquids and/or solids may drain, drop, diffuse, or be drawn into the product.

B5.1.2 Shall mean all surfaces in contact with conveying air commencing at the discharge of the final air filter and ending at the first downstream surface in contact with the product.

B5.2 *Nonproduct Contact Surfaces:* Shall mean all other exposed surfaces.

B6 **Cleaning**

B6.1 *Mechanical Cleaning or Mechanically Cleaned:* Shall mean soil removal by impingement, circulation, or flowing chemical detergent solutions and water rinses onto and over the surfaces to be cleaned by mechanical means in equipment or systems specifically designed for this purpose.

B6.2 *Cleaned In Place (CIP):* Shall mean mechanical cleaning of equipment, the cleanability of which has been sufficiently established such that all product or solution contact surfaces do not have to be readily accessible for inspection (for example, silo-type tanks, and welded pipelines.

B6.3 *Manual (COP) Cleaning:* Shall mean soil removal when the equipment is partially or totally disassembled. Soil removal is effected with chemical solutions and water rinses with the assistance of one or a combination of brushes, nonmetallic scouring pads and scrapers, high or low pressure hoses and tank(s) which may be fitted with recirculating pump(s), and with all cleaning aids manipulated by hand.

B7 *Soil:* Shall mean the presence of unwanted organic residue or inorganic matter, with or without microorganisms, including food residue, in or on the equipment.

B8 *Easily or Readily Removable:* Shall mean quickly separated from the equipment with the use of simple hand tools if necessary.

B9 *Easily or Readily Accessible:* Shall mean a location which can be safely reached by personnel from a floor, other permanent work area, or stable platform (permanent or moveable).

B10 *Inspectable:* Shall mean all product contact surfaces can be made available for close visual observation.

B11 *Simple Hand Tools:* Shall mean implements normally used by operating and cleaning personnel such as a screwdriver, wrench, or mallet.

B12 *Nontoxic Materials:* Shall mean those substances which under the conditions of their use are in conformance to applicable requirements of the Food and Drug Administration.

B13 *Bond:* Shall mean the adhesive or cohesive forces holding materials together. This definition excludes press and shrink fits.

B14 *Sanitizing or Sanitization:* Shall mean a process applied to a cleaned surface which is capable of reducing the numbers of the most resistant human pathogens by at least 5 $\log_{10}$ reductions (99.999%) to 7 $\log_{10}$ reductions (99.99999%) by applying accumulated hot water, hot air, or steam, or by applying an EPA-registered sanitizer according to label directions. Sanitizing may be effected by mechanical or manual methods.

B15 *Substantially Flush:* Shall mean mating surfaces or other juxtaposed surfaces shall be within 1/32 in. (0.794 mm).

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C MATERIALS

C1 Metals

C1.1 Product contact surfaces shall be of stainless steel of the American Iron and Steel Institute (AISI) 300 Series[2] (excluding 301 and 302) or corresponding Alloy Cast Institute (ACI) types[3] (See Appendix, Section J), or metal which under conditions of intended use is at least as corrosion resistant as stainless steel of the foregoing types, and is nontoxic and nonabsorbent, except that:

C1.1.1 Aluminum alloys conforming to the Aluminum Association[4] designates 5052, 6061 and 6063 may be used as a dry product contact surface for dust covers, shields and parts having the same functional properties. These shall be removed prior to mechanical cleaning.

C2 Nonmetals

C2.1 Rubber and rubber-like materials may be used for gaskets, fluidizers, and flexible connectors, and parts having the same functional purposes.

C2.1.1 Rubber and rubber-like materials when used for the above-specified applications shall conform to the applicable provisions of the 3-A Sanitary Standards, Number 18- except that flexible tubing to distribute compressed air needs only to meet the requirements of 21 CFR 177.2600.

C2.2 Plastic materials may be used in sight and/or light openings, divertor valves and for fluidizers, gaskets and flexible connectors, and parts having the same functional purposes.

C2.2.1 Plastic materials when used for the above-specified applications shall conform to the applicable provisions of the 3-A Sanitary Standards, Number 20- except that sintered fluidizers and flexible tubing to distribute compressed air shall meet the requirements of 21 CFR Parts 170-199 or otherwise be accepted by Food and Drug Administration for food contact.

C2.3 Rubber and rubber-like materials and plastic materials having a product contact surface(s) shall be of such composition as to retain their surface and conformation characteristics when exposed to the conditions encountered in the environment of intended use and in cleaning and sanitization.

C2.4 Cotton, linen, synthetic or silk materials may be used for flexible connectors and filter media. These materials shall be nontoxic, nonshedding, relatively insoluble, easily cleanable, and shall not impart a flavor to the product.

C2.5 Glass may be used in sight and/or light openings and shall be of a clear heat resistant type, and conform to the applicable provisions of 3-A Sanitary Standards, Number 65-.

C2.6 The adhesive, if used, for bonding rubber and rubber-like materials and bonding plastic materials shall be nontoxic.[5]

C3 Air Filters

C3.1 Air filter media used to filter conveying air shall consist of one or more of the following materials:

C3.1.1 Fiberglass with a downstream backing dense enough to prevent fiberglass break-off from passing through, cotton flannel, wool flannel, nonwoven fabric, absorbent cotton fiber, polyester fiber or other suitable materials which, under conditions of intended use, are nontoxic and nonshedding and which do not release toxic volatiles or other contaminants to the air, or volatiles which may impart any flavor or odor to the product.

C3.1.2 Bonding materials contained in the air filter media shall be nontoxic, nonvolatile and insoluble under all conditions of use.

C3.2 Filter element sealing gaskets, if affixed to the upstream face of the filter frame, or to the filters as supplied by the filter manufacturer, shall be of nonabsorbent material. Conformance of such gaskets to the 3-A Sanitary Standard, Number 18- is not required.

[2] The data for this series are contained in the *AISI Steel Products Manual, Stainless & Heat Resisting Steels*, Table 2-1. Available from the American Iron and Steel Society, 410 Commonwealth Drive, Warrendale, PA 15086.

[3] Steel Founders Society of America, Cast Metal Federation Building, 455 State Street, Des Plaines, IL 60016.

[4] Aluminum Association, 420 Lexington Avenue, New York, NY 10017.

[5] Adhesives shall comply with 21 CFR 175 - Indirect Food Additives: Adhesives and Components of Coatings. Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

C4 **Nonproduct Contact Surfaces**

C4.1 Nonproduct contact surfaces shall be of corrosion-resistant materials or material that is rendered corrosion resistant. If coated, the coating used shall adhere. Nonproduct contact surfaces shall be relatively nonabsorbent, durable and cleanable. Parts removable for cleaning having both product contact and nonproduct contact surfaces shall not be painted.

D **FABRICATION**

D1 **Surface Texture**

D1.1 All product contact surfaces shall have a texture at least as smooth as 32 µin. or 0.8 µm R_a finish on stainless steel sheets and be free of imperfections such as pits, folds, and crevices in the final fabricated form. (See Appendix, Section K.) except:

D1.1.1 As provided for in Section D2.1.1 and D2.1.2.

D1.2 Single-service fluidizers may be a sintered material.

D1.3 Smooth bore PVC flexible hose in conformance to 3-A Sanitary Standard, Number 20-.

D2 **Permanent Joints**

D2.1 All permanent joints in product contact surfaces shall be continuously welded.

D2.1.1 Pipeline welds shall be made in accordance with the 3-A Accepted Practices, Number 605-

D2.1.2 Pipeline welds made as specified in D2.1.1 are not required to have internal or external grinding and/or polishing. When permanent welds of tubing and ductwork larger than 4.00 in. (102 mm) diameter but smaller than 24.00 in. (610 mm) diameter and not covered by ASTM A270-Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing, are made by the tungsten inert gas (TIG) method with internal inert gas purging, the welds need not be ground and polished.[6]

[6] Criteria for hygienic welds may be found in AWS/ANSI D18.1 *Specification for Welding of Austenitic Stainless Steel Tube and Pipe Systems in Sanitary (Hygienic) Applications*. Available from the American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33126, and EHEDG Doc. 9 – Welding Stainless Steel to Meet Hygiene Requirements. Available from the European Hygienic Equipment Design Group, Eiben Moens, Avenue Grand Champ 148, 1150 Brussels, Belgium.

D3 **Bonded Materials**

D3.1 Bonded rubber and rubber-like materials bonded plastic materials having product con surfaces shall be bonded in a manner that the l is continuous and mechanically sound, so that v exposed to the conditions encountered in environment of intended use and in cleaning sanitizing treatment, the rubber and rubber material or the plastic material does not sepa from the base material to which it is bonded.

D4 **Gaskets**

D4.1 Gaskets having a product contact surface sha substantially flush fitting and shall be removab bonded

D4.2 Grooves in gaskets shall be no deeper than width unless the gasket is readily removable reversible for cleaning.

D4.3 Gasket retaining grooves in product contact surf for removable gaskets shall not exceed 1/4 in. (mm) in depth or be less than 1/4 in. (6.35 mm) (except those for standard O-rings smaller that in. (6.35 mm), and those provided for in Sec D8.

D4.4 Hollow tube material may be used only as inflat seals using pressurized air. When hollow material is used as inflatable seals a pres sensing device and alarm shall be provided to d rupture of, or air leakage from, hollow material. A method for testing the alarm sha provided.

D5 **Radii**

D5.1 All internal angles of less than 135° on pro contact surfaces shall have radii of not less that in. (6.35 mm), except:

D5.2 When the thickness of one or both parts joins less than 3/16 in. (4.76 mm), the minimum radi fillets of welds on product contact surfaces sha not less than 1/8 in. (3.18 mm).

D5.3 The radii in grooves in gaskets or gasket retai grooves shall be not less than 1/16 in. (1.59 r except for those for standard 1/4 in. (6.35 mm) smaller O-rings, and those provided for in the Standards referenced in Section D8.1 and D9.

D5.4 Minimum radii in standard O-ring grooves shall be as specified in Appendix, Section L.

D5.5 Minimum radii in nonstandard O-ring grooves shall be those radii closest to standard O-ring as specified in Appendix, Section L.

D5.6 On "O" ring grooves of ASME rated manways designed for pressure/vacuum, the radii may be less than 1/32 in. (0.794 mm). The product contact surface of this angle shall be readily accessible for cleaning and inspection.

D6 **Cleaning and Inspectability**

D6.1 Conveyors that are to be mechanically cleaned shall be designed so that all product contact surfaces and all appurtenances not removed during cleaning can be mechanically cleaned and are inspectable. Parts removed for cleaning shall be readily removable and easily dismantled.

D6.1.1 Pipelines that conform to 3-A Accepted Practice 605- and are to be CIP cleaned shall have representative product contact surfaces easily accessible and inspectable.

D6.2 Product contact surfaces of conveyors not designed to be mechanically cleaned shall be easily accessible for cleaning and inspection either when in an assembled position or when removed. Parts removed for cleaning shall be readily removable, except that fan wheels and fluidizer valves need only be readily accessible for cleaning and inspection. When large or heavy components must be moved to provide access, appropriate mechanical means shall be provided by the fabricator or user.

D6.3 Cleaning devices intended to remain in place shall conform to 3-A Sanitary Standards, Number 78-.

D7 **Draining**

D7.1 Product contact surfaces intended for wet cleaning shall be self-draining, drainable or purgeable with air except for normal clingage.

D8 **Fittings, Connections and Valves**

D8.1 Sanitary fittings and valves shall conform to the applicable criteria in 3-A Sanitary Standards, Number 63-, Number 53-, Number 66-, and Number 68-.

D8.2 Other types of fittings and couplings such as flanges shall conform to the applicable design, material and fabrication provisions listed in these standards.

D8.3 Butterfly valves are acceptable for dry product service only and not suitable for applications involving mechanical cleaning or CIP. These valves shall be removed and disassembled for manual cleaning.

D8.4 Diverter valves and rotary valves shall be of sanitary design and construction to the fabrication and material specifications in this document.

D9 **Instrument Connections**

D9.1 All instrument connections having product contact surfaces shall conform to the applicable provisions of the 3-A Sanitary Standards, Number 74- or 3-A Sanitary Standards, Number 50-.

D10 **Threads**

D10.1 There shall be no threads on product contact surfaces.

D11 **Personnel Access Ports**

D11.1 Personnel access port(s) shall be provided as needed. The inside dimensions of the access port opening shall not be less than 15.0 by 20.0 in. (400 by 500 mm) if oval or 18.0 in. (450 mm) in diameter if round. The upper edge of a top-entering access port opening shall not be less than 3/8 in. (9.52 mm) higher than the surrounding area, and if any exterior flange is incorporated in it, it shall slope and drain away from the opening. The sleeve or collar of an access port opening for an inside swing-type access port cover shall be pitched so that liquids cannot accumulate.

D12 **Sight and Light Openings**

D12.1 Sight and light openings provided shall conform to the applicable provisions of the 3-A Sanitary Standards, Number 65-.

D13 **Bearings**

D13.1 Bearings having a product contact surface shall be of a nonlubricated type. Lubricated bearings shall be located outside the product contact surface with at least 1.00 in. (25.4 mm) clearance between the bearing and any product contact surface. When a shaft passes through a product contact surface, the portion of the opening surrounding the shaft shall be protected to prevent the entrance of contaminants and air.

D14 **Flexible Connections**

D14.1 Flexible connections having product contact surfaces shall have straight sides without corrugations except that:

D14.1.1 Flexible connections less than 18.0 in. (457 mm) long which are used in a vertical position may have corrugations which have a radius of not less than 0.500 in. (12.7 mm) and are no deeper than their width.

D14.2 If a flexible connection is a hose assembly it shall conform to applicable provisions of the 3-A Sanitary Standards, Number 62- except that

D14.2.1 For applications where increased flexibility is required, hose with a smooth inside surface and a convoluted outside surface with removable clamped sanitary fittings are acceptable for dry product service only and not suitable for applications involving mechanical cleaning or CIP. These hose assemblies shall be removed and disassembled for manual cleaning.

D15 **Sintered Fluidizers**

D15.1 The sintered material of fluidizers shall be designed to be discarded if they become wet or plugged.

D15.2 The manufacturer shall provide guidance concerning the sanitary handling and storage of sintered fluidizers temporarily removed from service. See Appendix M for an acceptable method.

F **AIR SUPPLY FOR CONVEYING PRODU**

F1 The air supply system and/or ducting shall be that all of the air is caused to pass through proj installed air filters before coming into contact product contact surfaces of the conveying syst

F1.1 Air supplied from air compressors for pos pressure conveying up to 150 psig shall through a properly installed and maintained filter(s) with at least 99% efficiency as measur the DOP test per 3-A Accepted Practice, Nu 604- Supplying air under pressure in contact milk and milk products.

F1.2 Air supplied from fans and blowers for pos pressure conveying up to 15 psig shall pass thr a properly installed and maintained final filte selected to have a minimum average efficien 95% when tested in accordance with the ASHR Atmospheric Dust Spot Method when operated design face velocity.

F1.3 Air drawn by vacuum fans, vacuum blowers pumps for negative pressure conveying down in. (737 mm) Hg, shall pass through a proj installed and maintained final filter(s), selecte have a minimum average efficiency of 95%, t tested in accordance with the ASHR Atmospheric Dust Spot Method when operated design face velocity.

F2 Air supplied from air compressors for dry pro applications shall conform to the 3-A Acce Practice, Number 604- up to the point of the filter. The following design criteria are fron final filter to the point of application.

F2.1 A check valve shall not be required for air u pressure that is introduced into the product. connection points shall be removed and capp isolated during cleaning operations.

F2.2 For these dry products applications, plasti rubber or rubber-like tubing and suitable compr threaded fittings and connections made of pl nickel-plated brass, or stainless steel may be between the final filter and the point of pressu air application. The tube fittings and conne may be commercially available compressio push-lock type.

[7] For sale by the Superintendent of Documents, U.S. Government Pri Office, Washington, D.C. 20402.

F **EXCLUSION OF UNFILTERED CONVEYING AIR**

F1 Product level sensors and automatic interlocks with rotary airlock valves or other product isolating equipment shall be provided for conveyors from bag dump or intermediate bulk container (IBC's) unloading equipment to prevent entrance of unfiltered ambient conveying air in case of low or no product level.

F2 Conveyors for product from large flexible bulk bags shall be designed to prevent the entrance of unfiltered ambient air by the following or other equally effective means:

F2.1 Bag emptying into a hopper with a rotary airlock valve, product metering device, or other isolating equipment. The hopper shall be equipped with a level sensor and automatic interlock as described in F1.

F2.2 Direct airtight connection of the bag emptying spout to the conveyor product feed pipe, causing collapse of the bag as product is discharged. While bags are being changed, the product feed pipe is capped/valved off or the product rotary airlock valve or other metering device is stopped.

F3 Conveyors of product/air mixtures from filling heads of packaging operations where product is recovered for human food shall be designed and equipped to prevent entrance of unfiltered ambient air by the following or other equally effective means:

F3.1 Direct airtight connection of the filling head to the container or liner being filled, together with automatic means of valving off the pneumatic conveyor while containers are being changed.

G **Nonproduct Contact Surfaces**

G1 The following criteria shall apply only to those nonproduct contact surfaces, which are subject to product residues and splashing. Nonproduct contact surfaces, including frame assemblies, shall have a relatively smooth finish, be relatively free of pockets and crevices and be readily cleanable. Surfaces to be coated shall be effectively prepared for coating. If not made of corrosion-resistant metal, they shall be painted or coated. Stainless steel equipment frames and exterior nonproduct surfaces may be glass-beaded if desired. Exposed threads shall be minimized. Exposed braided covering of cable or hose shall not be used. No continuous or piano-type hinges shall be used on the equipment or its control panels. Electrical and utility connections shall be as remote as practical from the product areas. Riveted nameplates or appendages shall not be used. Nameplates shall be welded or effectively sealed to the equipment. Socket head cap screws shall not be used.

G2 The requirement to be relatively free of pockets and crevices does not apply to exposed exterior surfaces of ancillary equipment such as sanitary fittings, service fittings, electric motors, drives, fans, mechanical linkages, drives for rotary valves and other similar equipment.

H **Supports**

H1 The means of supporting the conveyor shall provide a clearance between the lowest part of the conveyor, with exception of legs, and the floor of at least 4.00 in. (102 mm) when the conveyor is not more than 25.0 in. (635 mm) wide or a clearance of at least 6.00 in. (152 mm) when the conveyor is more than 25.0 in. (635 mm) wide. An exception is made to these minimum clearances for conveyors that convey product from equipment supported directly on a floor. Such conveyors supported directly on the floor shall be capable of being moved.

H2 Legs, if provided, shall be smooth, have no exposed threads and shall have rounded ends or be designed to permit sealing to the floor or other mounting surface.

H3 Legs made of hollow stock shall be sealed. Conveyors that are portable may be equipped with casters. Casters shall be easily cleanable, durable and of a size that will permit easy movement of the conveyor.

I **Guards and Other Safety Devices**

I1 Guards required by a personnel safety standard shall be removable for cleaning and inspection of the equipment. When guards are removed, OSHA lockout-tagout regulations[8] shall be followed.

[8] 29 CFR 1910.147 The control of Hazardous Energy. Document for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

APPENDIX

I STAINLESS STEEL MATERIALS

I1 Stainless steel conforming to the applicable composition ranges established by AISI for wrought products, or by ACI for cast products, should be considered in conformance to the requirements of Section C1 herein. Where welding is involved, the carbon content of the stainless steel should not exceed 0.08%. The first reference cited in C1 sets forth the chemical ranges and limits of acceptable stainless steel of the 300 Series. Cast grades of stainless steel corresponding to types 303, 304, and 316 are designated CF-16F, CT-8, and CF-8M, respectively. The chemical compositions of these cast grades are covered by ASTM specifications[9] A351/A351M, A743/A743M and A744/A744M.

I2 **TABLE 1**

WROUGHT PRODUCTS TYPICALLY USED			
UNS #	**ASTM[9]**	**AISI/ SAE[10]**	**Common Names**
S30300	A-582	303	Free-Machining S.S., Austenitic
S30400	A-276 A-666	304	Austenitic S.S.
S30403	A-276 A-666	304L	Low Carbon Austenitic S.S.
S31600	A-276 A-666	316	Austenitic S.S. plus Mo*
S31603	A-276 A-666	316L	Low Carbon Austenitic S.S. plus Mo*

*Molybdenum

TABLE 2

CAST PRODUCTS			
UNS#	**ASTM[9]**	**ACI[11]**	**Common Names**
J92500	A-351 A-743 A-744	CF-3	Cast 304L
J92800	A-351 A-743 A-744	CF-3M	Cast 316L
J92600	A-351 A-743 A-744	CF-8	Cast 304
J92900	A-351 A-743 A-744	CF-8M	Cast 316
J92180	A-747	CB7 Cu-1	Cast 17-4 PH
J92110	A-747	CB7 Cu-2	Cast 15-5 PH
N26055	A-494	CY5Sn BiM	Waukesha 88
J92701	A-743	CF-16F	Free Machining Austenitic S.S.

TABLE 3 OPTIONAL METAL ALLOYS
Optional metal alloys having the following compositions are examples considered in conformance to Section C herein. (Percentages are maximum unless range is given.)

	UNS N08367	UNS S21800	UNS S20161	UNS N26055	UNS N26455	UNS S17400	UNS S15500	UNS S32900	UNS R20500	UNS R50400
	ASTM A743 Grade CN-3MN	ASTM A743 Grade CF-10 SMnN		ASTM A494 Grade CY5SnBiM	ASTM A494 Grade CW-2M	ASTM A747 Grade CB7Cu-1	ASTM A747 Grade CB7Cu-2		ASTM A580 Grade 50Cr-50Ni	ASTM B67 Grade C-2
C	0.03	0.10	0.15	0.05	0.02	0.07	0.07	0.20	0.10	0.10
Mn	2.00	7.00-9.00	4.00-6.00	1.5	1.00	0.70	0.70	1.00	0.50	
Si	1.00	3.50-4.50	3.00-4.00	0.5	0.80	1.00	1.00	0.75	1.00	
P	0.040	0.040	0.040	0.03	0.03	0.035	0.035	0.040	0.02	
S	0.010	0.030	0.040	0.03	0.03	0.03	0.03	0.030	0.02	
Cr	20.0-22.0	16.00-18.00	15.0-18.0	11.0-14.0	15.0-17.5	15.50-17.5	14.0-15.50	23.0-28.0	48.0-52.0	
Ni	23.5-25.5	8.00-9.00	4.00-6.00	Balance	Balance	3.60-4.60	3.50-5.50	2.50-5.00	Balance	
Mo	6.0-7.0			2.0-3.5	15.0-17.5			1.00-2.00		
Cb						0.15-0.35	0.15-0.35			
Cu	0.75					2.50-3.20	2.50-3.20			
N	0.18-0.26	0.08-0.18	0.08-0.20			0.05	0.05		0.30	
Fe	Balance	Balance	Balance	2.00	2.00	Balance	Balance	Balance	1.00	0.30
Sn				3.0-5.0						
Bi				3.0-5.0						
W					1.0					
Ti									0.50	Balance
Al									0.25	
Other										Ti – 0.015 N – 0.03 O – 0.25

J3 Metal alloys or metals other than the above may be as corrosion resistant as 300 Series Stainless steel. This may be shown when metal alloys or metals are tested in accordance with ASTM G31 Laboratory Immersion Corrosion Testing of Metals and have a corrosion rate of less than 10.0 mil per year. The test parameters such as the type of chemical(s), their concentration(s), and temperature(s) should be representative of cleaning and sanitizing conditions used in dairy equipment. Alloys containing lead, leachable copper, or other toxic metals should not be used.

[9] Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

K PRODUCT CONTACT SURFACE FINISH

Surface finish equivalent to 150 grit or better as obtained with silicon carbide, properly applied on stainless steel sheets is considered in conformance to the requirements of Section D1 herein, providing the surface is a maximum R_a of 32 µin (0.8 µm), when measured according to the recommendations in American National Standards Institute (ANSI)/American Society of Mechanical Engineers (ASME)[9] B46.1 - *Surface Texture, Waviness and Lay* is considered to be equivalent to a No. 4 finish.

L O-RING GROOVE RADII

TABLE 4 - Minimum Groove Radii Dimensions for Standard O-Rings

O-Ring Cross Section, Nominal (AS 568[11])	O-Ring Cross Section, Actual (AS 568)	O-Ring Cross Section, Actual (ISO 3601-1[12])	Minimum Groove Radius
1/16 in.	0.070 in.	1.80 mm	0.0160 in. (0.406 mm)
3/32 in.	0.103 in.	2.65 mm	0.0310 in. (0.787 mm)
1/8 in.	0.139 in.	3.55 mm	0.0310 in. (0.787 mm)
3/16 in.	0.210 in.	5.30 mm	0.0620 in. (1.575 mm)
1/4 in.	0.275 in.	7.00 mm	0.0940 in. (2.39 mm)

[9] Available from the American Society of Mechanical Engineers, 345 East 47th Street, New York, NY 10017-2392.

[11] The documents establishing these standard dimensions is Aerospace Standard (AS) 568, published by SAE, 400 Commonwealth Drive, Warrendale, PA 15086.

[12] The document establishing these standard dimensions is ISO 3601-1 published by the International Organization for Standardization (ISO), 1 Rue de Varembe, Case Postale 56, CH-1211, Geneva, Switzerland.

M SINTERED FLUIDIZERS HANDLING AND STORAGE

M1 Fluidizers should be removed prior to wet was of equipment

M2 New, disposable type sanitary gloves should worn when handling the fluidizers.

M3 Fluidizers that become contaminated thr contact with unsanitary surfaces or become we should be discarded.

M4 The fluidizers should be placed inside a clean or single use, sealed, sanitary container and st in a clean dry location.

N ENGINEERING DESIGN AND TECHNIC CONSTRUCTION FILE

The following is an example of an engine design and technical construction file (EDTCF be maintained by the fabricator as evidenc conforming to 3-A Sanitary Standards or Accepted Practices. (The file may contain mo less information as applicable to the equipmen system.)

N1 **Purpose**

N1.1 To establish and document the material, fabrica and installation (where appropriate) requirem for the engineering design and techn construction files for all products, assemblies, sub-assemblies supplied by the manufacturer tha to be in conformance to the sanitary criteria li in 3-A Sanitary Standards or 3-A Acce Practices. It is recommended that the enginee and construction file or files be submitted applications for 3-A Symbol use authorization

N2 **Scope**

N2.1 This EDTCF applies to equipment specified b

N2.1.1 3-A Sanitary Standards for Pneumatic Conve for Dry Milk and Dry Milk Products, Number 01.

N2.1.2 List all applicable 3-A Sanitary Standards and Accepted Practices.

N3 **Responsibilities**

N3.1 This EDTCF is maintained by: The Engineering Manager (or other company official) **[name and title of responsible official]** is responsible for maintaining, publishing, and distributing this EDTCF.

N3.2 Implementation: All divisions, specifically development engineering, standards engineering, sales engineering, and product departments are responsible for implementing this EDTCF.

N4 **Applicability**

N4.1 The 3-A Sanitary Standards and 3-A Accepted Practices are voluntarily applied as suitable sanitary criteria for dairy and food processing equipment. 3-A Sanitary Standards are referenced in the Grade A Pasteurized Milk Ordinance. "Equipment manufactured in conformity to 3-A Sanitary Standards conforms to the sanitary design and construction standards of this Ordinance."

N5 **References**

N5.1 List any additional regulations that apply to the equipment or system covered by this EDTCF.

N5.2 Date of conformity or 3-A Symbol Authorization and certificate number, if authorized:

N6 **Design and Technical Construction File**

N6.1 The Engineering Design and Technical Construction File may consist of the following:

a. an overall drawing of the subject equipment;
b. full detailed drawings, accompanied by any calculations, notes, test results, etc. required to check the conformity of the equipment with the 3-A Standards or 3-A Practices;
c. a list of:
   (1) the essential requirements of the standards or practices;
   (2) other technical specifications, which were used when the equipment was designed;
d. a description of methods adopted;
e. if essential, any technical report or certificate obtained from a competent testing body or laboratory;
f. any technical report giving the results of tests carried out internally by Engineering or others;
g. documentation and test reports on any research or tests on components, assemblies and/or the complete product to determine and demonstrate that by its design and construction the product is capable of being installed, put into service, and operated in a sanitary manner (optional);
h. a determination of the foreseeable lifetime of the product (optional);
i. a copy of the instructions for the product (Instruction Manuals/Instruction Books);
j. for serial manufacturing, the internal measures that will be implemented to insure that the equipment will continue to be manufactured in conformity to the provisions of the 3-A Sanitary Standards or 3-A Accepted Practices;
k. engineering reports;
l. laboratory reports;
m. bills of material;
n. wiring diagrams, if applicable;
o. sales order engineering files;
p. hazard evaluation committee reports, if executed;
q. change records;
r. customer specifications;
s. any notified body technical reports and certification tests;
t. copy of the 3-A Symbol authorization, if applicable.

N6.2 The file does not have to include detailed plans or any other specific information regarding the sub-assemblies, tooling, or fixtures used for the manufacture of the product unless a knowledge of them is essential for verification of conformity to the basic sanitary requirements found in 3-A documents.

N6.3 The documentation referred to in N6.1 above need not permanently exist in a material manner in the EDTCF, but it must be possible to assemble them and make them available within a period of time commensurate with its importance (one week is considered reasonable time). As a minimum, each product EDTCF must physically contain an index of the applicable document of N6.1 above.

N6.4 The EDTCF may be in hard copy or software form.

N7 **Confidentiality**

N7.1 The EDTCF is the property of the manufacturer and is shown at their discretion, except that all or part of this file will be available to the 3-A SSI or a regulatory agency for cause and upon request.

N8 **File Location**

N8.1 The EDTCF shall be maintained at **[location]**.

N9 **File Retention**

N9.1 The EDTCF (including all documentation referred to in N6.1) shall be retained and kept available for 12 years following the date of placing the product in use or from the last unit produced in the case of series manufacture.

COMING EVENTS

DECEMBER

- **1–3, Microbiology and Engineering of Sterilization Processes Course,** Valley Forge Scanticon Hotel and Conference Center, King of Prussia, PA. For more information, contact Ann Rath at 612.626.1278.
- **3–5, Basic HACCP,** Ithaca, NY. For more information, call Food Processors Institute at 202.393.0890; E-mail: jepstein@nfpa-food.org.
- **4–5, ASI Food Safety Workshop,** Las Vegas, NV. For more information, call Jeanette Huge at 800.477.0778 ext. 113 E-mail: jhuge@asifood.com.
- **8–12, Ice Cream Technology Workshop,** Nashville, TN. For more information, call 205.595.6455; E-mail: us@randolphconsulting.com.
- **9–12, Refrigeration and Deep-Freeze,** Triumph Pavilion, Rosstroy Expo in Moscow. For more information, contact Ken Cardelle at 203.357.1400; E-mail: KCardelle@iegexpo.com.

JANUARY

- **12–13, HACCP I: Documenting HACCP Prerequisites,** Guelph Food Technology Centre, Guelph, Ontario, Canada. For more information, contact Marlene Inglis at 519.821.1246; E-mail: minglis@gftc.ca.
- **14–16, HACCP II: Developing Your HACCP Plan,** Guelph Food Technology Centre, Guelph, Ontario, Canada. For more information, contact Marlene Inglis at 519. 821.1246; E-mail: minglis@gftc.ca.
- **21–22, ServSafe® for the Food Industry and Food Service,** Guelph Food Technology Centre, Guelph, Ontario, Canada. For more information, contact Marlene Inglis at 519.821.1246; E-mail: minglis@gftc.ca.
- **22–23, ASI Principles of HACCP Workshop,** Orlando, FL. For more information, call Jeanette Huge at 800.477.0778 ext. 113; E-mail: jhuge@asifood.com.
- **26–27, Quality Improvement Associate (ASQ), Part I,** Guelph Food Technology Centre, Guelph, Ontario, Canada. For more information, contact Marlene Inglis at 519.821.1246; E-mail: minglis@gftc.ca.
- **28–30, International Poultry Exposition,** Georgia World Congress Center, Atlanta, GA. For more information, contact Jackie Stewart at 770.493.9401; E-mail: jstewart@poultryegg.org

FEBRUARY

- **17–19, Kentucky Association of Milk, Food and Environmental Sanitarians,** Hurstbourne Hotel, Louisville, KY. For more information, contact Sue Jewell at 859.371.2278.
- **19–20, ASI Principles of HACCP Workshop,** Las Vegas, NV. For more information, call Jeanette Huge at 800.477.0778 ext. 113; E-mail: jhuge@asifood.com.

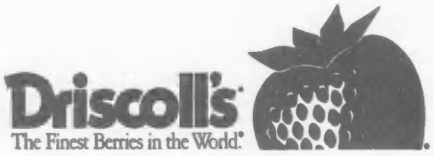
IAFP UPCOMING MEETINGS

AUGUST 8-11, 2004
Phoenix, Arizona

AUGUST 14-17, 2005
Baltimore, Maryland

AUGUST 13-16, 2006
Calgary, Alberta, Canada

CAREER SERVICES SECTION



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PS Form 3526, October 1999 (See Instructions on Reverse)

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a. Total Number of Copies (Net press run)	3,254	3,375
b. Paid and/or Requested Circulation (1) Paid/Requested Outside-County Mail Subscriptions Stated on Form 3541. (Include advertiser's proof and exchange copies)	2,378	2,265
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(2) In-County as Stated on Form 3541	0	0
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e. Free Distribution Outside the Mail (Carriers or other means)	164	227
f. Total Free Distribution (Sum of 15d. and 15e.)	219	328
g. Total Distribution (Sum of 15c. and 15f)	3,108	3,198
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17. Signature and Title of Editor, Publisher, Business Manager, or Owner: David W. Tharp, Executive Director — Date: 9/19/03

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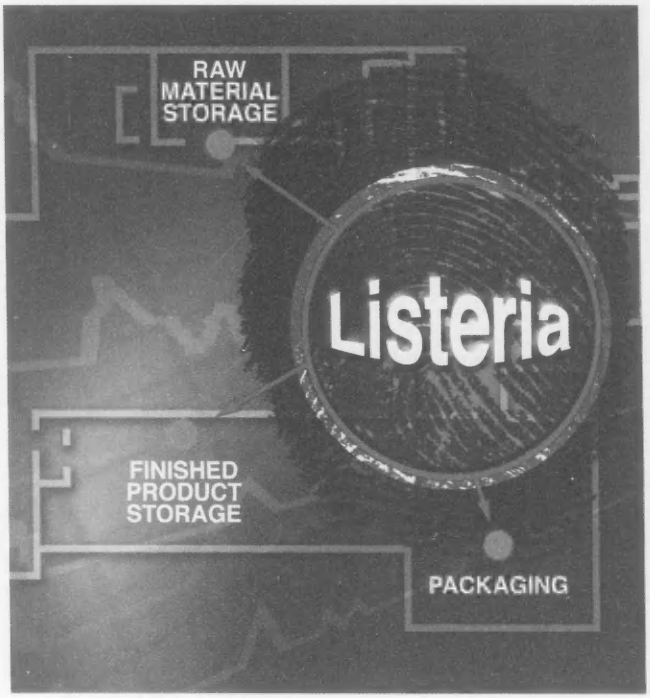

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