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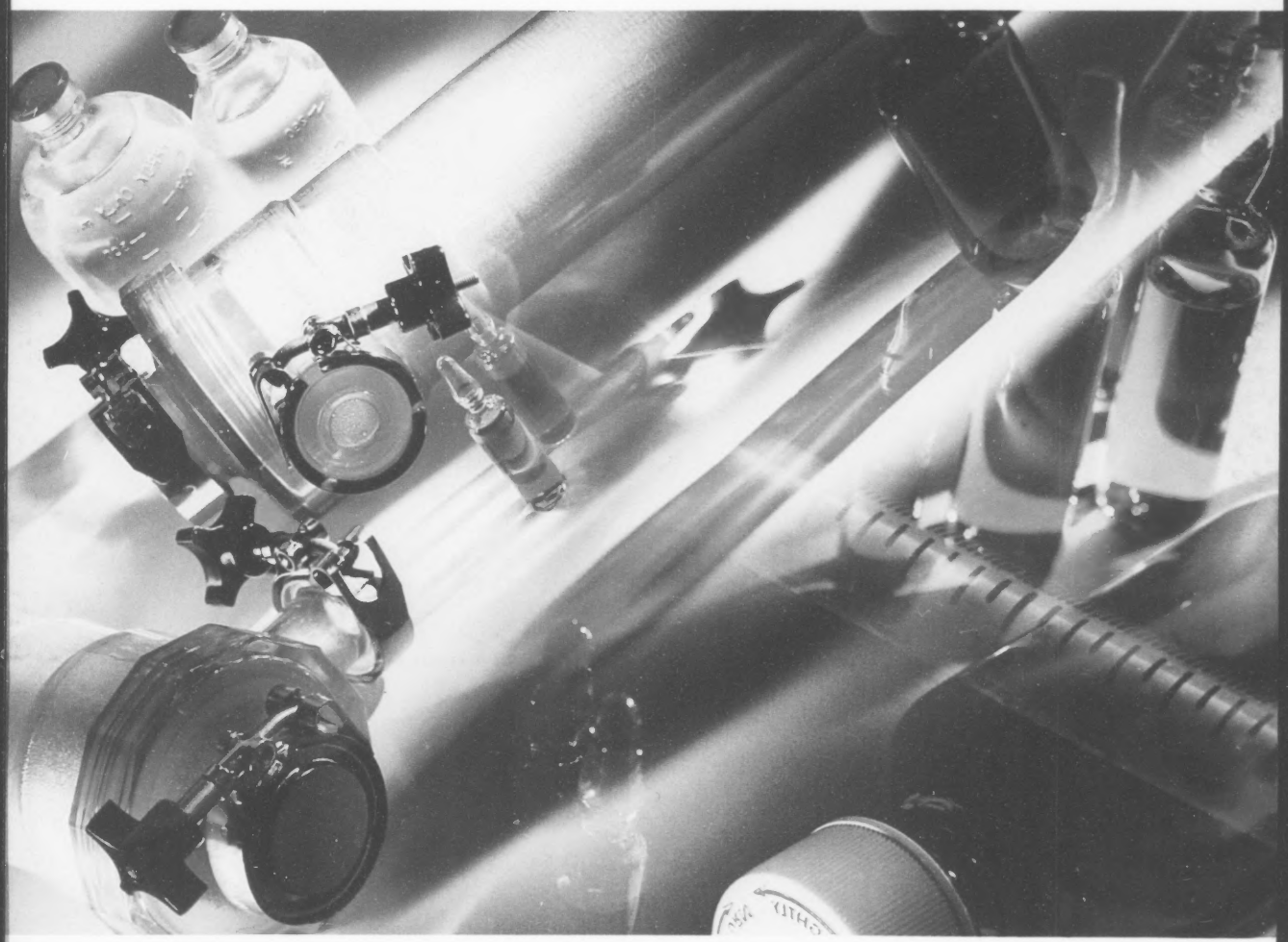
DAIRY, FOOD AND ENVIRONMENTAL

SANITATION

NOVEMBER 1994



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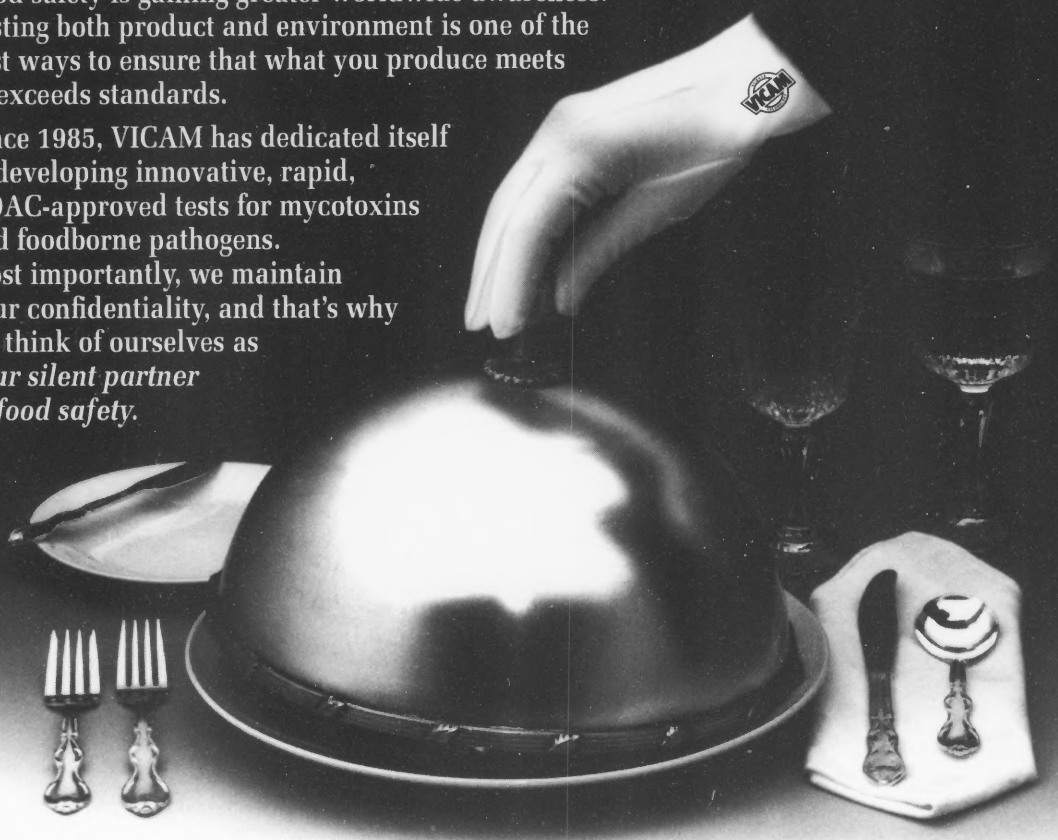

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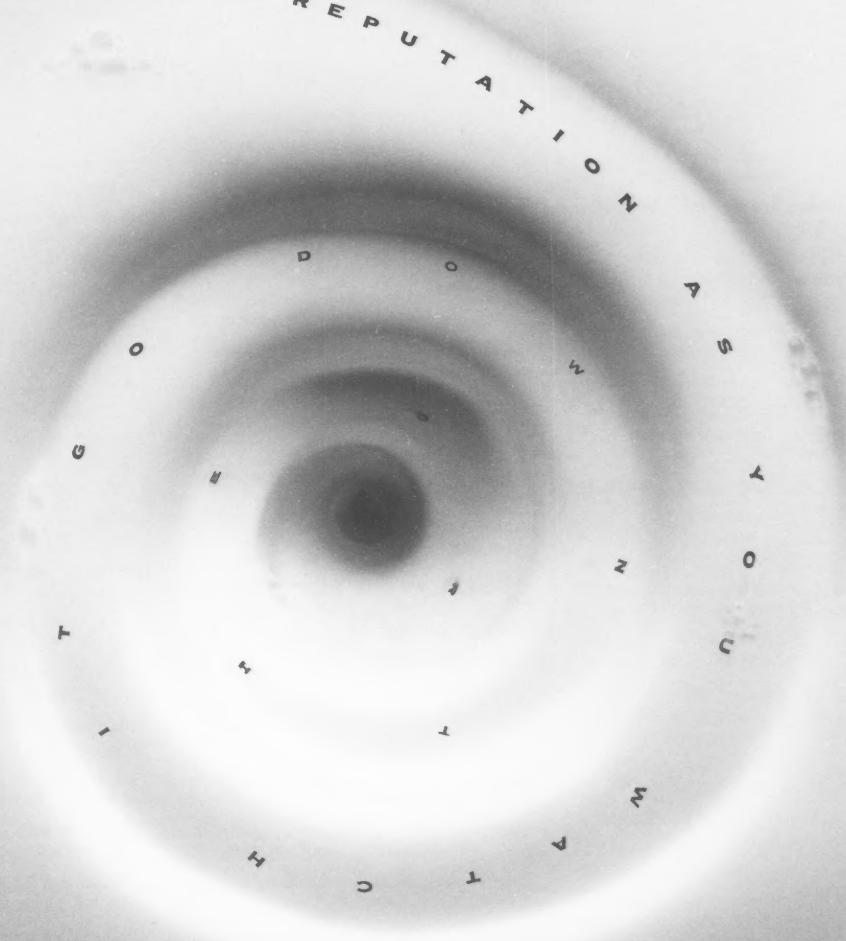

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Dairy, Food and Environmental Sanitation (ISSN-1043-3546) is published monthly beginning with the January number by the International Association of Milk, Food and Environmental Sanitarians, Inc. executive offices at 6200 Aurora Avenue,Suite 200W, Des Moines, IA 50322-2838, USA. Each volume comprisas 12 numbers. Printed by Heuss Printing, Inc., 911 N. Second Street, Ames, IA 50010, USA. Second Class Postage paid at Des Moines, IA 50318 and additional entry offices.

Postmaster: Sand address changes to **Dairy, Food and Environmantal Sanitation,** 6200 Aurora Avenua, Suite 200W, Des Moines, IA 50322-2838, USA.

Manuscripts: Correspondence regarding manuscripts and other reading materials should ba addressed to Jodie M. Cantwell, IAMFES, 6200 Aurora Ava., Suite 200W, Des Moines, IA 50322-2838; 515-276-3344. "**Instructions to Contributors**" can be obtained from the editor.

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Thoughts From the President . . .

By
C. Dee Clingman
IAMFES President

Tough Times Don't Last — Tough People Do!

As the holiday time approaches we generally get in that spirited and festive mood. However, during this past year many organizations have been hit by reengineering, downsizing, or organized displacement. So it would be natural if we were a little "down in the dumps" this holiday season. Right?

Perhaps, we can draw an answer from a Charles Dickens quote in the *Tale of Two Cities*: "It was the best of times — it was the worst of times." Today's business climate is different than in previous history. This does not mean it is better or worse - just different. In the past the employee was part of the "family" with his or her employer. The employer even had some sense of responsibility to care for the employee in later years (retirement). Today the family concept is gone — the employee is a "team" member. As a "team" member the employee works hard to be accepted as a team member by management and fellow team members. Team management no longer looks at the employee in the long term but as an asset to buy, sell, relocate, or discard as professional sports teams do on an ongoing basis. We must recognize this difference in business operations since it will eventually effect academia and government as it already has in some situations.

So while it may appear to be the worst of times, it can also be made to be the best of times. By recognizing the changes and incorporating strategies and planning for the future, today's business climate can be rewarding.

This past year at the IAMFES Des Moines headquarters office, we had to eliminate some positions and personnel because of a projected deficit in year-end budgeting. Your Executive Board concurred that we would not operate the Association in "the red." You, the electorate, voted for what you would want — fiscally responsible Board members. It was a tough decision to make these reengineering/downsizing changes. The Board knew that some things would have to be eliminated or changed. For a while we had the typical, yet anticipated, problems and confusions of "who does what and when." Errors even trickled into our journal publication process. But the tough times didn't last — the tough people did! The remaining IAMFES staff and replacements for vacancies around the same time pulled together as a "team" and repositioned the organizational structure, and are in the process of building an even stronger organization than before. Their efforts have to be applauded as we move into a higher level of performance and service to our members.

Ah, it IS the best of times!

Happy Holidays!

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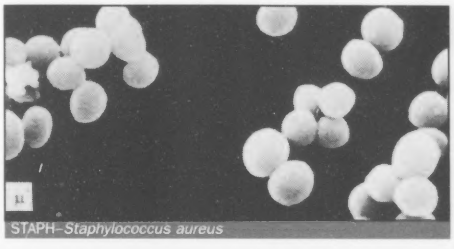
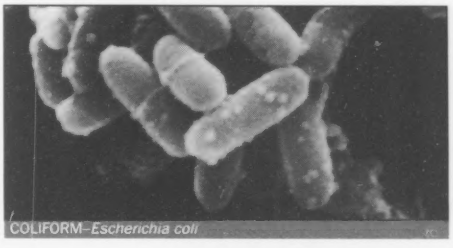
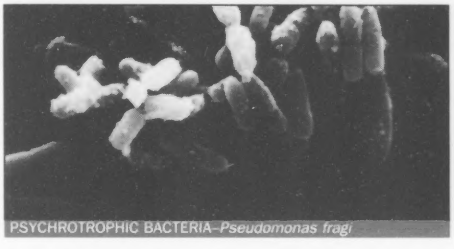
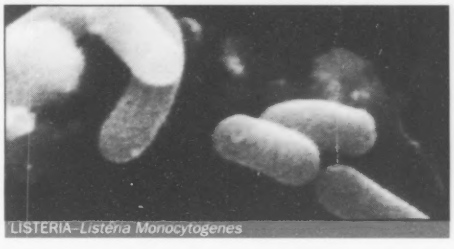

STAPH–*Staphylococcus aureus*


COLIFORM–*Escherichia coli*


PSYCHROTROPHIC BACTERIA–*Pseudomonas fragi*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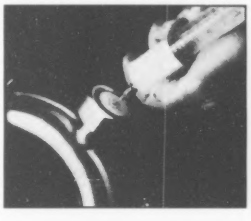

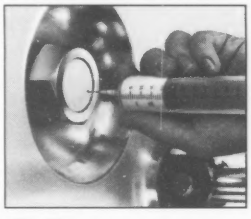

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On My Mind . . .

By
Steven K. Halstead, CAE
IAMFES
Executive Manager

is the 1994 Annual Meeting....

Long before I became the Executive Manager of IAMFES, the November issue of DFES served as a review of the Annual Meeting. Even way back when there was only one journal, the November issue of that journal was dedicated to the Annual Meeting.

It is always interesting to write this column. Reflecting on events that took place some three months ago has a way of dimming the memories — both the good and the bad.

One memory that stands out is the way the staff performed. Because of budget forced reductions in staff and resignations of other key staff, we found ourselves putting on the meeting with a staff who had never done an Annual Meeting. It was stressful.

We try our best to reduce the stress level of the meeting attendees as much as possible. I sometimes think that this is a transfer process. The only way we can take the stress off the attendees is by picking it up ourselves. Add to that the stress that comes from doing something for the very first time — and trying to do it picture perfect — and you come up with a tremendous stress load. I was proud and grateful for the way the staff handled the job and the ability they showed in doing it.

Another memory that stands out is the fun we had in working with the Texas Affiliate. It seemed that every one of them was chosen for his or her sense of humor and willingness to roll up their sleeves and get a job done. We never had to ask twice for anything unless it was to have them repeat a joke.

I know of no better way to get to know people than by working side by side with them to accomplish a task. Even though I have attended the last three TAMFES Annual Meetings, I never got to know their members the way I did in putting on this meeting.

On reflection, that is one of the highlights of the meeting — not just this one, but all of them. Putting on a meeting like this makes the hosting affiliate indispensable.

The next memory that comes to mind immediately is the dedication and service of the Executive Board. Let me share with you the rigors these people go through during the meeting.

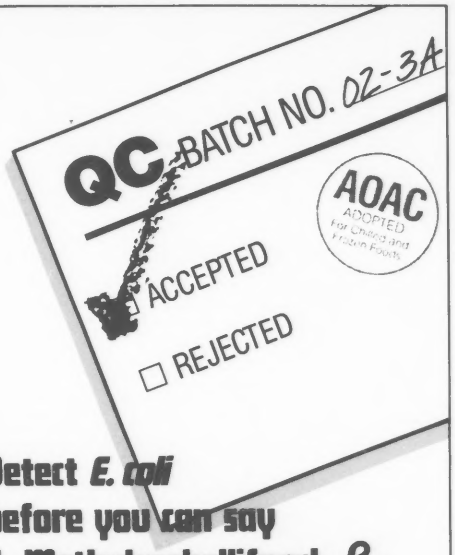
The Board meets all day long on the Saturday preceding the meeting. This means they have to come in on Friday night. They meet with the Affiliate Council beginning at 7:00 AM on Sunday and continue attending committee meetings the rest of the day, usually without a break. Often the meetings end just in time to head off for the Ivan Parkin Lecture.

Monday begins with a 7:00 AM meeting with the chairs of the Committees, Task Forces and Professional Development Groups. Then there is a 7:00 AM Board meeting on Tuesday that is an effort to make the Board more accessible to the membership. Finally, there is the Awards Banquet on Wednesday evening and it's all over. Not quite — there is another Board meeting on Thursday that usually runs until noon or after.

All this ignores the hours that are spent inside meetings and in preparation for the meetings and other events. Seldom do the Board members get chance to attend the educational sessions.

For all their work and dedication, I hope you will join me in saluting the members of the Executive Board (and their spouses who have to put up with all this).

With warm memories of the '94 meeting, we now turn our attention to '95.



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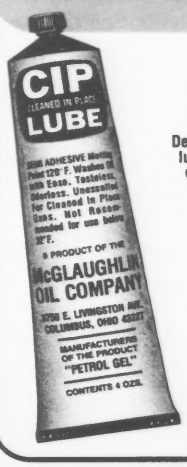

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HACCP: Present Status and Future in Contribution to Food Safety

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ABSTRACT

An implemented and maintained hazard analysis critical control point (HACCP) system offers high assurance of food safety. The HACCP system is rational because it is based on historical data about causes of illness and spoilage; it is comprehensive because it takes into consideration ingredients, processes and subsequent use of products and is applicable at all links of the food chain; it is continuous because problems are detected when they occur and action is taken then for correction; and it is systematic because it is a thorough plan covering step-by-step operations and procedures. It is presently the state of the art, and science, of food safety.

The HACCP approach is being used by some health and food regulatory agencies as well as progressive food industries. Internationally, it is (a) being incorporated into Codex documents (*17*); (b) endorsed and promoted by the International Commission on Microbiological Specifications for Foods (*25*); (c) developed into practical how-to-do-it manuals by the International Association of Milk, Food and Environmental Sanitarians (*13*), Campden Food and Drink Research Association (*23*), and International Life Sciences Institute Europe (*26*); and (d) being taught in training courses by the World Health Organization (*5,36*), other groups and consultants. In the United States of America, as an example of national activity, it is mandatory for use by processors of low-acid canned foods (*33*). It is promoted for use for fish and shellfish processing (*29,30*). Applications of it are also being used for processing meat and poultry (*18,28*). Some state and local regulatory agencies, but not all yet, are converting traditional inspections to HACCP promotion, consultation and/or verification activities for foodservice operations and markets (*16,22*). The State of Maryland has required its application for foodservice operations. The Food Marketing Institute (*3*), University of California, Davis and the National Food Processors (*31*), and the Education Foundation of the National Restaurant Association (*20*) have developed HACCP reference manuals. Several of these actions are well known by those in leadership of the food safety movement. This paper will address the present status and use of HACCP in retail food operations which is less well known than its use by food processors, and it will give predictions for the future.

PRESENT STATUS

HACCP Development in Retail Stores. Development of HACCP systems in retail stores is often more complex than it is for food processing plants in which only one food item is processed or only a few "straight" lines are used to process a number of foods in similar manner. Foodservice operations seldom have straight line conveying of foods. Development of HACCP systems for them involves coverage of all potentially hazardous foods which frequently totals between 50 and 500 foods. Because of this, HACCP systems are usually developed for groups of foods that have similar characteristics and/or processes. The process for development of HACCP systems is similar to that used by food processors, and the same principles are involved. It, however, may be done by one person rather than a team of company specialists.

Hazard analyses consider (a) reviewing epidemiological data about the food or food group in question; (b) testing pH and water activity of foods if these characteristics appear critical to its control or shelf stability; (c) reviewing formulations or recipes for anticipated hazards from ingredients and operations; (d) evaluating actual or potential contamination, survival and growth of microorganisms by observing each step of the operations; (e) making appropriate tests (e.g., analysis for microorganisms, chlorine concentrations) and measurements (e.g., measuring time-temperature exposures during cooking, hot holding, holding at room or outside ambient temperatures, cooling and reheating) to provide more information to evaluate microbial survival and growth; and (f) conducting challenge tests when necessary to gather data unidentified from the above activities and to confirm or refute hypotheses that are conceived during the analyses. Next, severity of potential outcomes (e.g., illness or spoilage) and risk of the hazards are assessed.

Flow diagrams, for example, foods in each category should list each ingredient and illustrate sequential operations for the preparation of the food. Each step of preparation is highlighted by a box surrounding a term that represents the step. Symbols for hazards are inserted (a) besides contaminated ingredients, (b) after preparation steps where observed, measured or anticipated contamination occurred or is likely to occur, (c) at processes in which microorganisms are likely to survive, and (d) when conditions prevail by which, and intervals within which, bacteria or molds multiply. Symbols

for critical control points are inserted adjacent to appropriate boxes to emphasize operations where the hazards could be controlled or prevented. Some preventive or control measures at critical control points (CCP) eliminate hazards resulting in nil risks. Others prevent further development, but they do not eliminate preexisting hazards. Others, however, only minimize, reduce or delay hazards, but they neither eliminate or prevent them. Still others either fail to prevent or control certain hazards or are not monitored, and thus it is unknown whether the preventive and control measures achieve their intended purpose. Hence, varying degrees of risks may remain.

The flow diagram is not the end product of a HACCP system, it's only a guideline for its development. HACCP systems consider each operation in relation to (a) hazards, (b) degree of concern (e.g., about the hazards' severity and risk) (c) type critical control point, (d) control measures and criteria (critical limits) at critical control points, (e) monitoring procedures, (f) monitoring record and responsibility, (g) corrective actions, and (h) verification activities. Monitoring forms are developed for use at various work stations and by managers. Verification forms are developed for use by quality control personnel.

Drafts of HACCP systems and supporting data should be reviewed by key members of quality control, production and product design staff whether or not they have been a part of a team that developed the systems. The HACCP systems should be revised, if necessary, following this consultation. Furthermore, the systems will require revision whenever (a) new foods are added to the menu, (b) different ingredients from those that were added at the time the systems were developed are used, (c) different or new equipment is employed during preparation or holding of the foods, (f) additional hazards are observed during verification visits, or (g) scientific or epidemiological studies identify previously undetected hazards.

At its completion each HACCP system must be critically reviewed by the developer(s) and summarized in what hazards it eliminates, prevents, minimizes, reduces or delays and what hazards remain and the relative risks of these outcomes. Such analyses are essential following development of HACCP systems to avoid misunderstanding or over confidence. Priority for attention, training and supervision must be at critical control points, which are operations where control can be attained and where monitoring is done to ensure food safety. Highlights abstracted from the systems (including listings of hazards, control procedures and monitoring procedures and responsibilities) can be used as (a) notices in stores, (b) in recipe books, cards or disks, and (c) in operational manuals. Steps for development of HACCP systems and suggestions for implementation are illustrated in Fig. 1.

Success of HACCP systems depends on management commitment. Executives must support the principles of the HACCP concept and supervisors of departments must give high priority to implementation of the systems. Store managers, supervisors and persons who are to monitor critical control points will need to be trained in (a) criteria for control, (b) monitoring procedures, (c) use of monitoring forms, and (d) corrective actions (*4*). Quality control personnel will have to be (a) oriented to the HACCP systems, (b) focused toward new priorities and (c) trained in procedures to verify the effectiveness of monitoring procedures. Store or corporate procedural manuals will have to be modified to incorporate appropriate aspects of the HACCP systems. Meanwhile supplemental sheets will have to be issued.

During verification visits, quality control staff should be alert for: (a) failures to monitor effectively a critical control point or to take appropriate corrective actions; (b) falsification of monitoring records; (c) lack of discipline in monitoring and verifying by store personnel; (d) improper corrective actions when monitoring detects that the critical limits are not attained; (e) modification of either recipes or procedures that circumvent control, monitoring or corrective actions; (f) previously unidentified hazards; (g) additional or omitted critical control points that can be effectively monitored; and (h) new ingredients, modified recipes, procedures or equipment that may affect food safety. Upon detection of the latter (h), procedures, or equipment, HACCP systems should be reviewed and revised as necessary. Regulatory agencies may observe further deficiencies in either the systems or its implementation during HACCP plan reviews, inspections or verification visits. If so, HACCP systems will require further adjustment.

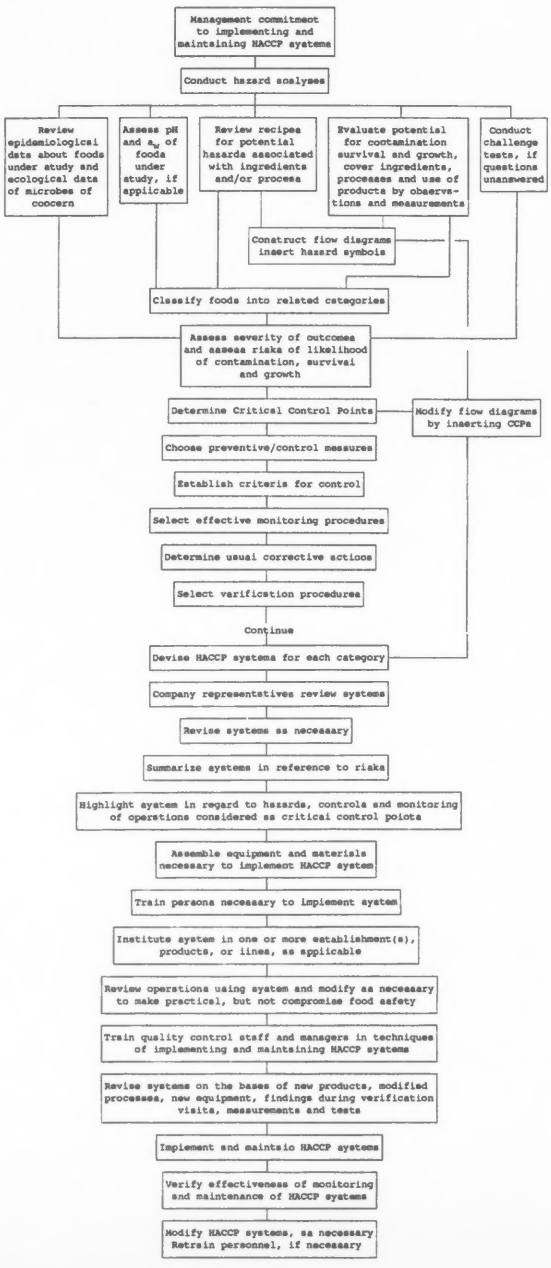
Regulatory Agency Actions. For approximately a decade, some state or local regulatory agencies have experimented with or utilized a HACCP approach (*16*). Several of them have switched from traditional sanitation inspections to critical item focused inspections. Some have conducted hazard analyses of foods of concern because of their frequent involvement as vehicles of foodborne diseases (*6,7,8,9,10*). Others (*22*) have conducted hazard analyses and focused on verification of critical control points based on factors that contribute to foodborne outbreaks (*1,2,19,32,34*). Furthermore, the Food and Drug Administration (FDA) in cooperation with some state and local jurisdictions have demonstrated by field trials that HACCP is a viable and practical option to improve food safety (*21*).

The Commissioner of the Food and Drug Administration has stated that "...application of hazard analysis critical control point (HACCP) principles at retail is the best available system for assuring food safety..." (*21*). The new FDA food code (*21*) for retail operations endorses it and recommends its implementation and allows variance from requirements if approved HACCP systems are implemented and maintained. For example, it states that..."FDA is recommending the implementation of HACCP in food establishments because it is a system of preventive controls that is the most effective and efficient way to assure that food products are safe. A HACCP system will emphasize the industry's role in continuous problem solving and prevention rather than relying solely on periodic facility inspections by regulatory agencies...A HACCP system allows regulatory agencies to more comprehensively determine an establishment's current and past conditions...Traditional inspection is relatively resource-intensive and inefficient and is reactive rather than preventive compared to the HACCP approach for assuring food safety...FDA believes that HACCP concepts have matured to the point at which they can be formally implemented for all food products on an industry-wide basis. HACCP is a systematic approach to food safety which will dramatically improve the level of

food safety...An effective national food safety program from food production to consumer is enhanced by the implementation of HACCP. Implementation of HACCP programs by the establishments will profoundly enhance their role in the protection of public health beyond the traditional emphasis on facility and equipment design and maintenance and adherence to the principles of sanitation, good manufacturing and food preparation practices." These quotes show considerable progress of the FDA from past positions, and the need for training state and local health and regulatory agency and food industry personnel so that they reach the same conclusions.

Under the 1993 Food Code, food processing operations at retail food establishments (e.g., reduced oxygen packaging, curing and smoking) must be done according to an approved HACCP plan. Additionally, establishments can seek a variance from the requirements of the Code by submitting a HACCP plan for approval. Such plans must include flow diagrams, product formulations, training proposals, corrective actions that will be used, and verification activities. The plans must contain sufficient detail to allow the regulator to fully understand the operations and intended controls.

Figure 1. *Activities for developing HACCP systems for foodservice operations.*



Duties of the person in charge that are specified as HACCP-related include verifying: (a) employees' handwashing; (b) employees' evaluation of foods upon receipt; (c) employees' routine monitoring of food temperatures after cooking; (d) employees' routine monitoring of food temperatures during cooling; (e) that consumers are informed that raw or partially cooked foods of animal origin may cause foodborne illness; and (f) employees' monitoring of solution temperature and exposure time for hot water sanitizing and concentration, pH, temperature, and exposure time for chemical sanitizing of equipment and utensils during cleaning.

Based on the risks of foodborne illnesses inherent to the food operation, during inspections and upon request, the person in charge is required to demonstrate to the regulatory authority knowledge of foodborne disease prevention, application of the hazard analysis critical control point principles, and requirements of the Code. This dictates training in these subjects.

According to FDA guidelines which are annexed to the Food Code (FDA, 1993), the field orientation of sanitarians and inspectors should include at least one full HACCP inspection to acquaint them with sequential food operations. The inspector should be able to demonstrate proficiency with gathering information about the process, including accurate diagraming of food flows and determination of critical control points and their critical limits. The HACCP training exercise should include defining practical monitoring at critical control points, recordkeeping, actions to take when critical limits are not met, and preparation of a comprehensive report of the exercise. The training officer should critique this report.

According to FDA (1993) guidelines, "inspections" or official verifications of establishments operating under HACCP plans include a review of specifics of the plan. Foods that have been more frequently implicated in foodborne illness, those prepared in large volumes, and those requiring manual assembly prior to service should receive high priority for review. Critical limits to be measured or sampled during the visit include food temperatures, pH, water activity, and sanitizer concentrations in reference to temperatures and times at which pathogen are killed or their growth is limited. The verification should include whether critical control points are monitored at a frequency that ensures control.

FUTURE

To predict the future is speculative. Many seemingly unrelated and sometimes unpredictable events influence outcomes, particularly of actions that persons or companies take. It may take a long time for some of these predictions to become reality. A few generations of program administrators will probably pass before all of them will occur. Implementation of the HACCP approach to food safety has already endured a 25 to 30-year lag period since the concept evolved and was initially applied.

HACCP systems for at least potentially hazardous foods will become commonplace because of actions by that portion of the food industry that want to present high-quality products to their customers or want to minimize risks of their products causing foodborne illness or being subject to recalls and associated adverse publicity. In countries that demand or desire a high level of food safety, HACCP systems for potentially hazardous foods will become mandatory by law or regulation. Requirements of imports will demand statements that foods have been produced, processed and shipped under the protection of officially verified HACCP systems. If it is not a national policy, requirement for HACCP systems will be made by certain States or Provinces or even by certain progressive local jurisdictions. Recommendations to this effect have already been made by working groups and expert committees (*17,33*).

Hazard (e.g., microbiological) modeling will be an aid in hazard analysis. Computer software for this purpose is already available from the U.S. Department of Agriculture and the Institute of Food Research (U.K.). Computer programs will become available to guide those interested in developing HACCP systems. (At this time at least one such program is available from Campden Food and Drink Research Association.)

Hazard analyses will be conducted of ethnic foods in developing countries, and on these bases, priorities will be set for regulatory and educational activities. Food safety programs will shift from emphasis on aesthetics and items of minor sanitary significance to the operations foods undergo. Education will emphasize practical solutions to problems associated with contamination, survival and growth of foodborne pathogens in the foods processed in cottage industries, prepared and displayed by street and small shop vendors, and the public. Initial activities of this sort have already been done (*11,12,14,15,24,27,35,37*), but much more needs to be done. The findings should be used to change program focus and to implement applicable food safety activities.

Monitoring will become more technically sophisticated even at the retail level. For temperature monitoring, for example, thermocouple probes will be inserted into foods and information such as doneness or lack of compliance with the criteria set for critical control points will be signaled and/or recorded. In some cases the measurements will be recorded, saved and printed out on request at the site or at corporate headquarters. The data will become part of HACCP records available for verification. Technology to implement this is available and will become cheaper as its demand increases. Each establishment or chain will have verification forms for use at various work stations, by managers, and by quality control staff. As time goes by these will become automated and saved on computer disks for verification purposes. Training will be an essential element of implementation of HACCP systems. The training will need to be designed for (a) persons who will conduct HACCP evaluations and who will set-up the HACCP system, (b) persons who prepare and process foods at critical operations, (c) persons who monitor critical control points, (d) persons who supervise operations involving critical control points, (e) persons who verify critical control points, and (f) persons who administer food safety, food quality assurance and food regulatory activities (*4*). The training programs for persons who monitor critical control points will lead to certification, which will become mandatory in some jurisdictions. Such training will be sponsored by food industry associations, professional organizations and State/Provincial or national food regulatory or health promotional agencies.

Purchasers at the retail level will specify that processors have verified HACCP systems. Large retail companies or chains with quality control staff will verify processing operations with their staff; others will require evidence that critical control points are monitored effectively. This may not entirely replace end product specifications, but these will provide only partial evidence of verification and not be the primary food safety criterion; a HACCP plan will provide the focus. Actions of this sort by some food chains are already taking place.

These actions by purchasers and regulatory agencies will create a degree of confusion and non-uniformity of inspections and training. As frustration builds, action will be taken to put all available HACCP systems with identification of critical control points, monitoring procedures and verification approaches in computer networks. This may be done either by appropriate regulatory agencies at State/Provincial and national levels and/or by food industry associations or perhaps by an entrepreneur. This will allow a company to distribute elsewhere its HACCP systems to those who use and regulate it. This will result in the uniformity that the food industry has longed for. The networks will link all communities in which a food chain has stores. Approval will be done by either a centralized agency or at the community or State at which the company has its headquarters. In the later case, those giving approval will be trained and certified by a centralized agency. Systems for all food groups for any food chain or processor can be called up by the computer at any location linked to the network. Inspectors will be guided on what to look for and questions to ask to verify food safety for the item and place under investigation.

Such a network will expand nationwide if it does not start at that level. International agencies will sponsor working groups to standardize the networks. They may even establish computer networks of their own to distribute the systems to all countries having stores of food chains or receiving foods from a processor. This will at least be a recommendation of some working groups.

Such actions will make a dynamic impact on prevention of foodborne illness. "Safe foods for all through the HACCP approach," or words to that effect, will become an internationally used slogan.

Surveillance of foodborne disease will intensify and upon detection of outbreaks, HACCP systems will be established or modified. Other places processing or preparing the same foods or having similar operations, will be alerted and actions taken to ensure the implementation or readjustment of HACCP systems. Summary data will include incidence of foodborne disease cases and outbreaks, prevalence of vehicles, and relative risks of factors that contributed to the causation of the outbreaks. Regulatory, training and education activities will focus on epidemiological data and be revised based on contemporary events and food processing and preparation practices.

The HACCP concept has come out of the lag phase and is in a phase of rapid employment. The future will record that it replaced traditional approaches such as inspections, health examinations, and end product testing. HACCP is the future of food safety. The sooner that all involved with food production, processing, distribution, storage, marketing and preparation of foods learn this, the sooner that foodborne diseases will disappear and only become an interesting note in history books and a reminder that a HACCP system was either improperly designed, implemented or maintained.

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Relevance of *Escherichia coli* O157:H7 to the Dairy Industry

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INTRODUCTION

The food and dairy industry in the U.S. provides the safest food supply in the world. Occasionally, however, an outbreak of foodborne illness is of such magnitude or consequence that concern about food safety is heightened. This can result in media attention that blemishes the image of food safety in one or more commodity areas or for the food industry in general. Consumers are very aware of some pathogens, such as *Salmonella*, which is frequently associated with foodborne illness from consuming poultry and dairy products. In 1993, media focus on a large outbreak of foodborne illness from *Escherichia coli* O157:H7-contaminated hamburgers implicated dairy cattle as the source of the contamination (*3*). Undercooked ground beef is frequently implicated as the source of *E. coli* O157:H7 but other food products, including raw milk, apple cider, water and mayonnaise, have also been linked to illnesses from this pathogen (*27,30,32,35*).

To protect the image of wholesomeness and safety of dairy products, the dairy industry must exhibit the same respect for *E. coli* O157:H7 as given other pathogenic microorganisms. This pathogen poses similar food safety considerations, e.g., appropriate plant and personnel sanitation procedures, temperature considerations, and post-pasteurization controls, but does have some unique characteristics that suggest special considerations. This organism can survive in products with pH as low as 3.7 (*41*). Therefore, fermented products with no additional heat processing could pose a risk.

Familiarization with the characteristics of the organism and sources of contamination provides the industry with the power to implement appropriate safety measures. This paper addresses the characteristics of this pathogen, including incidence and characteristics of the associated illness, implications of this pathogen to the dairy industry, and precautions the dairy industry may use to avoid contamination of processed products with this pathogen.

CHARACTERISTICS OF *ESCHERICHIA COLI* O157:H7

There are many types of *E. coli*, most of which are harmless or may provide benefits to the host. As natural inhabitants of human and animal intestinal tract, many of these organisms function to suppress growth of harmful bacteria. They may also synthesize vitamins necessary for growth and health of the body. Of the 176 serogroups identified in the last 50 years, approximately 60 are recognized as pathogenic organisms, causing intestinal diseases in man or animals (*40*).

The pathogenic strains of *E. coli* may be categorized, generally, as enteropathogenic *E. coli*. There are several subclasses based on the type of illness or mode by which the illness may be incurred. These subclasses include enterotoxigenic, enteropathogenic, enteroinvasive, and enterohemorrhagic (*23*). *Escherichia coli* O157:H7 is an enterohemorrhagic *E. coli*. The toxin produced by this organism is a verotoxin, or shiga-like toxin, and causes severe damage to the intestinal lining (*30*). The infectious dose is not known (*20*), but is estimated to be similar to *Shigella*, requiring ten or fewer organisms per gram of food. The infectious dose for children is low (*32*), possibly as few as one to four organisms/g can cause illness (*13*).

The most common vehicle of *E. coli* O157:H7 is contaminated foods. Food sources linked to illnesses from this pathogen include, but are not limited to, ground beef, raw milk, water, apple cider, and mayonnaise (*27,30,32,35*). Person-to-person transmission of the organism also occurs through inadequate hygiene (*20,30*). Aerosol transfer, as from coughing or sneezing, is not a means by which the organism will spread (*40*).

The infection resulting from ingestion of *E. coli* O157:H7 causes severe abdominal cramps and watery diarrhea that may become bloody (*20,26*). Vomiting and nausea, with or without a low-grade fever, may result as the colon wall is inflamed where bacteria attach. Hemorrhagic colitis is usually self-limiting in healthy adults and recovery usually occurs within four to ten days (*20,25,26*). Children, elderly adults or immunocompromised individuals are more susceptible. Hemorrhagic colitis can be extremely severe and as many as 50% of patients testing positive for *E. coli* O157:H7 have been hospitalized (*26*).

The infection may develop into a more severe illness, hemolytic uremic syndrome (HUS), in two to 15% of the confirmed cases in children. This syndrome begins three to four days after contaminated food is consumed, lasting eight to ten days (*20*). Symptoms include acute abdominal cramps,

bloody diarrhea and hemolytic anemia, a low-grade fever, and urinary tract infection. This may lead to renal failure and, potentially, permanent loss of kidney function. Hospitalization is required and dialysis may be necessary for recovery. HUS is the leading cause of acute kidney failure in children and the elderly. Extreme cases of HUS may progress to thrombotic thrombocytopenic purpura (TTP) in adults, especially the elderly. TTP is a central nervous system disease that causes seizures, coma and blood clots in the brain (*20*). The death rate from *E. coli* O157:H7 is three to five percent (*25*). Incidence of death in the elderly from TTP is reported to be as high as 50% of confirmed cases (*20*).

The symptoms of this infection are not widely recognized by the general population or medical doctors so the infection often goes undetected. Infection from *E. coli* O157:H7 is diagnosed by culturing stool samples but, generally, the diarrhea from this infection resolves itself within a few days without specific treatment and the stool is not tested. Until recently, no national surveillance system existed and doctors were not familiar with the symptoms of the infection (*8,26*); therefore stool cultures were not requested (*8,25,31*). The stool culture test for *E. coli* O157:H7 is not routine in clinical laboratories and the pathogen would not be detected by a standard culture test (*6,8,21,31*). Until this year, only 11 states required reporting of *E. coli* O157:H7 to their health departments (*8,16,31*) but, in July 1993, the Association of State Epidemiologists voted to make *E. coli* O157:H7 a reportable disease (*15*). Doctors should now include *E. coli* O157:H7 in the differential diagnosis when bloody diarrhea is observed (26). The magnitude of infections from this pathogen in the U.S. is not known (*26*) but, as national reporting is initiated, we may realize a more accurate picture.

HISTORICAL PERSPECTIVE OF *E. COLI* O157:H7 INCIDENCE

The importance of *E. coli* O157:H7 as a pathogen has been increasingly realized over the past decade. *Escherichia coli* O157:H7 was first recognized as a pathogen in 1982 (*20,32*) when three foodborne illness outbreaks, with hemorrhagic colitis as a common symptom, were linked to this organism (*36*). It is now recognized as a major cause of intestinal diarrheal illness in the U.S. From 1982 to 1992, 16 deaths in the U.S. were associated with *E. coli* O157:H7 (*20*). Reports of incidence of illness associated with this disease have been increasing (*15,38*). This increase may reflect an increased interest and knowledge of the organism leading to specific testing for the organism in cases of diarrheal illness, an availability of commercial tests for the organism, or it may reflect a real increase in incidence and geographic scope (*18,38*).

Until recently, incidence of *E. coli* O157:H7 was reported most extensively in summer months — June through August — and was most common in the Northern states and Canada (*13,15,16,26*). *Escherichia coli* O157:H7 has been reported as the third most common pathogen in Northern states (second in Maine), after *Salmonella* and *Campylobacter* (*16*). *Shigella* was reported as the third most common pathogen in the South, moving *E. coli* O157:H7 into fourth place (*16,26*). These regional and seasonal differences may not be as limiting as once thought, however, but may reflect biases from culturing and reporting of the organism. Reports of *E. coli* O157:H7-linked illnesses are now increasing in other states.

In the past year, there have been many reports of *E. coli* O157:H7 infections (*15*). The most notorious was the outbreak reported in the Pacific Northwest in January, 1993. This outbreak resulted in over 500 individuals suffering from the pathogen including 123 suffering from serious hemorrhagic colitis, at least 35 cases of HUS, and five deaths (*5,6,37*). Eighty-eight percent of the illnesses were traced to consumption of undercooked hamburgers from multiple outlets of a single fast-food restaurant chain (*37*). Nearly 12% resulted from secondary person-to-person contamination. The organism was spread from contaminated individuals to healthy persons through poor hygienic conditions over time because the organism can shed in feces for two or more weeks (*5*). The median age of this outbreak was 7.5 years; the oldest person meeting the case description was 74 years old (*37*).

Raw or undercooked hamburger meat is frequently the source of this pathogen. In this case, the company policy, as mandated by the parent company, required cooking the hamburgers to an FDA-recommended minimum internal temperature of 140°F (*33*). This standard was based on FDA recommendations. In the state of Washington, where the outbreak was first recognized, the required minimum internal temperature for cooked hamburgers had been increased to 155°F, as recommended by American Meat Institute in 1989, because of concern about the heat resistance of this pathogen (*33*).

Washington State is one of only 11 states that monitors and reports incidence of *E. coli* O157:H7 to state health departments (*31*). The state began monitoring incidences when several outbreaks had occurred in the early 1980s. Recognition of the outbreak occurred in Washington State when a high incidence of HUS was reported in December and January (*22*). More than 450 people suffered from the infection in Washington State. Three other states, California, Nevada and Idaho, reported synchronous outbreaks when an increased number of cases of diarrheal illness were reported in certain hospitals (*37*).

While it is recognized that the infection was contracted by consuming contaminated undercooked hamburger from a fast food restaurant chain, the original source of the contamination will probably never be known (*5,16*). The source of the contaminated meat served in the fast-food stores was traced to 11 lots of hamburger patties produced in a single day in a USDA-inspected meat processing plant in California (*5,6,22*). Contamination was <10 organisms/g in most samples cultured but occasional samples yielded recovery of hundreds of organisms/g (*5*). Five slaughter plants in the U.S. and one from Canada were supplied the beef for that production period (*6,22*). Finding evidence to identify the direct source of the contamination seems unlikely.

Many other outbreaks of *E. coli* O157:H7 have been reported in 1993, although none were as large as the one in the Pacific Northwest. Four other individuals have died from HUS this year. Most of the confirmed *E. coli* O157:H7 cases have been linked to undercooked ground beef but other sources have included contaminated mayonnaise and raw milk. Of 89 potential cases of illness associated with a steak

house restaurant chain in Oregon, at least 25 have been confirmed as *E. coli* O157:H7 infections. These cases have been linked to contaminated mayonnaise but it appears that the mayonnaise was contaminated through contact with raw meat during transportation (*6,14*).

In a separate incident in Oregon, six cases of illness related to *E. coli* O157:H7 were reported (*7,29*). Two persons were hospitalized but no severe kidney complications resulted. All infected individuals had consumed raw milk which was subsequently recalled. The raw milk had been supplied by a single dairy to health food stores or the health food section of large supermarkets in the Portland area (*7*). Oregon has nine dairies that distribute raw milk (*34*). Oregon Food and Dairy Division has advised consumers to consume only pasteurized milk (*7*).

RELATIONSHIP OF *E. COLI* O157:H7 AND THE DAIRY INDUSTRY

The dairy industry is implicated in *E. coli* O157:H7 risk because dairy cattle may harbor the organism. The pathogen has been found in only a small percentage of raw milk (*40*) but at least one outbreak of the illness from consumption of raw milk has already occurred (*20,29*). Milk tankers and drivers, contaminated with fecal material on the dairy farm, can carry the pathogen back to the dairy plant. Dairy cattle are also a major source of ground beef, which has been implicated in many outbreaks of illness (*40*). Fortunately, the organism and toxin are destroyed by adequate cooking or pasteurization (*20,40*). The heat lethality is similar to *Salmonella* (*20*).

There are certain characteristics of this pathogen that have great significance to the dairy industry. This pathogen can survive refrigeration temperatures and, unlike most pathogens, can grow slowly at 44°F (*20*). The organism can survive at ultra low freezing temperatures as low as -112°F. Storage for nine months at -4°F does not reduce a population of *E. coli* O157:H7. Thus, the organism can survive very well in refrigerated raw milk or meat, potentially increasing slowly in bacterial numbers, and frozen storage will not destroy the organisms. Refrigerated dairy products contaminated after the pasteurization step can support survival and growth of this pathogen.

In addition to surviving very well in refrigerated conditions, this pathogen can also survive in products with low pH. High acid conditions, as in fermented dairy products, may not offer adequate protection (*16*). *Escherichia coli* O157:H7 can survive pH as low as 3.7 (*9,17,41*) in apple cider. This was recognized after an outbreak in Maine in 1991 when unwashed apples, which had fallen in a pasture, were pressed for unpasteurized apple cider (*9,21*). Fresh pressed unpasteurized apple cider, pH 3.7, inoculated with *E. coli* O157:H7, harbored organisms for as long as 31 days when stored at 46.4°F (*9,17,41*). If consumed during the expected shelf-life of two to three weeks, the pathogen would still be viable. Sodium benzoate, frequently used as a preservative in apple cider, was an effective antimicrobial at 0.1%, preventing growth in refrigerated cider within seven days but potassium sorbate at 0.1% was not effective (*9,17,41*). In combination, the two preservatives were very effective against the pathogen. The organism can grow on acidified beef products and in mayonnaise-based salads (*1,12*). Acetic acid is more lethal than lactic and citric acids at pH 5.

It is well documented that the growth of pathogens such as Salmonellae and *Staphylococcus aureus* is retarded in fermented milk products. This antagonistic action is caused by many factors in addition to acid production since repressed growth is observed when the pH is maintained at near neutral values. These factors can include the production of hydrogen peroxide, bacteriocins and other factors (*24*). Therefore, *E. coli* O157:H7 may not survive as well in fermented dairy products compared to apple cider. Research is needed in this area.

Most outbreaks have been related to cattle products, including ground beef and raw milk. Dairy cattle constitute 17% of the commercial meat supply and most dairy beef is used in producing ground beef. Contamination of the muscle occurs during slaughter if any fecal material comes in contact with the meat. During the grinding process, the surface bacteria are distributed throughout the product, whereas on intact meat cuts, the organisms are restricted to the surface (*40*). In steaks, the organism on the surface is killed during cooking; internal temperature is not critical (*33*). In ground meat, however, the internal temperature must be adequate to kill the organism. Thus, a ground hamburger patty cooked to 140°F may still have viable cells in the interior of the burger.

Whether the ground beef comes from a dairy or beef source seems to be of little relevance. Dairy cattle have been implicated as a reservoir for the organism because many reports have indicated that dairy cows harbor *E. coli* O157:H7 serotype more often than other in bovines. Conflicting reports are now emerging as more research is conducted on animals that harbor the organism. Dairy herds are not found to harbor the pathogen any more than beef herds (*16,19*). In a study of 60 dairy herds in Washington State, five of 60 herds (8.3%) and only ten of 3,750 fecal samples (0.28%) collected from the dairy cattle were positive for *E. coli* O157:H7 (*28*). As more thorough testing of beef cattle is initiated, it seems that beef cattle harbor the organism more than originally thought. Sixteen percent (4/25) of cow-calf beef herds and ten of 1,412 (0.71%) fecal samples were positive for *E. coli* O157:H7. Feedlot cattle shed the organism similar to dairy cattle (0.33%) (*28*). While dairy calves are more likely to harbor the organism than adult cows, the prevalence is still low (*33*). Preliminary research at The University of Georgia does indicate a higher incidence in dairy calves than previously reported (*12*). Five of 12 "control" herds which had previously been tested as *E. coli* O157:H7-free were testing positive for the pathogen on a second evaluation. Heifers seem to be at greatest risk (*16*) but the National Animal Health Monitoring System, which tested 1,068 dairies across the U.S., found less than 1% of heifer calves contaminated with the organism. One study suggested that feeding whole cottonseed to cattle was negatively associated with *E. coli* O157:H7 incidence (*16,28*). Positive risk factors included small herd size, computerized feeding, pooled samples (fecal slurry, bulk milk samples, milk fillers), manure on pasture, and manure bedding (*28*).

It is difficult to identify cows harboring this pathogen. The organism, which resides in the intestines of healthy animals, does not commonly cause illness in cattle. Those

cows testing positive for *E. coli* O157:H7 at one test date will probably have shed the organism before they can be retested, thus appearing negative on a second test (*11*). There is no connection between *E. coli* O157:H7 and mastitis. Most strains of *E. coli* that cause mastitis do not cause human illness (*40*). Mack Graves, of Coleman Natural Meats, Inc., is promoting a link between medications and increased incidence of *E. coli*-related illnesses (*4*). The relationship is based on the argument that prolonged use of antibiotics causes increased antibiotic resistance in bacteria. That resistance in intestinal bacteria of animals is transferred to humans when they eat meat. Therefore, bacteria are mutating and becoming more resistant to antibiotics, resulting in an increase in virulent strains such as *E. coli* O157:H7. There is no evidence to support this connection but the consuming public may be influenced by these arguments (*2,18*).

The established tolerance level for coliforms, as indicator organisms of fecal contamination in pasteurized milk, is ten colonies/g. If one coliform is detected, further investigation takes place to isolate any potential problems. This test does not demonstrate that *E. coli* O157:H7 is present. In fact, it is difficult to detect. The traditional tests for pathogenic *E. coli* do not detect *E. coli* O157:H7 because it responds differently on certain assays than other *E. coli* serotypes (*33*). The traditional tests require incubation at 44.5°C for detection of *E. coli*. However, maximum growth of *E. coli* O157:H7 occurs at 43°C. Therefore, incubating samples at the temperature suggested for *E. coli* will not permit growth of this serotype. The MUG test, which is used to detect glucoronidase activity and used to detect most *E. coli*, misses *E. coli* O157:H7. Also, most *E. coli* are sorbitol positive but *E. coli* O157:H7 is sorbitol negative (*33*).

Current methods for inspecting beef carcasses are organoleptic in nature. Inspectors check each carcass for fecal, digested food or milk contamination by evaluating appearance, touch or smell (*33*). Any such contamination is trimmed off. Specific identification of contamination by *E. coli* O157:H7 is not possible by these methods. The standard microbial assay for *E. coli* O157:H7 identification can confirm a negative sample within 24 h but requires six days to confirm a positive. Rapid methods still require an enrichment test and, though less labor intensive, require several days before positive confirmation could be made (*39*). Recently, a rapid method using direct epifluorescent filter technique with antibody probe technology for identification and enumeration of *E. coli* O157:H7 was developed (*39*). This methodology yields results in 1 h without a growth or enrichment step in milk and apple juice for pure *E. coli* O157:H7 culture and in milk with mixed microbial population. This could be a real asset in detecting *E. coli* O157:H7 infected samples.

PRECAUTIONS

So what can be done to protect against *E. coli* O157:H7 contamination in food and dairy products? Implementation of a good HACCP program is always beneficial in protecting the dairy plant and product from any pathogen contamination. Clean handling of raw products is important for reducing opportunities of contamination. However, the most critical step is an adequate heating process. Pasteurization will destroy the organism in milk (*40*). Raw milk should never be consumed (*20,29*).

Prevention of cross-contamination or post-pasteurization contamination is critical in protecting food products against *E. coli* O157:H7. Many outbreaks have occurred when poor hygienic conditions were in place or raw product came in contact with final product. Instruction of personnel on the importance of good personal hygiene is very important in preventing transfer of the pathogen from person-to-person or person-to-product. Complete handwashing after handling raw milk or after use of bathroom facilities is required. Boot washing is very critical when moving from the raw milk receiving into the production facility. Obviously, perishable raw products must be quickly refrigerated to control growth of any organisms that may be present. This will not destroy organisms that are present, however.

Action is being taken to prevent future outbreaks of *E. coli* O157:H7. Improving government interaction with the public and labor groups is a high priority to FSIS (*33*). A two-track approach is being developed to reduce risk from *E. coli* O157:H7 and other pathogens. Aggressive research is being funded to determine causes, actual incidence in different bovine and animal species, means of cross-contamination and foodhandling errors, and improved methodologies for detection (*10*). FSIS is dedicated to supporting a strong inspection system and research to assure the safest food supply possible.

CONCLUSIONS

A respect for *E. coli* O157:H7 is important. The association of this organism with dairy cattle and raw milk indicate there is an opportunity for contamination of processed dairy products if inadequate precautions are taken. The organism is destroyed by pasteurization but can survive low pH conditions. Post-pasteurization contamination is always a vehicle for transmission of the organism into the food supply. The dairy industry can protect its image by maintaining and constantly improving food safety goals in the plant.

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Updates & Affiliate News

82nd IAMFES Annual Meeting Call for Papers

This is an invitation to all IAMFES members to submit a paper for presentation at the 82nd Annual Meeting, July 30-August 2, 1995, in Pittsburgh, PA. Abstract forms were published in the September and October issues of *Dairy, Food and Environmental Sanitation* and the *Journal of Food Protection.*

To receive more information on submitting a paper for presentation, contact IAMFES at (800) 369-6337 or (515) 276-3344.

Attention IAMFES Members

Announcing the Availability of Advertising Space in the 1995-1996 Annual Membership Directory

From now until January 10, 1995, IAMFES will be accepting advertising orders for its 1994-95 Annual Membership Directory.

Once again, the Directory will feature Commercial Listing of industry suppliers, in addition to listings of IAMFES Members, Associations and Government Agencies.

To reserve your company's advertisement or Commercial Listing in this important resource, call your Advertising Representative at: (800) 369-6337 or (515) 276-3344.

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CADMS Sanitarian of the Year

Presented September 17, 1994 at the Annual Meeting of CADMS, Stockton, California

Each year the California Association of Dairy and Milk Sonitorions selects a member from the Californio industry, ocademic or the regulatory community who through their coreer hos provided leodership to the doiry foods industry and to CADMS.

This year's recipient has served the dairy industry and the regulotory community in many capacities. First, as one who worked in the processing industry os o quolity control supervisor for Safeway ond loter ot Californio Cooperotive Creamery.

After 13 plus yeors in the industry, our awordee joined the California Department of Food and Agriculture as a Dairy Foods Specialist serving the industry in northern Californio. Later, the owordee was appointed to a position in Sacramento of coordinoting the vorious regulatory progroms of the Milk ond Doiry Foods Control Bronch of the California Department of Food and Agriculture.

A 1961 graduate of UC Davis with highest honors, our awardee has taken extensive additional training in regulotory work to better serve the needs of the doiry industry.

Because of our owordee's extensive knowledge and communication skills, he is called upon by state and national regulatory and industry associations to give talks and testimony on "how we do it in California."

In the last several years he has been ot the front of the notionol leodership efforts on the implementotion of Appendix N of the Posteurized Milk Ordinance. He hos been faithful in this work and saw that the original intent of the IMS Conference was followed, although we all recognize that it was not o simple tosk.

Our awardee has been exceptional in his support of educational octivities and in particular of the CADMS educotional conferences, encouraging and supporting attendance by as many industry and regulatory people as possible. He has even been known to give o talk or two ot these meetings, with very little arm twisting. His dairy industry colleagues olwoys compliment his talks, and are omozed ot his commond of the information. A tribute to his efforts to be on top of the issues.

He is an exceptionally fine professional whose efforts have allowed the dairy industry to continue to provide the consumer with the safest of milk and dairy foods. We are pleased thot **Leon**, or **Lee H. Jensen** is working in Californio for us ond the public. And, I should remark, he hos o number of yeors yet to continue these contributions—which is great news for all. No retirement to Sonoma, yet.

Join me in congratulating Lee on this most deserved recognition.

HAZCON-Based Total Quality Management

Regulatory Inspection HACCP vs. Food Operation Self-Control HACCP — Part 2*

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Principle No. 6

Principle No. 6, **ESTABLISH EFFECTIVE RECORDKEEPING PROCEDURES THAT DOCUMENT THE HACCP SYSTEM**, is misleading. The fundamental document for the operation of any business is the policies, procedures, and standards manual. All management schools teach their students to write operating manuals to control the company's processes. The documentation procedure that has been identified by the NACMCF is cumbersome, too lengthy, and virtually impossible for any line worker to understand. Actually, the recipe is the real control document for the line employee. Because regulators, as a rule, do not know how to cook or operate a process, they have created a form for their use that is useless to the processor. Regulators must be able to read the processor's five control documents. In addition, if regulators must be able to validate and certify processes as safe, it is questionable that there are currently any regulators who are qualified to validate recipes, as for example in The Escoffier Cook Book (2).

Principle No. 7

Principle No. 7 says to **ESTABLISH PROCEDURES FOR VERIFICATION THAT THE HACCP SYSTEM IS WORKING CORRECTLY**. Actually, this should say that the manager/owner should carry out this verification. Then, the regulator's job is not so much to verify what the employee is doing, but rather to verify that management is providing leadership and oversight so that the employees will continue to perform with zero defects the certified safe procedures they have been taught before being allowed on the line to do the process.

WHAT REGULATIONS MUST PROVIDE

Gaps in current government regulations are the basic cause of much of today's foodborne disease and injury. In the case of three forms of food processes, 1) milk, 2) high-acid food, and 3) sterilization, the hazards are identified and the regulations are sufficiently rigorous with process standards and limits that when followed, virtually zero liability costs are assured.

The same is true of the vast majority of the processes specified in USDA regulations. There is simply no indication of a problem when manufacturers follow, for instance, the sausage making or meat cooking rules. While there is some indication that some of these processes over-process the food (e.g., cooking chicken to 160°F with no time standard), they do assure the food's safety.

The need for HACCP then, is mostly for the growing and slaughtering steps and the final retail food preparation steps. In the case of retail food safety process standards, the FDA retail food codes have been grossly inaccurate in terms of hazard controls. Hazards are not accurately identified.

FOOD OPERATIONS HACCP SELF-CONTROL

Since training the government field auditors — especially those in retail food where there is no FDA control — will take years and permit thousands of additional consumer deaths, a better answer is needed. The starting point for any control system will be to empower the food science departments of state universities to become the educators and food processing authorities in order to help the food operations in their states to immediately implement/improve processes so that they are capable of zero liability costs.

The U.S. is a nation of states with individual rights. Therefore, the states should be given the responsibility of teaching their food operations how to control the hazards. Moreover, hazards will vary by locality. In Florida and along the U.S. coastlines, for instance, there are many seafood hazards. In the Midwest, hazards are predominantly meat and poultry based. Therefore, each region/state can emphasize the hazards that are most critical to its environment.

An excellent network already exists with the USDA Agricultural Extension Service, many of whose agents are highly trained in food science and nutrition. They are already on the government payroll and in the field, and are able to communicate HACCP to the food industry.

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*Continued from the October 1994 *Dairy, Food and Environmental Sanitation*, pages 592-595.

THE INDUSTRY SELF-CONTROL SYSTEM FOR FOOD SAFETY

The first component of the unit operations system for hazard control is the understanding that it is a part of the company's continuously evolving Total Quality Management (TQM) program. Processes change every day, as do supplies, personnel, environment, etc. HACCP must be implemented as part of the continuous quality improvement program in an organization. It is not a fixed set of rules that never gets changed in a unit. Each time someone changes a component, the process for producing a given product and the hazard controls must be reviewed. The basic cycle for continuous quality improvement is shown in Figure 2. The four steps in continuous quality improvement management cycle are a result of combining the old management principles of PLAN, ORGANIZE, DIRECT, CONTROL, with the Deming cycle of CHECK, ACT, PLAN, DO.

In principle, a company's quality improvement department is searching both in the factory, and from customers, for opportunities to improve the product. This is the CHECK step. Next, this information is used in the ACT step by the quality improvement department to review the written process documentation and to do the necessary research and development to create/improve process steps. In the PLAN step, this information is implemented in the organization by providing improved equipment and facilities, and by continuous training to improve performance of employees on the line. In the DO step, the process is performed again, product is produced with greater standardization than previously, but still without perfection, and improvement opportunities are identified for the next cycle.

Figure 3 shows the steps in a food operations self-control HACCP program.

Step 1: The HACCP-TQM project team is assembled. The team should gather a library of hazard and control knowledge, and find experts and consultants who can help identify hazards.

Step 2: The team describes the products, distribution, and intended consumer use by process category. Process categories include stew-like foods, roasted foods, canned foods, bakery items, etc.

Step 3: The team describes the system input-process-output and its processes. Figure 4 provides both a graphical and flow chart view of the input-process-output system.

Step 4: The team constructs flow process diagrams. They can take any form such as graphic, box, logic, or narrative. Actually, a computer program is a narrative flow process. When food that will be served raw needs to be "HACCP-ed", the team goes back to the supplier and makes sure that the supplier has a HACCP program whereby the supplier can certify that the pathogenic substances in the oysters, raw beef, etc. will be controlled to a safe level.

Step 5: If there are quality assurance policies, procedures, and standards for the process, the team assembles them. If there are no written procedures for this process, they must be written. It is not possible to instruct employees to do the process or to verify or validate a process if procedures are not written down.

Figure 2. *The basic cycle for continuous quality improvement.*

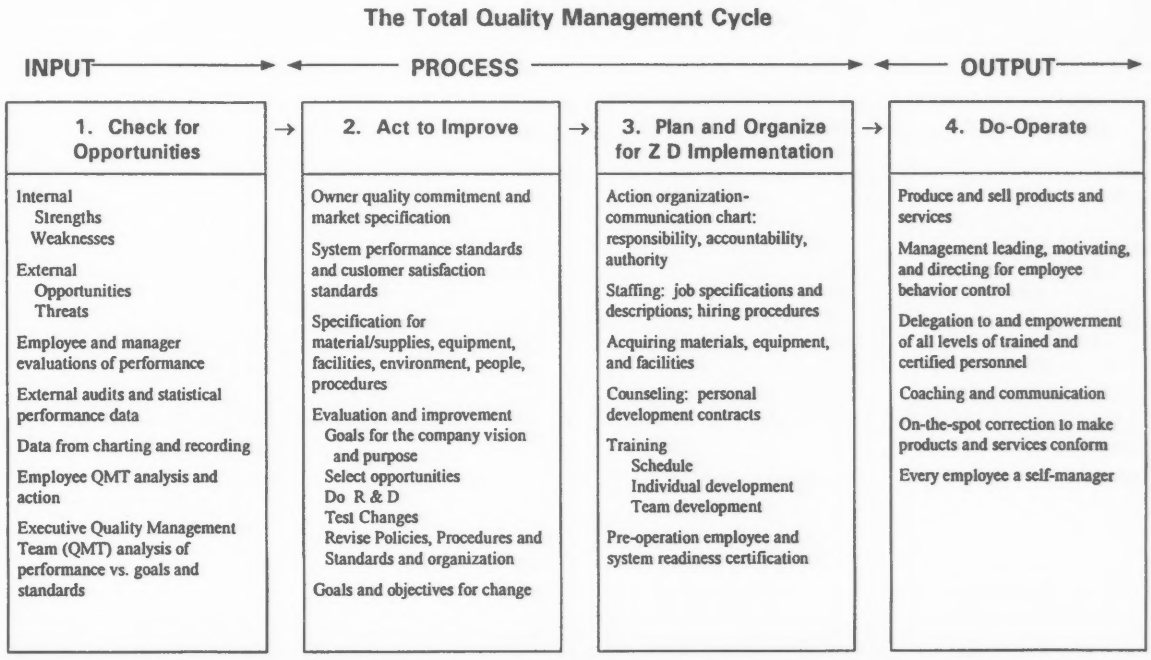


Figure 3. *Steps in a food operations self-control HACCP program.*

HITM LOGIC SEQUENCE FOR THE APPLICATION OF HACCP-TQM

1. **Assemble the HACCP-TQM project team.** Gather the hazard analysis and control library and knowledge base.

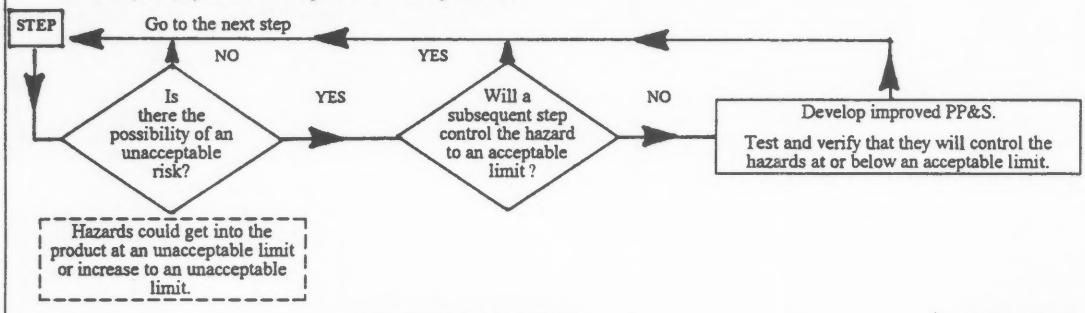
2. **Describe the products, distribution, and intended consumer use by process category.**

3. **Describe the system (INPUT-PROCESSES-OUTPUT) and its processes:** product processes, environment, facilities, equipment, source of supplies, personnel, customers.

4. **Construct process flow diagrams** (graphic, box, logic, narrative) from growing to consumption. Verify.

5. **If QA policies, procedures, and standards (PP&S) exist for the processes, assemble them.** If PP&S do not exist, have the HACCP TQM team draft them. The processes cannot be controlled without written procedures.

6. (Principle 1; Principle 2; Principle 3) **Analyze each step for biological, chemical, and physical hazards.** Identify acceptable and unacceptable hazard illness and injury threshold limits for hazards that could be in or get into the products. Do risk analysis. Identify critical process variable targets and limits to keep the process in control. Improve existing PP&S when necessary. (See also **PROCESS-PRODUCT RISK ANALYSIS FORM.**) Establish a defect prevention, Statistical Process Control (SPC) system for the processes and operation.



Hazard and Risk Analysis					Risk Control
Step	Hazards and their acceptable and unacceptable limits	FMEA / risk analysis and probability	Critical process variables	Critical process variable limits	QA PP&S; how to do the step with acceptable risk

7. (Principle 4) **Establish structured process measuring and control procedures** for process variables using SPC to keep each step in control and gather information for process improvement.

   If ≥ / ≤ _____
   then _____
   or else _____

8. (Principle 5) **Identify corrective action to be taken with the process and product** if critical process variables exceed critical hazard limits.

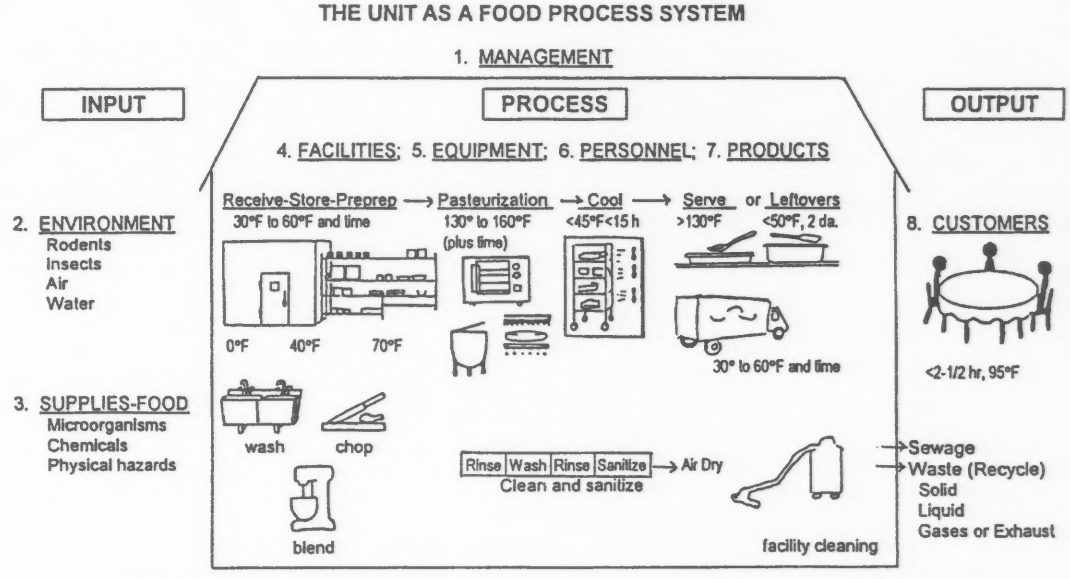
9. (Principle 6) **Assemble all material and write / revise the HACCP plan.** Write / revise checklists and data forms to improve the collection of performance data from employee monitoring and management observation for the SPC system.

10. (Principle 7) **Establish management oversight and verification procedures to assure that the process is operating according to PP&S.**

11. **Develop the organization chart, employee's jobs, and responsibilities for zero-defect capability.** Develop and conduct the employee hazard control training and mastery certification program. Assemble all resources.

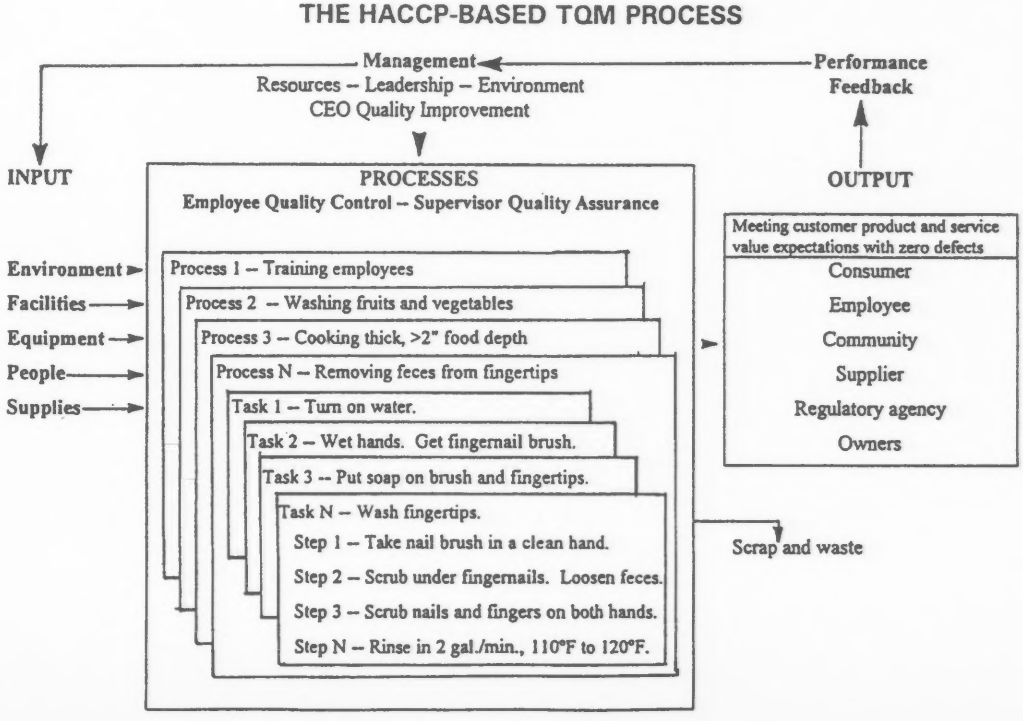
12. **Operate, check, measure, look for opportunities to reduce process variability and risk.** Plan and execute process and system improvements. Go to the next production cycle.

Figure 4. *A graphical and flow chart view of the input-process-output system.*



HAZARDS: Microorganisms [bacteria (vegetative cells and spores), viruses, parasites]; chemicals; hard foreign objects.

CONTROLS: Management involvement; hazard analysis and control; written procedures; employee training and empowerment; process measurement, control, and improvement; discipline and consequences.



Step 6: In an industry self-control HACCP program, Principles 1, 2, and 3 are combined because they must be done at the same time. Each step is analyzed for biological, chemical, and physical hazards. Acceptable and unacceptable hazard limits for illness and injury thresholds are identified. A risk analysis is performed. The critical process variable targets and safety control limits to keep the process in control are specified. Policies, procedures, and standards are improved if necessary. A defect prevention program is established, and Statistical Process Control (SPC) charts are put into place so that the process can be monitored. Using the SPC methods, the process can be continually improved, and this improvement is measured in terms of process capability index.

Step 7: Structured process measuring and control procedures are defined for each process variable using SPC to keep each step in control and gather information for process improvement.

Step 8: It is possible for the team to identify corrective action to be taken with the process and product if critical variables are exceeded.

Step 9: All materials are assembled. The HACCP plan is written, revised, and checked with management for management approval and endorsement in terms of financial support.

Step 10: Management oversight and verification are established to assure that the process is being performed according to the policies, procedures, and standards.

Step 11: Each employee is informed of his/her supervisor and then coached to help that employee develop zero-defect performance capability.

Step 12: Finally, the system operates, the process is continually monitored and measured by employees, who look for opportunities to improve the system and feed the information back through employee quality management teams and by the work of the quality improvement department in the food operation.

SUMMARY

This presentation has provided an overview of the problems with a regulatory inspection approach to hazard control. If the food provided to the U.S. consumer is to be safe, regulatory agencies must immediately change to an industry self-control approach. In this approach, before the owner is given a license to operate, he/she is tested for correct hazard and control knowledge. The owner must then certify that he/she knows that he/she is totally accountable and responsible for controlling the hazards in the food that is sold. Hazard control will function only when the buyer/customer demands that suppliers identify the level of hazards in the food and then is willing to only select suppliers who can accurately tell him/her the level of these pathogenic substances in the food. When owners lead and then train and empower employees to perform with zero defects, and state educational systems provide correct knowledge, the U.S. will not need government regulators, only government R & D. The U.S. will begin to have world-class quality food that is continually improving in terms of long-term health and pleasure for U.S. consumers and visitors from around the world.

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1. AT&T. 1984. Statistical Quality Control Handbook. Delmar Printing Company. Charlotte, NC.
2. Escoffier, A. 1969. The Escoffier Cook Book. Crown Publishers, Inc. NY.
3. Kane, V.E. 1989. Defect Prevention: Use of Simple Statistical Tools. Marcel Dekker, Inc. NY.
4. The National Advisory Committee on Microbiological Criteria for Foods (NACMCF). 1992. Hazard analysis and critical control point system. Intern. J. Food Microbiol. 16;1-23.
5. United States Department of Agriculture (USDA). 1994. National beef microbiology baseline data collection program: Steers and heifers (October 1992-September 1993). USDA. FSIS. Washington, DC.

Federal Register

Department of Health and Human Services

Food and Drug Administration

21 CFR Part 178

[Docket No. 90F-0036]

Indirect Food Additives: Adjuvants, Production Aids, and Sanitizers

Agency: Food and Drug Administration, HHS.

Action: Final rule.

Summary: The Food and Drug Administration (FDA) is amending the food additive regulations to provide for the safe use of boric acid as a stabilizer in ethylene-vinyl acetate-vinyl alcohol copolymers intended for use in contact with food. This action is in response to a petition filed by Nippon Synthetic Chemical Industry Co., Ltd.

Dates: Effective September 6, 1994; written objections by October 6, 1994.

Addresses: Submit written objections to the Dockets Management Branch (HFA-305), Food and Drug Administration, rm. 1-23, 12420 Parklawn Dr., Rockville, MD 20857.

For Further Information Contact: Hortense S. Macon, Center for Food Safety and Applied Nutrition (HFS-216), Food and Drug Administration, 200 C St. S.W., Washington, DC 20204, (202) 254-9500.

Supplementary Information: In a notice published in the Federal Register of February 28, 1990 (55 FR 7032), FDA announced that a petition (FAP OB4188) had been filed by Nippon Chemical Industry Co. Ltd., 9-6, Nozaki-Cho, Kita-Ku, Osaka, Japan. The petition proposed to amend the food additive regulations in §178.2010 *Antioxidants and/or stabilizers for polymers* (21 CFR 178.2010) to provide for the safe use of boric acid as a stabilizer in ethylene-vinyl acetate-vinyl alcohol copolymers intended for use in contact with food.

FDA has evaluated data in the petition and other relevant material. The agency concludes that the proposed additive use is safe, and that 21 CFR 178.2010 should be amended as set forth below.

In accordance with §171.1(h) [21 CFR 171.1(h)], the petition and the documents that FDA considered and relied upon in reaching its decision to approve the petition are available for inspection at the Center for Food Safety and Applied Nutrition by appointment with the information contact person listed above. As provided in 21 CFR 171.1(h), the agency will delete from the documents any materials that are not available for public disclosure before making the documents available for inspection.

The agency has carefully considered the potential enviromnental effects of this action. FDA has concluded that the action will not have a significant impact on the human environment, and that an enviromnental impact statement is not required. The agency's finding of no significant impact and the evidence supporting that finding, contained in an environmental assessment, may be seen in the Dockets Management Branch (address to the left) between 9 a.m. and 4 p.m., Monday through Friday.

Any person who will be adversely affected by this regulation may at any time on or before October 6, 1994, file with the Dockets Management Branch (address to the left) written objections thereto. Each objection shall be separately numbered, and each numbered objection shall specify with particularity the provisions of the regulation to which objection is made and the grounds for the objection. Each numbered objection on which a hearing is requested shall specifically so state. Failure to request a hearing for any particular objection shall constitute a waiver of the right to a hearing on that objection. Each numbered objection on which a hearing is requested shall include a detailed description and analysis of the specific factual information intended to be presented in support of the objection in the event that a hearing is held. Failure to include such a description and analysis for any particular objection shall constitute a waiver of the right to a hearing on the objection. Three copies of all documents shall be submitted and shall be identified with the docket number found in brackets in the heading of this document. Any objections received in response to the regulation may be seen in the Dockets Management Branch between 9 a.m. and 4 p.m., Monday through Friday.

List of Subjects in 21 CFR Part 178

Food additives, Food packaging.

Therefore, under the Federal Food, Drug, and Cosmetic Act and under authority delegated to the Commissioner of Food and Drugs and redelegated to the Director, Center for Food Safety and Applied Nutrition, 21 CFR part 178 is amended as follows:

Part 178 — Indirect Food Additives: Adjuvants, Production Aids, and Sanitizers

1. The authority citation for 21 CFR part 178 continues to read as follows:

Authority: Secs. 201, 402, 409, 721 of the Federal Food, Drug, and Cosmetic Act (21 U.S.C. 321, 342, 348, 379e).

2. Section 178.2010 is amended in the table in paragraph (b) by alphabetically adding a new entry under the headings "Substances" and "Limitations" to read as follows:

§178.2010 Antioxidants and/or stabilizers for polymers.

* * * * *

(b) * * *

Substances	Limitations
Boric acid (CAS Reg. No. 10043-35).....	For use only at levels not to exceed 0.16 percent by weight of ethylene-vinyl acetate-vinyl alcohol copolymers complying with §177.1360(a)(3) and (d) of this chapter.

Dated: August 24, 1994.

Fred R. Shank, Director, Center for Food Safety and Applied Nutrition.

81st IAMFES Annual Meeting Highlights

The 81st Annual Meeting of the International Association of Milk, Food and Environmental Sanitarians was held July 31 - August 2, 1994, in San Antonio, Texas. "Seize the Moment for Food Safety...The Future is Now" was the theme for this year's meeting.

Co-Hosting the Meeting was the Texas Association of Milk, Food and Environmental Sanitarians (TAMFES). The local arrangements committee under the direction of Chairperson, Ron Richter, provided several hours of volunteer time to plan and conduct an efficient, educational and enjoyable Annual Meeting. Mr. Richter and his committee are to be commended for their efforts. The Local Arrangement Committee included: Kent Roach, Janie Parks, Fred Reimers, Al Wagner, Nick Fohn, Ted Hickerson and Don Ritch.

Another ambitious year was accomplished for IAMFES with the 1994 Annual Meeting's program including over 180 Food Safety Professionals who gave 206 presentations. These, combined with two pre-meeting workshops, 20 professional development groups and committee meetings, and over 60 technical supplier displays, provided the over 900 meeting attendees with a wealth of information.

IAMFES was pleased to have the International Life Sciences Institute (ILSI) participate again in this year's Meeting. The Institute sponsored three symposia on Quantitative Risk Assessment in Food Microbiology, Application for Predictive Microbiology and Natural Antimicrobials and Inhibitors for Food Applications. The symposia included internationally renowned food safety experts. Other symposium sponsors included the Ontario Food Protection Association and the Grocery Manufacturers of America.

Pre-Meeting Workshops

IAMFES sponsored two day-and-a-half pre-meeting workshops. The workshops were excellent complements to the outstanding scientific presentations on food safety.

The HTST Pasteurization was a shortened version of the High-Temperature Short-Time Pasteurization workshop that was conducted in Texas a few years ago. Participants were given an overview of the concepts of pasteurization design and function as related to time, temperature and pressure. The workshop was conducted by Al Votion, Registered Sanitarian, who provides consulting services, equipment, sales and supplies for the Dairy Industry.

The Road to ISO 9000 tied together those things companies have been doing to establish top quality products in the marketplace with the things needed to compete in the coming global standards of quality. The workshop was conducted by Subhash C. Puri, who until recently was with Agriculture Canada. Of late, he has been consulting with U.S. and Canadian firms seeking ISO 9000 certification.

Annual Meeting Social Events

A fine array of spouse tours highlighted the ambiance of the beautiful San Antonio area.

Monday Evening Gala — Over 350 people enjoyed "A Little Bit Texan" evening at the Rio Cibolo Ranch. The evening included a Texas style barbecue, line dancing, horse shoes, volleyball, basketball and wagon rides.

Annual Meeting Program: A Review

Meeting of Committees and Professional Development Groups

Beginning Friday, July 29, six committees and 12 development groups met. Annual reports from these groups begin on page 679.

Opening Session/Ivan Parkin Lecture

According to our new President, C. Dee Clingman, the last minute cancellation by our Ivan Parkin Lecturer set the stage for the first of many "different ways of doing things at the IAMFES Annual Meeting." As originally planned, the lecture would have dealt with the impact of the insurance industry on food safety and vice versa.

Instead, Mr. Clingman presented a series of video clips dealing with food safety. These clips included local news cast "in depth reports" as well as network productions. The subjects of these reports ranged from restaurant inspections to grocery stores and meat packers. The program ended with an excerpt from "Saturday Night Live" featuring a spoof aboard the USS Marriott.

The crowd of over 350 were deeply appreciative of Mr. Clingman's foresight and creativity in allowing us to see ourselves as others portray us and to chuckle at ourselves.

Scientific Program

The three-day educational program consisted of five technical sessions of submitted presentations, 16 symposia of invited presentations, a general session and a scientific poster session.

Technical Sessions

The five technical sessions consisted of more than 30 submitted presentations. These sessions covered:

Dairy, convened by J. Avery.
Risk Assessment, convened by B. Johnson.

Analytical Methods, convened by K. Glass.
Antimicrobials, convened by N. Stern.
General Food Microbiology, convened by J. Cerveny.

Symposia

The bulk of the presentations at the 1994 Annual Meeting were scientific symposia. Over 100 symposia presentations were given during the three day event. Speakers from Australia, Brazil, Canada, Mexico, the Netherlands, Switzerland, the United Kingdom and United States presented the latest research in food microbiology, European food processing equipment standards, dairy, risk management and many other food safety topics. These symposia brought together many of the most internationally recognized authorities on food safety.

International Life Sciences Institute Sponsored Symposia

Quantitative Risk Assessment in Food Microbiology, convened by E. Todd and P. Slade.

Applications for Predictive Microbiology, convened by P. Slade and J. Scott.

Natural Antimicrobials and Inhibitors for Food Applications, convened by P. Hall.

Ontario Food Protection Association Sponsored Symposium

Meat Quality and Safety: Effects of Production and Processing on the Microbial Quality of Meat, convened by R. Tiffin and A. Lammerding.

Grocery Manufacturers of America Sponsored Symposia

Risk Management-Risk Assessment: The Risk Analysis Approach, convened by M. Cirigliano and S. Ziller.

Risk Management - Control Practices and Their Impact, convened by M. Cirigliano and G. Moore.

More Symposia

The remaining symposia covered a variety of food safety issues of importance to IAMFES members. These included:

Stainless Steels for Dairy and Food Equipment, convened by R. Avery and T. Gilmore.

Microbiological vs. Epidemiology: Complimentary or Incompatible, convened by E. Todd.

Reproduction of Foodborne Pathogens on Poultry, convened by S. Bailey and M. Robach.

Pesticides in the Food Industry, convened by K. Furgiuele and R. Gravani.

Meat Quality and Safety: Concerns and Solutions Throughout Distribution Systems, convened by L. Shelef and D. Bernard.

Safety and Quality-Related Research - Dairy Foods and Research Centers, convened by R. Bishop.

The Quality and Safety of Aquacultured Fishery Products, convened by Y. Huang.

Dairy Symposium II - Sanitation and New Approaches to Better Dairy Products, convened by D. Henning.

European Food Processing Equipment Hygiene Standards, convened by H. Lelieveld.

Current Food and Health Related Safety Issues, convened by J. Marcello.

Poster Session

The technical poster session provided over 60 presenters with the opportunity to display their research findings. The sessions included time for authors to attend questions. Winning poster presentations are listed on page 691.

Video Theater

Selections from the IAMFES Audio-Visual Lending Library were presented over the course of the meeting in a Video Theater. Over twenty-five tapes were presented. The tapes and many other titles are available to members through the Lending Library.

General Session

The General Session, The New FDA Model Food Code: How Will We Implement It?, was held Tuesday afternoon, August 2. This session was held alone to encourage all meeting participants to attend. The session was convened by J. Guzewich and included an overview of the new FDA Code and perspectives from Restaurant Industry, Food Stores, Vending Machine Industry, Agricultural Agencies and Health Agencies.

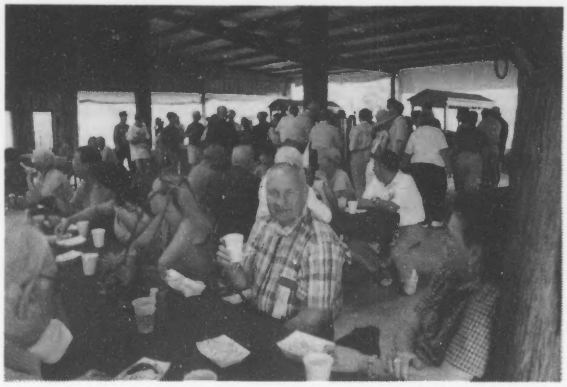
Annual Business Meeting

Following the General Session, IAMFES held its Annual Business Meeting. The meeting covered reports from the Executive Manager, Affiliate Council and Journal Management Committee, old and new business and presentation of resolutions. More details of the Annual Business Meeting are available on page 676.

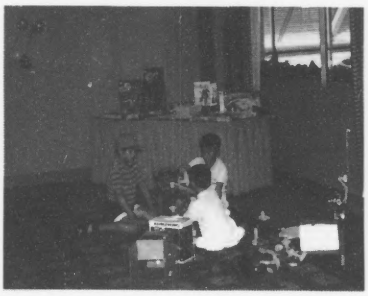
Scenes from the 1994 Annual Meeting...

Registration gifts awaiting distribution. Bags were provided by 3M and chips & salsa were courtesy of H-E-B Grocery and Pace.

President Harold Bengsch enjoys the evening at Rio Cibolo Ranch.



Local Arrangements Chair Ron Ritcher (right) and Fred Reimers (left) of H-E-B Grocery, enjoy appetizers at the President's Reception.

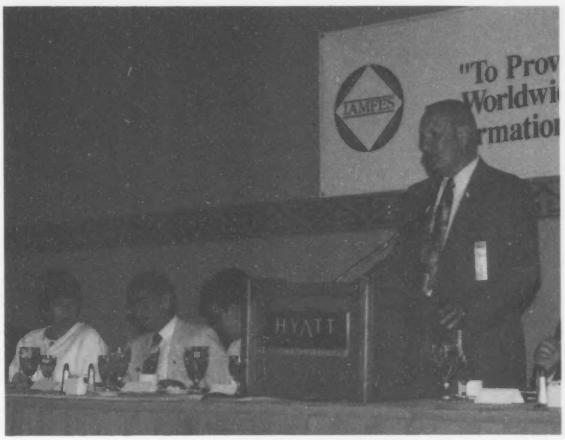


An activity room provided entertainment and supervision for members' children.

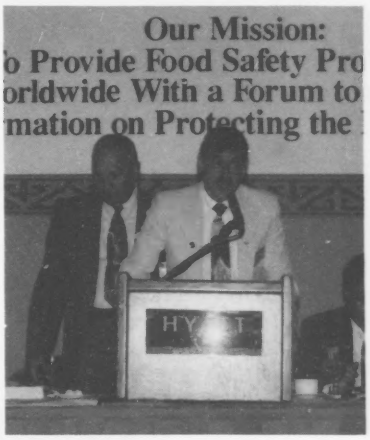
Kent Roach, TAMFES President, made sure supplies were stocked for the registration gifts.

Ruth Fuqua (left) and Earl Wright (right) pose for a photo at the Awards Banquet Reception.

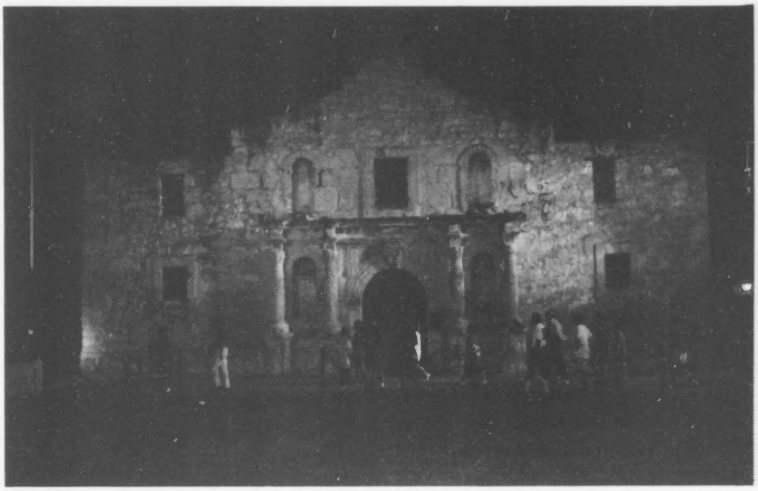
Over 60 Developing Scientists presented posters at the 81st Annual Meeting.



Horold Bengsch, President, begon the Ceremony for the Awords Bonquet.



Vice President, Michael Brodsky, gave the innvocotion.



The historical Alomo provided o stunning backdrop for the the 1994 Annuol Meeting.

Representotives from exhibiting organizations onswer questions ond provide informotion for members.

A Message from the Past President

Harold Bengsch
IAMFES Past President

Dear IAMFES Members:

The following document is a long range strategic plan which when adopted will map out the future for IAMFES. This Plan is vital for IAMFES now, through the year 2000 and beyond. Over two years of work has gone into the development of this document which included a membership survey, planning sessions and numerous committee meetings. The Plan was compiled only after information from many facets of the organization was reviewed. The extensive research and evaluation helped the Task Force to realize that IAMFES' membership segment of food safety professionals has expanded and changed extensively over the last few years.

As you read the plan you will note that the Mission Statement recognizes these changes and strives to include them while maintaining the same ideals and values IAMFES has always held. Consequently, we will need to continually examine our identity to ensure IAMFES is providing the services its members require as food safety professionals.

Since IAMFES has become so diverse, the Task Force needed to ask such questions as how can IAMFES strive to further meet the needs of its diverse membership; how best can IAMFES meet the needs of our international members (the segment showing the most growth potential); how can IAMFES maintain the highest quality programs and services; and how can IAMFES ensure prompt dissemination of current information? Also, just as important, how can IAMFES increase the involvement of its members.

Underlying each aspect of this Plan is communications. Communications is the major force that will propel all of us into the 21st century. IAMFES needs to place more emphasis on communications. It needs to not only maintain its current level, but to improve and create new methods to communicate. IAMFES will also need to review what it communicates and look for means to expand the information to meet and exceed our mission.

It is imperative that IAMFES face the future with great foresight and planning. Our efforts must focus on maintaining the ideals upon which IAMFES began, yet have the ability to adapt to our ever changing and demanding world. We as food safety professionals can lead the way to a safer and more productive food supply worldwide by maintaining our support of such important organizations as IAMFES.

I am grateful to everyone for their hard work and look forward to hearing some input from our other members.

Harold Bengsch
Past President

The IAMFES Mission

IAMFES is an international organization that represents a broad range of food protection professionals from different fields including: Academic, Industry and Government. In August of 1993 the Strategic Planning Task Force met to continue the planning process that had begun a year earlier. A clear mission statement for IAMFES was the first output from the Task Force.

The Mission of IAMFES is to provide food safety professionals worldwide with a forum to exchange information on protecting the food supply.

Within this mission are many possible objectives - places where IAMFES could use its scarce resources. These range from things which are very short term and easy to implement, to more difficult objectives which will take major resources and effort. Unfortunately, it is impossible to do everything at once. To ensure the plan deals with the most important items first, the group set four strategic goals: Membership, Education Program, Product and Service and Financial.

Strategic Goals

Strategic Goal #1 - MEMBERSHIP

Our traditional membership strategy has focused almost exclusively on recruiting affiliate organization members who are not IAMFES members. We have also had a volunteer committee responsible for recruitment which is a difficult task.

In the future, we will expand our membership focus beyond our affiliate members and seek individuals from other areas both inside and outside North America. We also need to have staff with marketing skills to develop membership recruitment and retention programs.

Strategic Goal #2 - EDUCATION PROGRAM

IAMFES' primary education program strategy has been to provide materials (journals, other publications and a lending library). The only other format has been the Annual Meeting, where the Program Advisory Committee works with the Executive Board to select the programs.

In the future, the education program development will be based on more verifiable market research of members needs, delivery formats and location options. Current ideas include creating a speaker's bureau which can deliver programs throughout the affiliates as well as other organizations. Professional Development Groups will have a charge to develop educational programs for the membership regionally as well as internationally, possibly in cooperation with FAO or other international assistance groups.

Strategic Goal #3 - PRODUCT AND SERVICE

Currently IAMFES bases most product and service offering decisions on management's judgement. To maintain and improve these offerings there will need to be a fundamental change in this strategy.

In the future, product and service offering decisions need to shift and be based as much as possible on research. A formal editorial policy for each journal is needed as well as research on what readers want, receive from the journals and what types of articles should be solicited. Other products and services will receive the same kind of market based review. The outcome of this review will be a marketing plan for each product or service.

Strategic Goal #4 - FINANCIAL PLAN

Presently, IAMFES operates on an annual budget cycle which reflects its annual financial plan. This will be expanded into a more formal multi-year financial plan with objectives for reserves, income stream contributions by new products and the like.

First Step for Implementation

After identifying the strategies and the order of priority, the Task Force determined a need to establish a committee for each goal. The function of the committees will be to provide member input and guidance for the projects.

The committees are as follows:

Membership Retention & Recruitment

Ruth Fuqua (Chair)
Bob Sanders
Anna Lammerding
Larry Claypool
Bob Marshall
Carol Mouchka (staff support)

Financial Plan

Dee Clingman (Chair)
Warren Clark
John Kvenberg
David Tharp (staff support)

Educational Programming

Bob Gravani (Chair)
Charles Price
Ann Draughon
Bruce Langlois
Ronald Schmidt
Carol Mouchka (staff support)

Product/Services

John Cerveny (Chair)
Michael Brodsky
Harold Bengsch
Cameron Hackney
Michael Doyle
Steven Halstead (staff support)

Current Status

Additional planning has included an action plan being developed by IAMFES staff and the marketing consulting firm used for the earlier planning. This planning session took the goals identified by the task force and developed action steps to be adopted and implemented. The action plan broke the steps down into time, staff and committee involvement required, and cost estimates. The action plan was then submitted to the above named committees.

Each committee was asked to react to the action plan in general and to prioritize the action steps within their charge. As many of the strategic goals involved a marketing function, a marketing professional was added to the IAMFES staff. With these marketing skills in place, detailed marketing plans can be developed for the identified goals and action plans. The marketing plan will be developed by staff with committee support and presented to the Board of Directors for final approval. At present, a marketing plan is being developed for membership recruitment and retention and will be presented to the Board at the November meeting.

Highlights of the Executive Board Meeting

The IAMFES Executive Board met three times over the course of the Annual Meeting. It met all day on July 30; for two hours in a public meeting on August 2; and for nearly five hours on August 4.

The following represents an unofficial summary of those meetings.

1. Received a report from Ruth Fuqua, chairperson of the Awards Task Force, suggesting modifications to the awards selection criteria. The biggest change was to go to a seven-point rating scale in the judging criteria.
2. Charles Price will be the Awards Task Force chairperson for 1995.
3. Bruce Langlois was named chairperson of the 1995 Program Advisory Committee, with John Cerveny to act as vice-chairperson. Named to three-year terms on the PAC were Charles Higgins, Kathy Glass and Sonya Gambrel-Lęnarz. Wally Jackson was named to a two-year term on the PAC.
4. Frank Busta was named chairperson of the Nominating Committee.
5. Voted to provide C. Dee Clingman $1,000 towards his expenses in attending the Third World Conference on Environmental Health in Malaysia.
6. Were informed that Mr. Clingman has established a fund to provide complementary IAMFES memberships to strategic individuals.
7. Learned that H-E-B Grocers of San Antonio was to be the first recipients of the Black Pearl Award.
8. Directed Ann Draughon and Michael Brodsky to develop guidelines to be used in determining the suitability of proposed Annual Meeting symposia offered by non-IAMFES groups.
9. Directed Harold Bengsch to put together a Strategic Plan for dues increases.
10. Learned that Joe Disch had been elected Secretary of the Affiliate Council.
11. Approved the proposed changes in the IAMFES Constitution and Bylaws.
12. Approved a balanced budget of $958,520 for the fiscal year September 1, 1994 to August 31, 1995 including a $10 increase in membership dues.
13. Received a report from David Tharp that some $50,000 in Foundation Funds had been invested in U.S. Government Treasury Notes at interest rates substantially higher than those available with certificates of deposits.
14. Rejected a proposal from Steve Halstead to change the fiscal year.
15. Discussed a suggested change in the way the affiliate hosting the Annual Meeting is reimbursed. Directed Susan Sumner and Michael Brodsky to survey past host affiliates for planning ideas.
16. Agreed to seek outside consultants to review the IAMFES publications process and to pay the fees associated with this review.
17. Directed that a proposal to change the Executive Manager's title to that of Executive Director be forwarded to the Constitution and Bylaws Committee.
18. Accepted a policy dealing with Conflict of Interest.
19. Directed that the chairperson of the Local Arrangements Committee for the 1996 Annual Meeting be a member of the IAMFES staff during the 1995 Annual Meeting.
20. Accepted the principal of a self-funded, undergraduate recognition program and directed P. C. Vasavada to continue with the project.
21. Directed a proposal to make the Communicable Diseases Affecting Man Professional Development Group into a Committee be forwarded to the Constitution and Bylaws Committee.
22. Directed the President to submit comments to the USDA regarding the proposed poultry inspection rules.
23. Established Des Moines as the site for the November 8-9, 1994 meeting of the Executive Board and Pittsburgh as the site of the March 7-8 meeting.

Minutes of the IAMFES 81st Annual Business Meeting

Welcome and Introduction: President Elect C. Dee Clingman welcomed those assembled and introduced IAMFES President Harold K. Bengsch.

Presidential Address: Mr. Bengsch proceeded to deliver the 1994 Presidential Address.

Business Meeting:

I. Call to Order: Following his address, President Bengsch called the 81st Annual Meeting of the International Association of Milk, Food, and Environmental Sanitarians, Inc. to order at 3:48 PM on Tuesday, August 2, 1994 at the Hyatt Regency Riverwalk Hotel located in San Antonio, Texas. A quorum, as defined by the IAMFES Constitution, was declared to be present.

II. Moment of Silence: Mr. Bengsch asked the audience to rise and to observe a moment of silence in memory of departed colleagues.

III. Minutes of the last Meeting: Secretary Michael H. Brodsky informed those gathered that the Minutes of the 80th Annual Meeting had been printed in the November, 1993 issue of *Dairy, Food, and Environmental Sanitation*.

MOTION To dispense with the reading of the Minutes of the 80th Annual Meeting and to approve them as printed in the November, 1993 *Dairy, Food, and Environmental Sanitation.*
Brodsky
Hibbard
PASSED

IV. Reports: The meeting then received the following reports:

A. Executive Manager: Steven Halstead

B. Affiliate Council: Charles Price

C. *Journal of Food Protection* Management Committee: Joseph Frank

D. *Dairy, Food, and Environmental Sanitation Management* Committee: John Bruhn

E. Readership Survey: Mr. Bruhn reported on the results of the journals readership survey he and Christine Bruhn had conducted

Mr. Bengsch thanked all who had served on the various Committees, Professional Development Groups and Task Forces and called attention to the fact that reports of the meetings held on July 31 were posted outside the Regency Ballroom. Appreciation was expressed to Charles Price for his outstanding leadership of the Affiliate Council and his service on the Executive Board.

V. Old Business: Lawrence Roth, Chairperson of the Nominating Committee reported that Paul Nierman and Gale Prince had been nominated to the office of IAMFES Secretary and that in the ensuing election, Mr. Prince had been elected to the post. The President thanked Mr. Roth and his committee for their work.

MOTION To destroy the ballots.
Roth
Sanders
PASSED

There was no other Old Business to come before the Association.

VI. New Business: President Bengsch called upon Past President Ron Case, Chairperson of the Constitution and Bylaws Committee for his report.

Mr. Case reported that the Affiliate Council had submitted proposed changes to the Constitution and Bylaws which would direct the Affiliate Council to establish its own operating guidelines. The Executive Board had reviewed the proposals and agreed to them.

MOTION To amend the IAMFES Constitution as published in the June, 1994 issue of *Dairy Food and Environmental Sanitation.*
Case
Roth
PASSED

MOTION To amend via the substitution distributed.
Bruhn
Gilmore
PASSED

The President declared that the amendment to the Constitution had passed the body and directed the Executive Manager to submit the question to membership for a mail ballot.

MOTION To amend the IAMFES Bylaws as published in the June, 1994 issue of *Dairy Food and Environmental Sanitation* pending the membership's approval of the Constitutional amendment.
Case
Roth
PASSED

MOTION To amend via the substitution distributed.
Bruhn
Gilmore
PASSED

The President declared that the amendment had been adopted.

President Bengsch named Frank Busta as Chairperson of the Nominating Committee for the 1995 election of the IAMFES Secretary.

Mr. Bengsch welcomed the newly elected Secretary, Gale Prince, and the new Affiliate Council Chairperson, Susan Sumner, to the IAMFES Executive Board.

Appreciation was expressed for the outstanding contributions of the Immediate Past President, Mr. Doyle, during his years of service on the Executive Board.

There was no other New Business to come before the Association.

VII. Resoltions: Immediate Past President Michael Doyle presented four resolutions to the meeting for consideration:

Resolution #1: Relating to the meeting's gratitude to the Texas Affiliate for their outstanding performance as hosts of the 81st Annual Meeting.

Resolution #2: Relating to the meeting's gratitude to the Hyatt Regency Riverwalk Hotel for its outstanding performance in serving the 81st Annual Meeting.

Resolution #3: Relating to the meeting's gratitude to the International Life Sciences Institute for its outstanding contributions to the educational programming of the 81st Annual Meeting.

Resolution #4: Relating to the meeting's gratitude to the Grocery Manufacturer's Association for its outstanding contributions to the educational programming of the 81st Annual Meeting.

MOTION To adopt Resolutions #1, #2, #3, and #4.
Doyle
Atherton
PASSED

President Bengsch directed the resolutions be attached to these Minutes as Addenda and be printed in an upcoming issue of *Dairy, Food, and Environmental Sanitation*.

VIII. Adjournment: There being no further business to come before the meeting, President Bengsch called for a motion to adjourn.

MOTION To adjourn.
Brodsky
Fry
PASSED

President Bengsch declared the meeting adjourned at 4:25 PM.

Respectfully submitted,

Michael H. Brodsky, Secretary

Resolutions Adopted by IAMFES

RESOLUTION #1

WHEREAS: The Texas Association of Milk, Food and Environmental Sanitarians and the Local Arrangements Committee have labored long, hard and with joy to plan, coordinate and host the 81st Annual Meeting of the International Association of Milk, Food and Environmental Sanitarians in San Antonio, TX and,

WHEREAS: The entire Annual Meeting was conducted and planned with style, grace and excellence by the Affiliate and the Local Arrangements Committee, and,

WHEREAS: The gracious hosts coordinated the efforts of industry, educational and governmental members towards the great success of this Annual Meeting, and

WHEREAS: The 1994 Meeting was truly an outstanding event and contributed to the goals of our Association.

THEREFORE, BE IT RESOLVED: That the International Association of Milk, Food and Environmental Sanitarians, Inc. adopt this resolution of appreciation and gratitude to the Texas Association of Food and Environmental Sanitarians and the Local Arrangements Committee and further that a copy of this resolution be sent to the Texas Association of Milk, Food and Environmental Sanitarians and be published in *Dairy, Food and Environmental Sanitation*.

RESOLUTION #2

WHEREAS: The personnel of the Hyatt Regency Riverwalk, San Antonio, Texas were very accommodating to the needs and desires of the members and guests of the International Association of Milk, Food and Environmental Sanitarians, Inc., and,

WHEREAS: The facilities for the entire program including the technical sessions and social activities were outstanding.

THEREFORE, BE IT RESOLVED: That an appropriate expression of our gratitude be sent to the management and staff of the Hyatt Regency.

RESOLUTION #3

WHEREAS: The International Life Sciences Institute through their Program Committee and Administrative Staff volunteered to sponsor three symposia at the 81st Annual Meeting of IAMFES.

WHEREAS: Through the invitations extended by the International Life Sciences Institute, internationally distinguished scientists were participants in and contributed to the success of the 81st Annual Meeting.

WHEREAS: The Administrative Staff of the International Life Sciences Institute, namely Catherine Nnoka and Beth Brueggemeyer met and exceeded all expectations in making the arrangements and conducting the administrative work necessary for the success of this cooperative effort between the International Life Sciences Institute and IAMFES.

THEREFORE, BE IT RESOLVED: That IAMFES recognizes, deeply appreciates and commends the International Life Sciences for their unparalleled contributions to the success of this 81st Annual Meeting of IAMFES.

RESOLUTION #4

WHEREAS: The Grocery Manufacturers of America volunteered to sponsor a symposium at the 81st Annual Meeting of IAMFES, and,

WHEREAS: Through the invitations extended by the Grocery Manufacturers of America, internationally distinguished scientists were participants in and contributed to the success of the 81st Annual Meeting, and

THEREFORE, BE IT RESOLVED: That IAMFES recognizes, deeply appreciates and commends the Grocery Manufacturers of America for their contributions to the success of this 81st Annual Meeting of IAMFES.

Committee, Professional Development Group and Task Force Reports

Dairy, Food and Environmental Sanitation Management Committee

Date: July 31, 1994

Members Present: *Ex-Officio*: Joe Frank, Steve Halstead, Jeanne Lightly, and Harold Bengsch.

Committee Members: Pete Cook, P. C. Vasavada, Bob Gravani, Bob Sanders, and Tom Gilmore.

Committee Members Absent: Floyd Bodyfelt, William LaGrange and Bill Coleman.

Others Present: Chris Newcomer, Robert Darrah, Earl Wright and others from time to time.

Presiding: John C. Bruhn, Committee Chair.

Summary of Actions and Activities:

1. The committee affirmed its wish to make the Journal's style elements including author and reference citations, abbreviations, table style and size and abstracts (summary) consistent with each issue and to the extent possible in accord with the *Journal of Food Protection*. These changes will be reflected in the "Instructions to Authors" which is being revised currently
2. The committee agreed that attempts to recruit a scientific editor continue through this coming year
3. Results of the "best paper award" were announced by John C. Bruhn
4. Ms. Lightly continues to develop a publication "flow diagram"
5. Christine Bruhn reviewed the membership survey results regarding the value, quality, & appropriateness of DFES

Recommendations to the Board:

1. Re-appoint F. W. Bodyfelt and R. Sanders and appoint Oliver (Pete) Cook for three-year terms effective the completion of the 1994 Annual Meeting
2. That John C. Bruhn, be re-appointed Chair
3. Discontinue the Best Paper Awards
4. Communicate with the Committee prior to the Board deciding issues relating to DFES
5. Affirm policy that the Committee membership continue to "rotate" by three-year terms, and that members may be re-appointed
6. Continue to support the Committee's efforts to organize the manuscript handling process and to change in the Instructions to Authors

Submitted by: John C. Bruhn, Committee Chair

Journal of Food Protection Management Committee

Members Present: J. Bruhn, C. Bruhn, Cousin, Hall, Gourama (for Doores), Bullerman, Beuchat, Lightly, Sumner, Bengsch, Frank, Todd, Newcomer

Presiding: Joe Frank

Summary:

1. Increase in submitted papers requires additional issues of JFP be published this year
2. Conversion to perfect binding in 1995 volume is recommended if the increase in paper submission continues
3. Removing author's name from papers before review will be continued
4. Report of the editors will be published in JFP

Recommendations: Recommend information on page charges of competing Journals be obtained before JFP raises its charges

Submitted by: Joe Frank

Program Advisory Committee

Attendance at the public meeting of PAC held on Sunday, July 31, 1994 was 28. PAC members present were Janet Avery, Jeff Farber, Beth Johnson, Doug Marshall, Kathleen Glass, John Cerveny and Bruce Langlois, Chair. Comments were made by several persons attending the meeting that the program, while excellent, is too technical for many members and they requested some practical sessions for the 1995 meeting. A number of symposia were proposed by individuals attending the meeting.

The PAC Committee will meet on Wednesday, August 3, 1994 to discuss and refine the 40 plus suggested topics from the public meeting and to begin to shape the 1995 IAMFES Annual Meeting Program. PAC will provide Ann Draughon with a status report. The PAC will meet to finalize the 1995 program sometime in January or February.

The PAC committee desires continued input from the members as well as their direct involvement in symposia. The committee recommends that a Call for Symposia Papers be published in April and May issues of the journals. The contribution to the 1994 annual meeting by ILSI was noted with appreciation and their involvement in the 1995 meeting was discussed.

The following is a list of suggested topics for symposia and workshops for the 1995 meeting. The list is not yet prioritized nor is it in its final format.

1. Practical approach to quality milk
2. Current safety issues in food service
3. 3-A of the future
4. OSHA in the workplace
5. Role of microbiology in HACCP
6. Farmers, Fieldmen and Politics
7. Bacteria under stress
8. How to deal with human relations in all aspects of food industry
9. Food safety in distribution control for quality and safety in foods and ingredients
10. Seafood group proposed following topics:
    - HACCP Seafood Regulations
    - Seafood hot line
    - What type of HACCP training for processor, regulators and retailers
    - US vs. international inspection
    - Safety of mail order seafood
    - Detection of toxins
    - Microbial safety
11. Processing seafood symposium
12. USDA HACCP at farm level
13. Update *Salmonella enteritidis*
14. Food safety and GATT
15. HACCP at retail level
16. Safety of ethnic foods
17. Disposal of dairy waste at farm and plant level; Land application of sewage sludge/waste
18. Environmental aspects on farm dairy operations
19. Human health and use of animal hormones
20. ISO 9000 and meat quality International aspects of raw meat quality
21. Equivalency of inspection - NAFTA and GATT
22. Hurdles to improve quality and safety of RTE meats
23. Sanitation in distribution of dairy farm products to consumers
24. Past, present, and future status of minimally processed packaged vegetables
25. Updates on MAP and Sons-Vides foods
26. Biofilms in the food industry. Where have we been and where are we headed
27. Instrumental approaches to risk assessment in food microbiology
28. New emerging pathogens
29. Irradiation
30. Alternative thermal processing strategies for pasteurization of milk and meat
31. Molecular typing — Advances in Food microbiology

Workshops:

Information retrieval
Quality Assurance
Rapid methods

Submitted by: Bruce Langlois

Past President's Advisory

Members Present: Dick Brazis, Bill Arledge, Howard Hutchings, Henry Atherton, Harry Haverland, Dick Whitehead, Earl Wright

Presiding: Mike Doyle

Summary of Activities and Action Taken: Discussed current matters being addressed by the Executive Board

Recommendations to the Executive Board:

1. Consider including cost of membership in on-site registration fee
2. Consider sending Affiliate correspondence to President, Secretary and Affiliate Council Representative (not solely to Affiliate Council Rep.) to improve communication with the Affiliates
3. Encourage Affiliate Council Representative to the Executive Board to improve communication with Affiliate Council Delegates
4. Strategic Long Range Planning Task Force consider adding the word "quality" to IAMFES mission statement
5. Journal Management Committees consider including translations of abstracts (Spanish and French) in IAMFES publications
6. Consider using Past Presidents as a resource for identifying dairy-related topics and speakers for symposia at annual IAMFES meeting
7. Past Presidents will provide President with the names of present and potential IAMFES members in countries not represented by Affiliates in IAMFES to assist in organizing new international Affiliates

Submitted by: Mike Doyle

PROFESSIONAL DEVELOPMENT GROUPS

Applied Laboratory Methods Professional Development Group

Chair: James S. Dickson, Iowa State University

Vice Chair: Thomas E. Graham, FDA

2nd Vice Chair: J. Sue McAllister, 3M

The meeting was called to order by: Tom Graham in Jim Dickson's absence at 1:30 PM

Members Present: The meeting was attended by 18 people including representatives from regulatory, industry and academia.

Summary of Activities:

1. Approved minutes of 1993 Annual Meeting
2. Old business
   a. Manuscript for extended refrigeration technique is in draft form. (M. Brodsky) Inoculated plates can be refrigerated before incubation. After the manuscript is submitted and accepted for publication, inclusion in the BAM will be investigated.
   b. Manuscript for extended coliform incubation has been accepted for publication in JFP. (L. Roth) MPN tube incubation can be extended from 48-72 hours.

      There was an informal discussion about lot-to-lot variation in media.
   c. Michael Brodsky reported on the status of the project to look at upper counting limits for selective media.

      Studies so far suggest upper counting limits may be much less than what have been generally used. Study is ongoing. Manuscript will be drafted during the next year.
   d. No additional old business items were brought up.
3. New Business
   a. There was an informal discussion about an apparent increase in incidence of pathogenic organisms in foods; e.g., (O1O4:H21) verogenic *Escherichia coli* was found associated with a dairy in northwestern U.S.; continued incidence of presence of O157:H7 in foods.

      The group expressed concern about the need for collaboration between epidemiologists and microbiologists in addressing microbiological concerns as they relate to foodborne outbreaks.

      The group also discussed becoming involved with various "Standard Methods" on microbiological issues. In addition, the group would also offer its resources to organizations involved in microbiological method approval/validation.
   b. The group discussed hosting a symposium at the next Annual Meeting. Suggested topics included: (1) Role of microbiology in HACCP (incorporating speed of rapid methodology; (2) Consumption of Raw Milk; (3) Bacteria Under Stress.
   c. Tom Tieso, Nebraska Department of Agriculture, was elected as new 2nd Vice Chair. Chairman Jim Dickson officially stepped down.
   d. The group expressed its appreciation for Jim Dickson's efforts and contributions during his term.
   e. Meeting adjourned at 3:30 PM

Submitted by: Tom Graham

Meat Safety & Quality

Members Present: John Cerveny, Wayne Sprung, Susan Sumner, Kathleen Glass, Bob Tiffin, Jenny Scott, Isabel Walls, Don Splitstoesser, Laurentina Pedrosa, Leora Shelef, James Price, Tom McCaskey, Anna Lammerding

Presiding: John Cerveny, Chairman
Kathy Glass, Secretary
Anna Lammerding, Scribe

Summary of Actions Taken:

- Recognition of Committee's efforts for the two symposia presented at 1994 Annual Meeting
- Listed and discussed potential topics for 1995 symposia we will investigate the possibility of coordinating symposium with Poultry Safety and Quality Committee because of common concerns
- Discussed the need for writing a paper on microbiological criteria for meat and poultry products

Recommendations:

1. Three symposia for 1995 meeting:
   - International perspectives to Meat Safety and Quality
   - Equivalency of Inspection System
   - Hurdles
2. Write a "White Paper" on microbiological criteria for meat and poultry products in response to USDA/FSIS proposed pathogen reduction program

Submitted by: John Cerveny - Chairman

Food Safety Network Professional Development Group

Date: July 31, 1994

Members Present: G. Brittan, D. Christensen, R. Buchanan, R. Clarke, R. Forsythe, D. Fung, L. Harris, M. Champagne, A. Lammerding, J. Kolar, K. Maloney, P. Vasavada, P. Krueger

Presiding: R. Clarke

Summary of Activities: A three day open workshop on Food Safety Networks is currently being held at the IAMFES Annual Meeting. Participants will be able to connect to a variety of computer information systems and receive information on research and rapid method networks.

Recommendations: 1) A directory of network listing contacts and a brief description be prepared; 2) A symposium on computer technology applications for food safety be held at the next general meeting.

Submitted by: Bob Clarke

Food Sanitation Professional Development Group

Members Present: Charlie Felix, Chair; Dee Clingman, Bennet Armstrong, John Marcello, Tom Schwarz, Gloria Swick, Phil Ventresca, Leslie Wisnewski

Mission: The group ratified its mission: "To develop awareness of the importance of food safety within the membership and the profession and to targeted groups outside the profession."

Objectives: The group confirmed the four objectives set last year as objectives through 1995 and added a 5th:

1. Develop brochures and other educational material for professional and non-professional foodhandlers;
2. Explore avenues of reaching the school-age population regarding principles of food safety, especially handwashing;
3. Develop, in cooperation with IAMFES Affiliates, workshops on timely food safety topics, especially important foodborne diseases and emerging pathogens;
4. Encourage and assist IAMFES to become a resource for print materials (training aids) on food safety;
5. Develop a turnkey delivery mechanism—a model system—for IAMFES to use in getting its education materials into as many hands as possible.

Projects Update

1. **Temporary Food Service** - Two versions of the temporary events sanitation leaflet were received and edited. These will be field tested for language and comprehensibility through appropriate avenues (National Association of Amusement Parks, for example) before finalization later this year. Subcommittee: Charlie Felix (703) 777-7448.
2. **Food Safety in Time of Disaster** - the group agreed that the disaster preparedness leaflet should be limited to food safety; cover both the before and after of disaster situations; and cover disasters generally, including floods, fire, hurricanes and other emergency scenarios. The FMI/USDA leaflet "Facts About Food and Floods" will serve as a guide to the IAMFES leaflet and the subcommittee will review the Educational Foundations Crisis Management Guidelines for ideas and direction. Subcommittee Chair: Gloria Swick (614) 645-7137.
3. **Food Carts and Kiosks** - A brochure on sanitation of carts and kiosks is in the early stages of development. Subcommittee Chair: Susan Grayson (919) 733-2905.
4. **Diarrheal Diseases Workshop** - No progress was made on this project, and other topics were considered to be more pertinent for next year's potential symposia (see below).
5. **Elementary School Curricula** - No progress to date.

New Projects

Develop the turnkey delivery mechanism described under objective No. 5.

1995 Symposia Recommendations

The group recommends two symposia topics:

1. **The Safety of Ethnic Foods** - Foods of various cultures, their potential hazards, proper handling procedures, etc. Also ideas on how best to communicate sanitation guidelines to non-English speaking ethnic good managers. Speaker to be drawn from areas of high ethnic concentration (e.g., Lawrence Pong in San Francisco) and experts like Dr. Frank Bryan.
2. **The Practical Application of HACCP Principles at Retail** - Quality control people from the foodservice and food store industries and field inspectors sharing their experience and insights about the delivery of HACCP in real situations. Besides appealing to working food sanitarians. This topic might also be instructive to scientific and academic segments of the IAMFES membership.

Submitted by: Charlie Felix

Environmental Issues in Food Safety Professional Development Group

Members Present: Paul Krueger, Brian Sheldon, Wayne Sprung, Dick Whitehead

Presiding and Submitted by: Brain W. Sheldon, in substitution for Roy E. Carawan, Chairman

Summary of Activities:

A. Review of '93-'94 Activities

1. Sponsored Symposium on "Water Reuse in Animal Processing Plant" at 1993 IAMFES Meeting in Atlanta
2. Reviewed Program and Abstracts for the 7th International Symposium on Agriculture and Food Processing Waste to be held in Chicago, Dec. 7-9, 1995; IAMFES is co-sponsoring the event; Roy Carawan is serving as IAMFES representative
3. Permission has been obtained from the Region VIII EPA office to use material introduced at last year's meeting entitled "Everything You Wanted to Know About Environmental Regulations But Were Afraid to Ask." Dr. Carawan will receive this document on disk
4. Reviewed minutes from 1993 Annual Meeting

B. 94-95 Activities

1. The PDG discussed how the EPA publication might be revised into a format suitable for publication in IAMFES. The group will forward this information to Dr. Carawan to initiate this activity.
2. The group discussed the possibility of preparing a brief 20 page Pocket Environmental Directory that might include such information as: regulatory overview of environmental regulations; names and addresses of regulatory offices and contact persons or resource persons

knowledgeable in environmental areas (air, water, solid waste, pesticides, regulatory, etc.).

3. The group also discussed establishing a list of environmental topics and resource persons to aid in handling technical questions received by IAMFES Headquarters. Suggested topics include: air, water, solid waste, pretreatment, recycling, pollution prevention, regulations, pesticides, etc. This information will be passed to Dr. Carawan for suggestions of resource persons to fill these slots.

4. The group also discussed several potential symposia topics for future annual meetings. No symposium topics will be submitted for 1995 due to the International Conference being held in Chicago.

Submitted by: Brian Sheldon

Committee on Communicable Diseases Affecting Man

Members Present: Bryan, F. L.; Cook, O. D; Guzewich, J. J.; Maxson, D.; Swanson, R. C.; Todd, E. C. D.; + 6 visitors

Presiding: Frank L. Bryan

Summary of Activities and Actions Taken: Continued development of revision of Procedures to Investigate Waterborne Illnesses, 2nd Edition. The 4th draft reviewed by committee found several gaps that need subsequent development. This will take a few months, after which final editing will be done and submitted to IAMFES .

An article is being developed for publication in one of the Journals. This information will also be used in updating "Procedures for Investigation of Foodborne Illness" manual.

Modifications are under consideration for revision of "Procedures to Implement the Hazard Analysis Critical Control System."

Recommendations to the Board:

1. Question of increase price of manuals — Committee feels that this is false economy

2. This "group" feels that we are a "Committee" and our authorship of manuals indicates this for decades. "Professional Development Group?" Whose professional development are "we" concerned with? Ours or the reader of our documents?

3. Project support from Executive Board needed after products developed as well as before

4. Get all of the manuals text, tables and forms on disks as soon as practical to facilitate rapid and timely revisions

Submitted by: Frank Bryan

Dairy Quality and Safety Professional Develop ent Group

The Dairy Quality and Safety Professional Development Group is divided into two sections: the Farm Section, chaired by Mr. John Scheffel and the Plant Section chaired by Mr. Gaylord Smith. Each section also has a leadership cadre.

The Farm section leadership cadre includes: Mr. Ted Hickerson, Mr. Norris Robertson, Mr. Terry Mitchell, Mr. Charles Price, Mr. Joseph Scolaro and Mr. Gary Trimmer.

The Plant section leadership cadre includes: Mr. Sid Barnard, Mr. Robert Darrah, Mr. J. J. Jezeski, Ms. Diane Lewis, Mr. Darwin Kurtenbach, Ms. Ginny McArthur, Mr. William McCarty, Mr. Vince Mills and Mr. Bruce Meyers.

Both sections share a common mission statement:

"This IAMFES committee works to improve quality and safety in production, processing and distribution of dairy products from farm to consumer."

Each section works toward this goal using the same key activities:

- Identify the needs of the dairy industry.
- Develop procedures and recommendations which address these needs.
- Disseminate information to appropriate dairy industry groups.

Members Present: Sidney Barnard, Jeff Bloom, Don Breiner, Ann Draughon, Gene Frey, Everett E. Johnson, Tom Keel, Don Kimball, Ken Kirby, Chris Newcomer, Norris A. Robertson, Jr., Alan R. Sayler, Gaylord Smith, Duane Spomer, Steve Sims.

Presiding: Farm Section Chairman John Scheffel

Summary of Activities and Actions Taken: Chairman Scheffel noted that the 1993 task to provide IAMFES members better access to educational material produced by the Northeast Dairy Practices Council (NDPC) has begun. The first notice appeared in the June issue of *Dairy, Food and Environmental Sanitation*. Even though the notice has been published for only a few weeks, ten full sets of educational materials and numerous publications on specific topics have been distributed as a direct result.

Mr. Charles Price presented an outline for a pocket guide for dairy field people. Those present expressed support for this project, offered some suggestions, encouraged Mr. Price to continue the work of this task group and complete this project if possible by next year.

Chairman Scheffel will lead a task group which will include Mr. Ken Kirby and Mr. S.D. Barnard. This group will work with similar task groups from the plant section and the Affiliate Council to develop a one-day dairy symposia for the 1995 IAMFES meeting in Pittsburgh.

Numerous topics were suggested and discussed.

Note: Later that day in a meeting with the Affiliate Council it was decided that the dairy symposia should consist of topics of mutual interest to farms or plants, and that the afternoon would consist of 2 concurrent sessions; one dealing with issues that are specific to farms and one dealing with issues that are specific to plants.

Plant Section Chairman Gaylord Smith began the plant section meeting immediately following the Farm Section at 11:00 AM.

Members Present: Ken Anderson, Sidney Barnard, Jeff Bloom, Robert M. Darrah, Gene Frey, Joseph A. Huseman, Everett Johnson, Tom Keel, Chris Newcomer, Charles D. Price, Pamela Price, Steven Sims, Duane Spomer, Harold Wainess, Dick B. Whitehead.

Summary of Actions and Activities: The Plant Section also expressed pleasure at the NDPC information being made more available to IAMFES members.

In an ongoing combined effort with NDPC messers Jeff Bloom and Chris Newcomer will prepare materials regarding how to comply with Grade A pasteurized milk ordinance requirements for completely separating store return milk from other dairy products in the milk plant. They will have these materials ready for presentation at the Fall NDPC meeting. The anticipated result will be a joint IAMFES/NDPC publication and if needed, proposals to modify the Grade A pasteurized milk ordinances by adding an informational appendix.

Sid Barnard, Bob Darrah and Charles Price will work with the Farm Section Affiliate Council representatives to plant the plant portion of the dairy symposia for next year's IAMFES meeting.

The combined Dairy Quality and Safety Committee will seek IAMFES executive board approval for a substantially reduced registration fee for these who wish to attend only the dairy symposia.

They will also seek continuing advice relative to the development of the pocket guide for dairy field persons.

Submitted by: Steven Sims

Baking Industry Sanitary Standards

Individuals Present: Everett Johnson and Chris Newcomer (Observers)

—No other attendees

There were no actions taken. Due to the lack of attendance, E. Johnson and Chris Newcomer joined the Dairy Farm Committee in the adjoining room.

Submitted by: Chris Newcomer

Poultry Safety and Quality

Members Present: Stan Bailey, Lynn Presto, Dick Forsyth, Amy Waldroup, Norman Stern, Neal Apple, Wayne Sprung, Brian Shelton, Marie-Jose Champagne.

Presiding: Stan Bailey

Summary of Activities: The DPG discussed in depth the recent actions of USDA and FSIS concerning new inspection regulations, potential microbiological standards, on-line microbiological testing and zero salmonellae in feed. A response to the Federal Register notice on Enhanced Poultry Inspection was drafted and approved and will be passed to the Executive Board. Names were identified to be added to the IAMFES Resource Directory for the following topics: Poultry Processing, Feeds, Production. One symposium, "Recovery of Injured Pathogens" was proposed. A recommendation for next year's Ivan Parkin," Proactive Safety Measures for Enhanced Public Health," will be forwarded to the Executive Committee.

Recommendations: Approve and forward response to Federal Register notice on Enhanced Poultry Inspection.

Submitted by: Stan Bailey, Chair

IAMFES Affiliate Council

Chairperson Charles Price called the meeting to order at 7:10 AM.

Delegates Present:

Susan S. Sumner, NE
Joseph J. Disch, WI
Charles D. Price, IL
Anna M. Lammerding, Ontario
Lawrence Roth, Alberta
Ruth Fuqua, TN
Joe Huseman, GA
Mike John, PA
Don Bechtel, KS
Beth Johnson, Carolinas
Tom McCaskey, AL
Durwood Zank, MI
Mike Klein, IA
John C. Bruhn, CA
William Brewer, WA
Terry Munson, NY
Fred Weber, Metropolitan
Gary S. Hoffman, ND
Helene Uhlman, IN
Laurie Leis, WY
David Klee, KY
Terry S. Long, MO
Paul Nierman, MN
Gloria Swick, OH
Pete Hibbard, FL

Guests:

Mostafa Sherzad, CA
Fritz Buss, WI

IAMFES Board: Gale Prince, Ann Draughon, Dee Clingman, Harold Bengsch

IAMFES Staff: Steve Halstead

Charles Price Provided an Affiliate Council update. He reported on the following: Changes at the IAMFES Office in Des Moines (dismissal of Margie Marble and Dee Buske); five entries for Shogren award, reminded delegates to leave information for the Affiliate Council table; and that he attended all executive board meetings.

Steve Halstead provided an update on the financial situation, projected $40,000 deficit, that lead to the dismissal of IAMFES staff members. The IAMFES staff has also taken action to reduce travel costs and operational costs. Steve reported that the June issue of DFES would be reprinted since it contained numerous errors. The current Affiliate Council contact at the Des Moines office is Steve or Julie. There was discussion among the Affiliate Council delegates about the shift in IAMFES to more science and less information for sanitarians. The delegate from Indiana voiced full support for the Affiliate liaison and that this was a good link to the IAMFES office and the position should not have been eliminated.

Harold Bengsch provided an update on the Executive Board. He continued to voice strong support for the Affiliate Council. Dee Clingman stressed that the Affiliate Council delegates should work with their chairperson to receive copies of the Executive Board meetings. The Affiliate Council chairperson can have the IAMFES staff mail minutes to delegates. Affiliate Council delegates told Mr. Bengsch that they should have been consulted on the logo change. Many affiliates use the IAMFES logo as part of their own logo. The delegates again stressed that communication with the board needs to be improved and allow for the Affiliate Council to provide input to the Executive Board. Before cutbacks, the IAMFES staff was providing a newsletter to Affiliate Council delegates. Delegates felt that this service should continue. Mr. Bengsch also reported that the local affiliate for the IAMFES meeting is involved in the planning and running of the IAMFES Annual Meeting.

Ann Draughon reported on the Program Advisory Committee meeting scheduled for Sunday, July 31, 1994 from 4:00 - 6:00 PM. This is an open meeting and she encouraged the Affiliate Council to send a representative. Terry Munson agreed to chair a symposium committee. Other committee members are Mike John, Beth Johnson and Joe Disch. This committee will meet at 1:00 on Sunday, July 31 and a representative will attend the PAC meeting.

John Bruhn reported on the changes in the Constitution and by-laws. He worked closely with Ron Case to develop the changes. The changes in the Constitution calls for the Affiliate Council to develop operational guidelines. Motion: T. Musson/R. Fuqua "to present revised Constitution at the 1994 IAMFES Business Meeting." Accepted.

John Bruhn agreed to chair an Operation Guidelines Committee. Other committee members are C. Price, B. Johnson, S. Sumner and F. Weber. John Bruhn will provide a draft document to the committee. The committee will provide a completed document to Affiliate Council delegates prior to the 1995 meeting. At the 1995 meeting the Affiliate Council will discuss and vote on the Operational Guidelines.

The Affiliate Council delegates discussed the status of the Idaho and Louisiana affiliates. Motion: P. Nierman/R. Fuqua "to allow both affiliates another year to improve their status of their affiliate." Accepted.

There were five entries for the 1994 Shogren Award. It was difficult for the judges to determine what information was current in each application since the affiliates did not indicate their calendar year. Next year entries for the Shogren Award must indicate the affiliate calendar year and include information for that time frame.

The 1994 nomination committee was C. Price and S. Sumner. The committee nominated J. Disch from Wisconsin for the office of secretary. Motion: T. Musson/D. Bechtel "that J. Disch be elected by acclamation." Accepted.

The Affiliate Council delegates discussed the issue of having the chairperson serve a two-year term. Motion: D. Klee/H. Uhlman ""that the office terms for secretary and chairperson remain the same with the secretary moving up chairperson." Accepted.

Affiliate Council Delegate Reports

TX - This has been a year of transition for the affiliate. Things are going well for the IAMFES meeting. They had 150 people registered for their June 1994 meeting.

NE - Sponsors one meeting (1 day) a year. Membership continues to be strong at 75.

Ontario - Sponsors a Fall annual meeting/symposium and a spring workshop. They also sponsor a scholarship.

Alberta - Their membership has increased. They sponsor three dinner/technical meetings a year. This year they established their own scholarship fund in addition to a joint scholarship which they sponsor.

TN - They sponsor two meetings a year. They had excellent attendance at their June meeting since the state inspectors also met at the same time.

GA - They sponsor two meetings which cover hot topics in the area of dairy, poultry, food science and general food topics. The topic for their August meeting depends on the affiliation (industry or university) of the vice-chairperson. This year they had a meeting which centered on media issues such as TV and newspaper reports. This meeting was well received. They also sponsor a scholarship for a graduate student to attend the IAMFES meeting.

PA - This affiliate will host the 1995 meeting. This year they changed their name to PAMFES. They hold an annual meeting in November at Penn State. They have four area affiliates that operate separate from the state affiliate. Sponsor a newsletter. They have 377 members.

OH - Most of their members come from the health department. They sponsor two meetings a year in the Columbus area. They usually have a tour for one meeting and an educational program.

KS - They have an October annual meeting and an educational program in April. They have a newsletter which is published quarterly. Cities in KS bid for the annual meeting. They sponsor two $500 scholarships.

Carolinas - The affiliate has been established for two years and is going strong with 75 members. This year they sponsored a tour at dairy farm and dairy plant. They had an excellent technical program which included information on *E. coli* O157:H7 and HACCP seafood.

AL - They have been an affiliate for 5 years. They have a 1 ½ day annual meeting in November.

MI - The Michigan Environmental Health Association averages over 300 people per meeting. They are concentrating on implementing HACCP programs at the state level.

FL - In 1995, the Florida affiliate will celebrate their 50th anniversary. They will host the 1997 meeting in Orlando. At their meeting this year, they had an excellent speaker from CNN. They sponsor prizes for high school science fair winners.

CA - The California affiliate sponsors two meetings a year: one in northern California and the other in southern California.

WA - The Washington affiliate will host the 1996 IAMFES meeting. They hold their annual meeting in September or October. They focus their attention on issues at the farm, field, regulatory, production and management levels.

NY - The New York affiliate has 571 members and 82 sustaining members. They hold their annual meeting in September. They publish four newsletters and an Annual Report each year. There are 13 affiliates of the State Association which each hold four to seven meetings annually.

Metropolitan - This affiliate completed their first full year with much success. They held a 1/2 day technical this year.

ND - They hold one annual meeting (two days) each year which rotates to different locations in the state. The local health district is the host for the annual meeting. Before this year's Annual Meeting they will host a pheasant hunt.

IN - This year they had two new activities to increase membership. They first had a two-for-one membership. If an existing member brought in a new member, the membership was free. Their second plan was to rebate $2 per each new member of the seven branch affiliates. Both of these plans were successful in getting new members. They sponsor a newsletter, scholarship and have two meetings per year.

WY - The Wyoming Public Health Association will jointly sponsor a satellite food safety course with the Wyoming Department of Agriculture and the University of Wyoming.

KY - The Kentucky affiliate has 300+ members. They sponsor a 2 ½ day meeting in February, workshops and a mid-year meeting.

MO - The Missouri affiliate has a three-day meeting in the spring. They offer six different sessions at this meeting. They have developed a new brochure for membership recruitment.

MN - The Minnesota affiliates continue to focus on dairy sanitarian and field inspectors with a very active 350 members. They hold their annual meeting in September and in April they hold a technical meeting. They sponsor several awards and scholarships.

IL - The Illinois affiliate was the 1994 Shogren award winner. They have a spring and fall meeting with very diversified programs. They sponsor a newsletter two times per year.

Charles Price announced the following affiliate recognitions:

Outstanding Annual Meeting — Wisconsin
Outstanding Communications — Ontario
Outstanding Membership Achievement — California
Outstanding Educational Programs — Illinois

The minutes of the August 3rd, 1993 Affiliate Council meeting were discussed. Minor changes were made in spelling of names and the addition of delegates present. Motion: D. Klee/R. Fuqua "to accept the minutes as amended with a charge to the Affiliate Chairperson to reinforce the Affiliate Council recommendations to the Executive Board." Accepted.

The meeting was adjourned at 11:17 am.

Submitted by: Susan Sumner, Secretary

AUDIO VISUAL LIBRARY PDG

Members Present: Schmidt (chairman), Darrah, Gilmore, Swick, and Vasavada; Draughon and Clingman (Ex. BD.); Haverland and Marshall (Foundation)

Summary of Activities and Actions Taken:

- IAMFES Report
  1. Library Usage Data
     a) Current Holdings: 204 total copies

1 copy - 52	5 copies - 3
2 copies - 18	7 copies - 2
3 copies - 7	8 copies - 2
4 copies - 10	10 copies - 1

b) Usage
Total requested 811
Total fulfilled 474

c) Budget
Allocated $4,000
Expended $4,700
Balance ($700)

- Videotape Acquisition Program

Initiated last year to obtain additional back up for heavily used tapes ($1,986 expended)

- Improved Efficiency Program

1) More efficient review process appears to be functioning

Motion (Swick) - "That IAMFES provide postage (as needed) for reviewers when returning their tapes (passed)"

2) Non-returned videotape

a) Revisited issue of charging a deposit

Motion (Vasavada) - "That a policy be put in place as follows: (1) A post card reminder be sent one week past loan period (3 weeks); (2) After an additional 30 days an invoice be sent for the purchase price (or value) or minimum of $25.00 (passed).

- Additional Discussion:

1) Budget request was discussed with Foundation members present

2) The need to purge and or update library holdings which are outdated. Plan to solicit assistance from other committees and PDG.

3) An appeal is being made for new PDG members and reviewers: If interested contact the IAMFES office.

Recommendation to Ex. Bd.

- Support budget request of $6,000

Submitted by: Ronald H. Schmidt

Foundation Report

Members Present: Dee Clingman, F. Ann Draughon, Robert T. Marshall, Earl Wright, Steven K. Halstead, David Tharp, A. Richard Brazis

Presiding: Harry Haverland

Summary of Activities and Action Taken: The Audio-Visual Library and the Foundation Fund Committee overlapped for several minutes. This was beneficial to both groups since the Audio-Visual members were concerned about additional funding from the Foundation Fund. It was agreed that the Library provides a valuable service to the membership and should be maintained at a quality level. Although the funding in 1993/94 was $4,000, it fell short of meeting the needs. The Audio-Visual Committee asked that the Foundation Fund Committee provide $6,000 in 1994/95 to meet projected costs. The Foundation Fund Committee agreed to provide the requested amount.

Dave Tharp reviewed the income and expenditures of the Foundation Fund. Approximately 80% of the Foundation's funds are now drawing, on an average of 5.5% interest. Bob Marshall recommended that we should, as rapidly as we can, move the monies into higher return investments. It was agreed that in order for the Foundation Fund, per se, to grow we need to establish a systematic approach to off-set inflation and increase our base. With the Executive Board's consent, the Committee would like to take 3% of the Foundation's gross income to meet this objective. Additionally, to maintain the Foundation's viability, service to the membership, and growth, the Committee would like to have a DONATION line added to the membership renewal form. (This was discussed following the meeting.)

Steve Halstead discussed the cooperative program between IAMFES and the Food and Agriculture Organization (FAO) in Rome, Italy for the distribution of surplus Journals to developing countries. This was successfully accomplished in 1994 and we would like to continue this worthwhile endeavor. To this end a letter was enclosed in each registration packet asking for support.

All of the activities being supported by Foundation monies were reviewed. We agreed with the *Dairy, Food and Environmental Sanitation* Journal Policy Committee that the DFES Awards Competition has reached maturity and should be discontinued. Bob Marshall introduced a motion, and seconded by Earl Wright that this recommendation be made to the Executive Board.

Although the Developing Scientist Awards Program is viable, we need to examine and implement ways of marketing this program to ensure continued success.

The projected income for 1994/95 is estimated at $11,500. Expenditures to support program activities is within the parameters of the income, estimated at $11,500.

Recommendations to the Executive Board:

1. In concurrence with the cited Journal Policy Committee that the Journal Awards Competition be discontinued
2. The Board concurs with the recommendation that 3% of the Foundation's gross income be set aside to prevent erosion of the base
3. The Board accepts the recommendation that a **Donation/Support** line be added to membership renewals to support and provide for future activities
4. The Board continues to support the cooperative program between IAMFES and FAO for the distribution of surplus Journals — we are looking to the future
5. The Executive Board approves "show-casing" the Developing Scientist Awards Program on the cover of the Journal(s) at an appropriate time

Submitted by: Harry Haverland

IAMFES FINANCIAL STATUS
SEPTEMBER 1, 1993 TO AUGUST 31, 1994

Cash on Hand September 1, 1993	**166,158**	
Cash Flow from Operations:		
		% of Total Revenue
Revenue:		
Advertising	142,566	16.11
Membership	220,942	24.97
Communication	327,109	36.99
Administrative	14,245	1.61
Annual Meeting	146,360	16.54
Workshops	8,955	1.01
Feagan Award Fund	10,859	1.23
Restricted Fund	1,192	0.13
Foundation Fund	12,515	1.41
Total Revenue	884,743	100.00
Expense:		
Salaries & Benefits	325,354	36.78
Building Operations	38,355	4.34
Office Operations	88,459	10.00
Professional Services	29,307	3.31
Publications	229,013	25.88
Travel	9,893	1.12
Executive Board	8,137	0.92
General Committee	2,579	0.29
Miscellaneous	6,671	0.75
Annual Meeting	105,314	11.90
Workshops	8,151	0.92
Feagan Award Fund	0	0.00
Restricted Fund	80	0.01
Foundation Fund	9,883	1.12
Total Expense	861,196	97.34
Revenue Less Expense	**23,547 ***	**2.66**
Change In:		
Asset/Liability Accounts	57,216	
Net Cash Flow from Operations	**80,763**	
Investing Activities:		
Equipment Purchases	(20,816)	
Net Change in Cash Flow	59,947	
Cash on Hand August 31, 1994	**226,105**	

*** Revenue Generated by Fund**

General Fund	8,944
Feagan Fund	10,859
Restricted Fund	1,112
Foundation Fund	2,632
Revenue Less Expense	23,547

IAMFES AWARDS PRESENTED...

1 · 9 · 9 · 4

Samuel J. Crumbine Consumer Protection Award

The Samuel J. Crumbine Award recognizes the importance of food protection at the local level. Each year, this award is presented to a local health department that has demonstrated unsurpassed achievement in providing outstanding food protection services to its community. This award provides acknowledgment for the contributions to public health and food safety that the unsung work of restaurant and food store inspectors make.

The Dupage County Health Department, recipients of the Samuel J. Crumbine Award.

The award, which honors Dr. Samuel J. Crumbine, a pioneer in disease prevention techniques who banned the common drinking cup, is sponsored by the Food Service & Packaging Institute. An independent panel of health professionals who are experts in the field of food safety selects the winner.

The 1994 Samuel J. Crumbine Award was given to the Dupage County Health Department (Illinois). The department was selected for having the best food protection program. The award is three engraved brass medallions that were presented at the Awards Banquet during the 1994 Annual Meeting.

Nobert F. Sherman Award

John Marcello (right) of the Educational Foundation of the National Restaurant Association presents the Norbert F. Sherman Award to Paul Hall

The Norbert F. Sherman Award, sponsored by the Educational Foundation of the National Restaurant Association, provides recognition for outstanding articles on food-service food protection appearing in the *Journal of Food Protection* or *Dairy, Food and Environmental Sanitation*. The award honors Norbert F. Sherman, the late treasurer of the Educational Foundation and an advocate of improved industry food protection standards. The 1994 Sherman Award was presented to:

The Microbiological and Food Safety Committee of the
National Food Processors Association
for
"HACCP Implementation: A Generic Model for
Chilled Foods"

The article appeared in the December, 1993 *Journal of Food Protection*. Paul Hall of Kraft Foods accepted the award. The authors received a distinguished plaque and a check for $500.

Dairy, Food and Environmental Sanitation Outstanding Articles

The IAMFES Foundation awarded certificates and $250 to authors with outstanding articles in the areas of Dairy, Food and Environment for the *Dairy, Food and Environmental Sanitation* journal.

This year's winners were:

Food Article: "Safe Handling of Potentially Hazardous Foods (PFH) - A Checklist" by George H. Reed, Jr., University of Massachusetts at Amherst, Amherst, MA.

Dairy: "Recovery of Short Chain-Length Fatty Acids from Milk by Several Methods," by G.L. Christen (senior author), N. Shen and J.L. Maruri, University of Tennessee, Knoxville, TN.

Environment: "GLPs - What are They and How Can They Help Food Processors?" by Richard F. Stier (senior author), Trean K. Blumenthal and Michael M. Blumenthal, Libra Laboratories, Metuchen, NJ.

Charles Price (right) presents the C. B. Shogren Award to Ron Case (left) of AIMFES.

C.B. Shogren Award

The Shogren Award is presented to the IAMFES Affiliate that shows outstanding service to its members over the past year. The 1994 recipient is the Associated Illinois Milk, Food & Environmental Sanitarians. The award was presented by Affiliate Council Representative, Charles Price and includes a plaque and check for $100.

Developing Scientist Awards

The Developing Scientist Awards Competition is sponsored by the IAMFES Foundation. Students' papers and presentations are judged and first through third place are announced for oral presentations and poster presentations. First place recipients receive $500, second place receive $300 and third place receive $100.

John Cerveny (right) presents the First Place Oral Presentation Award to J. David Monk (left).

Oral Presentation Award winners were:

First Place - J. David Monk, Centers for Food Safety and Quality Enhancement, Department of Food Science & Technology, University of Georgia, Griffin, GA, for "Irradiation Inactivation of *Listeria Monocytogenes* and *Staphylococcus aureus* in Ground Beef as Affected by Fat Content and Temperature."

Second Place - Charles Powell, Food Science Department, University of Manitoba, Winnipeg, Manitoba, Canada, for "Microbiological Evaluations of Reprocessed Broiler Carcasses."

Third Place - Nandini Natrajan, Department of Food Science, North Carolina State University, Raleigh, NC, for "Development of Bacteriocin-Based Packaging to Reduce Pathogenic Organisms in Fresh Poultry."

Poster Presentation Award winners are:

First Place - Ratih Dewanti, Department of Food Microbiology & Toxicology, University of Wisconsin-Madison, Madison, WI, for: Biofilm Formation by *Escherichia coli* O157:H7 on Stainless Steel Surface: Effect of Chemical Agents."

Second Place - J.R. Patel, Center for Food Safety and Quality Enhancement, University of Georgia, Griffin, GA, for "Efficacy of the Microcolony Immunoblot Technique to Detect Heat-Injured *Listeria Monocytogenes*."

Third Place - Chen-Jang Liu, Food Science Program, Department of Animal Science, University of Maryland, College Park, MD, for "S-Value and Epifluorescence Determination of Bacterial Attachment on the Cleaning Brush of an Automated Milking System."

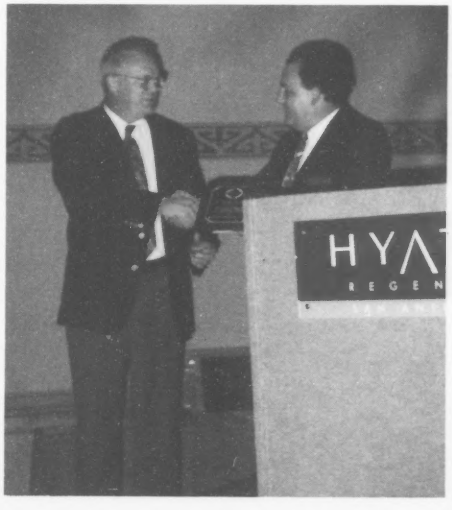
John Cerveny (right) presents the First Place Poster Award to Ratih Dewanti (left).

Membership Achievement Award

This Award is presented to the IAMFES Affiliate which has had the most new members in the past year. This year's winner was the California Association of Dairy & Milk Sanitarians.

Harold Barnum Industry Award

IAMFES President C. Dee Clingman (right) presents the Harold Barnum Award to R. Bruce Tompkin (left).



The Harold Barnum Industry Award, sponsored by NASCO International, is given in recognition of outstanding service to the public, IAMFES and the profession of a Sanitarian. The 1994 recipient of the Harold Barnum Industry Award was R. Bruce Tompkin, Vice President for Product Safety, Armour Swift-Eckrich.

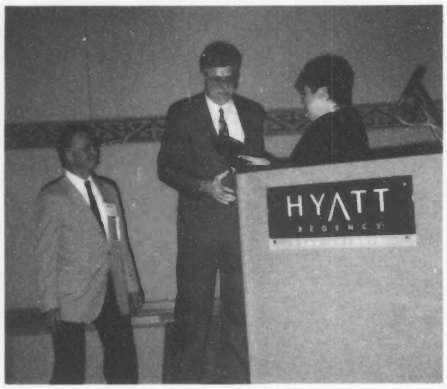
Mr. Tompkin has been directly involved in the many achievements of the meat industry in its efforts to provide higher quality, safer products for the American consumer. His work has included studies of sanitizers and disinfectants as well as packaging technologies. Lately, he has been deeply involved with HACCP and its industrial applications.

Mr. Tompkin is very active professionally. He holds memberships in IAMFES, IFT, ASM, APHA, AMI and the PELI. He has served on a number of international committees including

the WHO, National Academy of Science, and the Advisory Committee on Microbiological Criteria for Foods.

Mr. Tompkin is a prolific writer with over 90 articles, papers and book chapters to his credit. He has published works in nearly every scientific journal. He has lately concentrated on meat microbiology, pathogen reduction and HACCP. Mr. Tompkin received a plaque and $1,000 for his Award.

Ann Draughon (right) and Henry Atherton (left) present the Educator Award to Kenneth R. Swartzel (center).



Educator Award

The Educator Award, sponsored by IBA, Inc., honors outstanding service in academic contribution to the profession of the Sanitarian. The 1994 Educator Award was presented to Kenneth R. Swartzel, William Neal Reynolds Professor of Food Science, North Carolina State University. Mr. Swartzel divides his time between research and teaching, with more than a few extra hours thrown in as the Interim Food Science Department Head.

His understanding of heat flow in food processing led to the discovery of the process used to pasteurize and aseptically package eggs, and to the establishment of calibrating materials for thermal processing evaluation. Recent work has been in the areas of thermal memory of cells which will allow food processors to track heat transfers throughout the food processing cycle.

Mr. Swartzel is deeply involved in seeking better understandings and cooperations between academia and industry. He led the efforts to create the Center for Aseptic Packaging Studies and served as its first director.

Mr. Swartzel is active in many professional groups including IAMFES, IFT, ASAE, ADSA and AICE. He has received numerous other awards and has been published extensively.

Harold Bengsch (right) presents the Sanitarian Award to Charles Price (left).

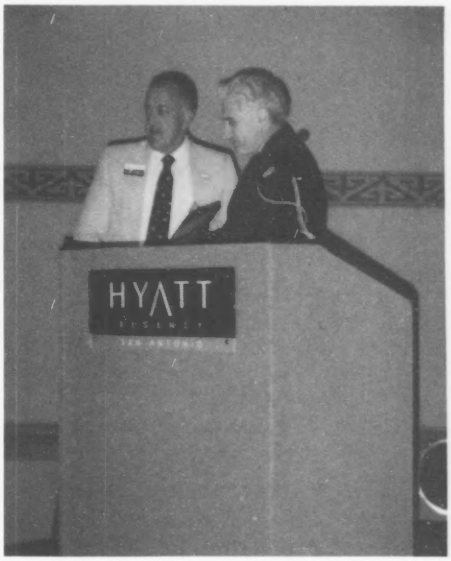
Sanitarian Award

The Sanitarian Award is sponsored by Diversy Corporation, Klenzade and H.B. Fuller Co., Monarch Division, to recognize an individual for outstanding service to the profession of the Sanitarian. The 1994 Sanitarian Award recipient was Charles Price, Senior Milk Specialist for the U.S. Food and Drug Administration. Mr Price was nominated for the award by his colleagues of the Associated Illinois Milk, Food and Environmental Sanitarians.

Mr. Price works throughout the midwest, overseeing the milk safety programs of seven states. When not inspecting dairy

plants, he is likely to be found presenting seminars and workshops or attending meetings somewhere in the midwest. He has made numerous presentations on plant safety, sanitation and processing procedures throughout the country. He recently was invited by the Canadian Government to serve as part of an FDA team evaluating dairy processing in Quebec.

Professionally, Mr. Price is active in IAMFES, serving on several committees and currently acting as chairperson of the Affiliate Council and, as such, a voting member of the executive Board. He has twice been president of his state affiliate (AIMFES), and served as co-chairperson of the Local Arrangements Committee for the 1990 IAMFES Annual Meeting. He is currently serving as editor of the AIMFES Newsletter.



Michael Doyle (right) presents the Citation Award to Sid E. Barnard (left).

Citation Award

The Citation Award is presented by IAMFES to an individual in recognition of years of services and devotion to the ideals and objectives of the Association. The 1994 Citation Award winner is Sidney E. Barnard, Professor of Food Science, Pennsylvania State University.

Mr. Barnard has been an active member of IAMFES for many years. He serves on many committees with a particular interest in the Milk Quality and Safety and the Applied Laboratory Methods Professional Development Groups. Mr. Barnard served on the IAMFES Executive Board for a number of years and was president of the Association in 1986.

Mr. Barnard was instrumental in establishing the IAMFES Lending Library and has contributed several materials to it. He also had a hand in starting *Dairy, Food and Environmental Sanitation*. He served on the DFES Advisory Committee for a number of years and has submitted numerous articles to the publication.

Honorary Life Membership

From time to time, the IAMFES Executive Board recognizes IAMFES members for their outstanding achievements by making them Honorary Life Members. The most recent recipient of this honor is Ken Kirby.

Mr. Kirby's entire working career has been in the dairy industry. His favorite role is that of a field representative which allows him to work one-on-one with dairy farmers to improve their sanitation techniques. He has the ability to communicate both the urgency and the possibilities of dairy sanitation.

Mr. Kirby has been an active participant in both IAMFES and the Wisconsin Association of Milk and Food Sanitarians. He has served on numerous IAMFES committees and was the Wisconsin chairperson of the Local Arrangements Committee for the 1990 Annual Meeting. In 1988, he received the Harold Barnum Industry Award. In 1989, he was President of WAMFS and was named the WAMFS Sanitarian of the year in 1990.

The Black Pearl Award

"The elusive Black Pearl, sought after from oceania to the Orient by European lords and Asian emporers alike. Its rarity is a sign of determination. Its luster a sign of quality. Its acquisition a sign of excellence."

So goes the ancient writing regarding the mystical "Black Pearl."

Thanks to the benevolence of Mr. Wilbur Feagan and the F & H Food Equipment Company, the IAMFES Board has created an additional recogition award category known as the "Black Pearl Award." This award is directed toward recognizing corporate commitment to food safety efforts. As such, the Black Pearl Award recognizes a company for its outstanding achievement in corporate excellence in food safety and quality.

Harold Bengsch (center) and Wilbur Feagan (right) present the Black Pearl Award to Bill Fry (left) of the H-E-B Company.

Criteria for evaluating nominations for the Black Pearl Award include: contributions to public health principals and food safety; food safety education activities; evidence of support for the goals and objectives on IAMFES; evidence demonstrating ethical and fair business practices; evidence of community/consumer relations to promote food safety; employee programs to promote food safety; products and/or services demonstrating a commitment to food safety; evidence that facilities are designed with food safety and sanitation as a primary concern, and evidence of adherence to food safety regulatory requirements.

This year's conference marked the first year for this award, and its recipient, the H-E-B Food Company is one of the largest privately-owned grocery companies throughout the state of Texas. It has three major manufacturing and distribution centers (Corpus Christi, Houston and San Antonio) and one HACCP-designated central commisary. The company operates two modern milk plants, an ice cream plant, a sweet goods bakery, bread bakery, tortilla and chip factory and a meat plant. H-E-B has over 42,000 employees and serves over 200 million customers annually.

1994 IAMFES Annual Meeting Exhibitors

3M Microbiology Products

St. Paul, MN **Sustaining Member**

Petrifilm™ plates increase efficiency to roise your productivity ond offer quality control made easy. Petrifilm plates save time because they're easier to use and deliver consistent, easy-to-read results. They reduce microbial testing to three simple steps. The Petrifilm plate family includes: Petrifilm aerobic count plates, Petrifilm coliform count plates, Petrifilm high-sensitivity coliform count plates, Petrifilm *Escherichio coli* count plates, and Petrifilm yeast and mold count plates. Also available is the Petrifilm test kit-HEC for hemorrhagic *E. coli* O157:H7 testing in meat and poultry.

Phone: (800) 228-3957
Fax: (612) 733-9596

A B C Research Corporation

Gainesville, FL **Sustaining Member**

Full service food chemistry and micrabiology laboratory. FDA accepted, seofood imports; decomposition, residues, filth analyses, HACCP training courses, foreman, supervisors ar custom designed for individual companies. Nutritional labeling; water and wastewater analyses; product development, pilot plant, plant audits, cansulting, government liaison.

Phone: (904) 372-0436
Fax: (904) 378-6483

A & B Process Systems Corp.

Stratford, WI **Sustaining Member**

As a single source supplier: A & B Pracess Systems pravides pracess flaw engineering and design, custom process equipment fabrication, process control systems and expert installation services. Specific areas of expertise include: CIP units/systems, "ECOMATE" cleaning solution regeneratian, pasteurizers, blending-batching systems; process vessels & agitatian.

Phone: (715) 687-4332
Fax: (715) 687-3225

Advanced Instruments, Inc.

Norwaad, MA

Advanced Instruments displayed cryoscopes for detectian af added water in milk, and the Fluorophos® ALP Test, o three-minute quontitotive alkaline phosphatase assay that detects as little as 0.0006% raw milk contamination in finished dairy products.

Phone #: (617) 320-9000
Fax #: (617) 320-8181

Atkins Technical, Inc.

Gainesville, FL **Sustaining Member**

Digital Thermocouple thermometers, digital temperature recorders, thermometer spoons, temperature probes, clipboord thermometers and panel thermometers.

Phone: (904) 378-5555,
(800) 284-2842
Fax: (904) 335-6736

Aquionics, Inc.

Erlanger, KY

Single lamp, high intensity ultraviolet systems for the disinfection of fluids, air and surfaces were on display. Newly designed lamps provide more economical water treatment with minimum maintenance and replacement cost. Units are suitable for treatment of carbon filtered water, incoming plant water, brine, chilled water, and transport waters. New campact surface unit is cost effective far packing disinfection such as yagurt and cottage cups, and paperboard containers. Control entire environment with UV systems designed for maving air flows ducted to culture, filling and packaging rooms.

Phone: (606) 341-0710,
(800) 925-0440
Fax: (606) 341-2302

Becton Dickinson Microbiology Systems

Cackeysville, MD **Sustaining Member**

Becton Dickinsan Micrabiology Systems exhibited praducts utilized far the cultivatian and identification of foodborne pathogens, including *Solmonello* and *Listerio*. The company also exhibited a complete line of BBL Pour Bottled Media for recovery of foodborne pathogens. In addition, an innovative new identification system that was recently introduced, will be presented as well as a new line af disposable dilution bottles to enhance user convenience in quantitative plating techniques.

Phone: (410) 771-0100
Fax: (410) 584-2806

Bentley Instruments, Inc.

Chaska, MN **Sustaining Member**

Bentley Instruments manufactures analytical instrumentation for milk analysis. On display was the Samacount instrument far samatic cells in milk and the Bactocount instrument for rapid determination of bacteria in milk.

Phone: (612) 448-7600
Fax: (612) 368-3355

See our ad on page 660.

BioControl Systems, Inc.

Bothell, WA

BioControl is committed to providing simple, accurate, and cost effective rapid diagnostic test systems for microbiology. Our products include the 1-2 Test; Assurance EIA for *Solmonello, Listerio, E. cali* O157:H7; ColiTrak, ColiTrak Plus and ColiComplete for colifarm and *E. coli* testing. Also featured was new to industrial microbiology, a fully automated EIA processor.

Phone: (800) 245-0113,
(206) 487-2055
Fax: (206) 487-1476

bioMérieux Vitek

Hazelwoad, MO **Sustaining Member**

biaMérieux Vitek, Inc. is committed to praviding the food industry with fully-automated, semi-automated, and manual test systems far QA/QC microbiology laboratary. VIDAS® and mini VIDAS® are fully autamated immunaassay systems used for rapidly screening pathogens such as *Salmanella, Listerio*, Staphylococcal enterotoxin, and *E. coli* O157:H7. The Bactometer is available for the detection and enumeration of micraarganisms in hours instead of days. For the identification of microorganisms, the VITEK® system, ATB® Identification System, or API® test strips pravide rapid results typically in 4-24 h.

Phone: (800) 638-4835,
(314) 731-8500
Fax: (314) 731-8700

Biotrace Inc.

Plainsbara, NJ

With sanitatian testing, sampling has always been the limiting factor—until naw...UNI-LITE is the world's first swab monitor, a revolutionary system specifically designed ta measure the entire swab - directly, with no dilution or transfer losses and with simplified operatian. Test results are available in minutes.

Phone: (609) 897-0282
Fax: (609) 897-0289

Cargill Analytical Services

Cedar Rapids, IA

Cargill Analytical Services, camprised of three individual and interactive laboratories, offers micrabiological and chemical testing, as well as a wide variety of technical services. Assistance in problem-salving, nutritian labeling, quality contral, HACCP pragrams, methods and product develapment, an-site training and more are all pravided with a commitment to Tatal Quality.

Phone: (319) 366-3570
Fax: (319) 366-4018

Charm Sciences Inc.

Malden, MA **Sustaining Member**

Intraducing C2saft 2.4, data management saftware far the Charm which alsa handles ather laboratory data and sample attributes e.g. butterfat, DMC, weight, temperature etc., far a complete raw milk audit. Rapid Charm tests featured included antibiotics, aflatoxins, alkaline phasphatase, pesticides, and bacteria (predict shelf-life and manitar sanitation environment.)

Phone: (617) 322-1523
Fax: (617) 322-3141

See our ad on the back cover.

Crouch Supply Co., Inc.

Ft. Worth, TX **Sustaining Member**

Since aur business began in 1914, the "Hause of Service" slagan has provided Crouch Supply Ca. with the incentive to appreciate and value aur customers. With all af aur six lacations around the sauthwest we are able to provide the necessary supplies, equipment and chemicals far faod, beverage, dairy and pharmaceutical industries.

Phone: (800) 825-1110,
(817) 332-2118
Fax: (817) 332-6511

Custom Control Products, Inc.

Racine, WI **Sustaining Member**

CCPI is an electrical process engineering graup, specializing in the design and assembly of autamatian cantral systems far faod, dairy and beverage autamatian. CCPI exhibited bath flow diversion valve controls, FDVC 100 & FDVC 500 and aur new "Perfect HTST cantral system." "CCPI setting new standards in contral design, customer commitment and praduct performance.™"

Phone: (414) 637-9225
Fax: (414) 637-5722

DQCI Services, Inc.

St. Paul, MN

DQCI Services supplies component standards for the calibration of infrared equipment and somatic cell control samples for electronic manitoring by milk testing labaratories. DQCI also pravides a wide range af chemical and bacteriological testing af milk and milk praducts.

Phone: (612) 785-0484
Fax: (612) 785-0584

See our od on poge 716.

Dairy & Food Labs, Inc.

San Ramon, CA **Sustaining Member**

Dairy & Faad Labs, Inc. (DFL) is a client driven service laboratory offering the highest quality micrabialagical testing, chemical analyses, and nutritianal labeling services. DFL can assist yau in your HACCP, Quality Cantrol, Regulatory Needs, Pathagen Screens, Enviranmental Programs, Infra-Red Milk Analysis, Shelf-Life Studies, On-Site Training Pragrams and Cansultation.

Phone: (510) 830-0350
Fax: (510) 830-0379

Decagon Devices, Inc.

Pullman, WA **Sustaining Member**

AquaLab from Decagon measures water activity. Water activity is important in predicting faad quality and safety, and crucial in monitoring micrabial grawth and enzymatic synthesis. AquaLab is accurate, ±0.003 a_w, aver a wide range, 0.030 ta 1.000 a_w, with the fastest measurement time, less than 5 min per reading.

Phone: (509) 332-2756

Difco Laboratories

Detriot, MI **Sustaining Member**

Difca Labarataries, a warldwide leader in quality products for industrial microbiology, will feature new praducts including 3-Step™Gram Stain, faad testing culture media, Sterility Battles and Triple Bagged Sterile Contact Plates.

Phone: (800) 521-0851
Fax: (313) 462-8517

Diversey Corporation

Livonia, MI **Sustaining Member**

Diversey Carparatian is the largest glabal supplier af sanitation praducts and programs. Featured at IAMFES was Shur-Visian, a software based pragram which allows plant personnel to take a praactive appraach ta Lab Management and CIP process management. QIP (Quality Insurance Pragram) offers micrabialagical analysis af finished praducts and surfaces utilizing state af the art detectian equipment with rapid results.

Phone : (800) 521-8140,
(313) 458-5000
Fax: (313) 458-2471

Dresser Industries Instrument Division

A broad selection of Ashcraft® pressure gauges, thermometers, thermawells, transducers and switches ta indicate pressure and temperature, switch at designated pressure, and transmit pressure readings as needed. All stainless steel construction for durability. Electropolished diaphragms far reliable, clean surfaces, steam-in-place capability for on-site cleaning and sterilizing. 3-A appraval.

Phone: (203) 378-8281
Fax: (203) 385-0289

E M Science

Gibbstown, NJ

The ReflectoQuant Analysis system is a handheld analysis system camposed af ian specific test strips (including peraxide, peracetic acid and nitrate) and a reflectance meter. Pragram the RQ flex meter with the bar cade and dip the test strip in the sample. Insert the test strip inta the meter and read the concentration directly.

Phone: (800) 222-0342
Fax: (609) 423-4389

The Educational Foundation of the National Restaurant Assn.

Chicago, IL **Sustaining Member**

Servsafe® faod safety training materials: Applied Faadservice Sanitatian, the mast widely used and accepted faad service sanitatian certification program in the natian; Managing a Faad Safety System certificatian caurse; HACCP Reference Book; Serving Safe Food Employee Guide; Serving Safe Food Video Series, including the new HACCP video "Managing Faad Safety."

Phone: (312)715-1010,
(800) 765-2122
Fax: (312) 715-0807

Electro-Steam Generator Corporation

Alexandria, VA

Electro-Steam Generator Carparatian manufactures an ALL-ELECTRIC steam generatar. Steam far sterilizatian, caaking, and cleaning —wherever quality steam is needed. Each unit is hand built to your specification and is

approved by ASME, National Board of PVI, UL, ETL, and CSA.

Phone: (703) 549-0664,
(800) 634-8177
Fax: (703) 836-1299

Charles Felix Associates

Leesburg, VA
Charles Felix Associotes is a consulting firm specializing in public health promotion, particularly in the area of food safety. The CFA exhibit offered samples of CFA publicotions: Food Protection Report ond Food Tolk; olso materials from CFA clients relating to single service (the foodservice & packaging institute) and ice sanitation (The Pockoged Ice Association).

Phone: (703) 777-7448
Fox: (703) 777-4453

Foss Food Technology Corporation

Eden Proirie, MN **Sustoining Member**
Foss Food Technology provides high quality onalytical instruments, consumables, and diognostic kits for QC, Production, ond Online Process Control to the Dairy, Food, Feed, and Beverage industries. Through our sales locations throughout North Americo, FFTC provides the instruments thot (1) Automoticolly onolyze fot, protein, loctose; (2) Ropidly count somatic cells and bacteria in milk and milk products; (3) Digest or Ash a wide range of samples to determine their moisture; (4) Determine fats and oils in food, animal food, meat, ond cereols; (5) Determine Protein in food, feed, groin, and meot; (6) Determine moisture in cereols, ond (7) Determine viscosity of storch, gel, batter, shortening, etc., ond sprout damage.

Phone: (612) 941-8870
Fax: (612) 941-6533

G & H Products Corp.

Kenosha, WI **Sustaining Member**
See our line of sanitary pumps (Centrifugal, Positive CIPable; Valves (manual & actuated, mixproof); Magnetic Flowmeter-for use in a Meter-bosed Timing System used in o grode A milk plant.

Phone: (414) 694-1010,
(800) 558-4060
Fax: (414) 694-2907

Gardex Chemicals Ltd.

Etobicoke, Ontario **Sustaining Member**
Gardex Chemicols Inc. is in the business of importing, manufacturing and distributing pest control supplies and equipment. Gardex responds to the industry's demand for greater access to technology and innovative products worldwide. Gordex not only offers a complete line of insecticides, baits, glue boards, monitors, application equipment and light traps, but is able to offer ancillary services such as application training and consultation on pest management.

Phone: (416) 675-1638,
(800) 563-4273
Fax: (416) 675-06727

See our od on page 660.

Gist-brocades Food Ingredients

Menomonee Falls, WI **SustainingMember**
Gist-brocades Dairy Ingredients Group demonstrated its new Delvo X-PRESS 8-min test for detection of ontibiotics in bulk milk, os well as displaying Delvotest® P/SP stondord diffusion tests for determining the presence of antibiotic residues in individual cow samples.

Phone: (414) 255-7955,
(800) 423-7906
Fax: (414) 255-7732

Idetek

Sunnyvale, CA **Sustoining Member**
Idetek utilizes advanced biotechnology diagnostic methods to ensure food quality, animal heolth ond environmentol safety. The 7-min LocTek tests enable detection of drug residues ot/neor the tolerance level in row milk ond finished dairy products. LocTek hos rapid ond reliable tests for Beta-Lactams, Sulfamethazine, Ceftiofur, Tetracyclines ond Gentamicin. Residue tests are also offered for Staphylococcus enterotoxin, Aflatoxin ond pesticides.

Phone: (408) 745-0544
Fox: (408) 745-0243

IDEXX Laboratories

Westbrook, ME **Sustoining Member**
IDEXX Laborotories monufoctures and markets advonced biotechnology-bosed, ropid detection systems for health and quality ossuronce applications in the food and environmental industries. Products include Colileri, o USEPA-opproved 24-h test for total coliforms and *E. coli* in water; and SNAP antibiotic residue screening test for milk processing plonts.

Phone: (800) 321-0207

International BioProducts, Inc.

Redmond, WA
International BioProducts is dedicated to providing the highest quality products to the food microbiology laboratory. We offer the TECRA diognostic products for the rapid detection of *Salmonella, Listeria Staphylococca* Enterotoxins A-E and *Bacillus Diarrhoeal*: Enterotoxin. TECRA UNIQUE is a 22-h *Salmonella* test. Tecro OPUS is on automoted ELISA system for rapid *Salmonella* and *Listeria* detection. International BioProducts sells over 1000 general use laboratory supplies including dehydrated and pre-poured culture media, pipets Petri dishes, & sample bacteria.

Phone: (206) 883-1349
Fax: (206) 881-6880

Integrated Biosolutions, Inc.

Monmouth Junction, NJ **Sustaining Member**
Microbiology - The Next Generotion: Experience the future of microbiology. Lumac bioluminescence assays offer speed, simplicity, and automation. From our two minute sanitation control test, to raw moterials ond finished product screens, a voriety of procedures ore ovoilable which meet your needs. Also on display: An integrated system of instruments which automates traditional microbiological procedures.

Phone: (908) 274-1778,
(800) 222-8260
Fax: (908) 274-1733

Klenzade, Ecolab Inc.

St. Paul, MN **Sustaining Member**
Sanitation products, systems and services for the dairy, food and beverage processing industries, including potented detergents, sonitizers, disinfectonts; CIP system design, instollotion ond fobricotion ond doiry plant lob software systems.

Phone: (612) 293-2549
Fax: (612) 293-2260

Meritech, Inc.

Englewood, CO
CleonTech® Automoted Hond and Glove Washing Systems. Proper handwashing is our specialty! If your handwashing procedures consist of manual woshing or dip stotions, Meritech offers a more convenient, more effective process thot guorontees on increose in your employee handwoshing complionce. CleanTech systems are now in use in over 400 foodhandling environments. They can make compony handwoshing policies become reality for the first time. Two of our five models were ovoilable for demonstrotion ot the 1994 IAMFES Convention.

Phone: (800) 932-7707,
(303) 790-4670
Fax: (303) 790-4859

Micro-Gen Equipment

Son Antonio, TX
Micro-Gen disployed the Vector Fly System, a new technology used to capture flies without chemicals, zapping or exploding body ports. Also on display was ULD BP300, ULD BP100,

Micro-Injector, Mouse Master, Pro-Control Total Release Foggers, Pro-Control Ant Bait ond other ULD Fogging equipment and chemicols.

Phone #: (210) 654-8570
Fax #: (210) 654-3613

Nasco

Fort Atkinson, WI **Sustaining Member**
Nasco manufactures Whirl-Pak, sterile, polyethylene bags used for product sampling, QA testing, ond R & D. These bags feature potented "Puncture Praof Tabs" which eliminate the sharp wire ends and bag puncture. Sterility documentation is ovoilable for every box; special bags are available for the Stomacher blender, *Listeria/Salmonella* testing and water sampling.

Phone #: (414) 563-2446
Fax #: (414) 564-8296

Nelson-Jameson, Inc.

Marshfield, WI **Sustaining Member**
Nelson-Jameson offers a wide range of unique products to help food & dairy processors integrate QA/QC with plant operations. Over 7500 products are featured in their 416-page Buyers Guide. It's free to qualified buyers. Expert technical support, competitive prices, same-day shipping policy, and toll free fax or phone ordering are provided.

Phone: (800) 826-8302,
(715) 387-1151
Fax: (715) 387-8746

See our ad on page 655.

Organon Teknika

Durham, NC **Sustaining Member**
Organon Teknika is proud to intraduce EHEC-Tek™, an ELISA kit to screen faad samples for the presence of *E. coli* O157:H7 within 24 h. The excellent specificity of EHEC-Tek™ reduces the labaratory's volume of confirmatory testing. Organan Teknika also provides rapid screening kits and confirmatory assays for *Salmonella* and *Listeria.* These kits allow for early release of food products that are free of pathogens while minimizing hands-on time in the laboratory. Our ELISA based products for *Listeria, Salmonella,* and *E. coli* O157:H7 detection ore recognized as the leaders in rapid testing systems.

Phone: (919) 620-2315
Fax: (919) 620-2107

Q Laboratories, Inc.

Cincinnati, OH
Q Laboratories, Inc. is an independent testing ond consulting laboratory, providing microbiologicol ond analytical chemistry support to the food, beveroge, cosmetic, pharmaceutical, and dairy industries. Services include QC/release testing, antimicrobial efficacy testing, GMP testing, plant sanitation audits (HACCP approach), nutritional labeling, preservative analysis, shelf-life studies, ond complete pothogen testing. Our Research and Development Division provides analyst training and education programs in compendial and rapid methods.

Phone: (513) 662-1300
Fax: (513) 662-1380

Ralston Analytical Laboratories

St. Louis, MO **Sustaining Member**
Ralston Analytical Laboratories provides complete chemical and micrabiolagical testing services to the food industry. Microbiological food safety ond quolity tests are offered as well as shelf-life and microbial challenge studies. Other services include nutrition label testing and assays far vitamins, fatty acids, amino acids, minerals, and metals.

Phone: (314) 982-2806,
(800) 423-6832
Fax: (314) 982-1078

R-TECH

Minneapalis, MN
R-TECH is one of the world's largest contract faad research laboratories, with aver 200 trained profassionals on staff. We provide a full spectrum of research services including: analytical testing, nutrition labeling, product development, sensory evaluatian, packaging engineering, and pilot plant facilities.

Phone : (612) 481-2207,
(800) 328-9687
Fax: (612) 486-0837

See our od on page 688.

REMEL

Lenexa, KS
REMEL is a leading manufacturer of quality microbiology products which include culture media (plates and tubes), stains, reagents, bottled media (for sterility testing and growth), contact plates for environmental sampling and a wide selection of other microbiology products for the dairy and food industries.

Phone: (913) 888-0939,
(913) 255-6730
Fax: (913) 888-5884

Silliker Laboratories Group

Homewood, IL **Sustaining Member**
Silliker Laboratories in an international network of 13 lobs which specializes in ossessing the safety, quality and nutritional value of foods. Our food testing capabilities range from complete microbiological analyses to onalytical chemistry analyses including nutrition labeling. In addition, Silliker also offers custom-designed research projects, technical consulting services, and food safety education programs, New for '94: "The Heart of HACCP: In-Plant Application of HACCP Principles" training video.

Phone: (708) 957-7878
Fax: (708) 957-8449

SmithKline Beecham Animal Health

Extan, PA **Sustaining Member**
SmithKline Beecham Animal Health offers technology to enable food and milk processors to test products for antibiotic residues. The Penzyme Farm Test and Penzyme III Antibiatic Residue Test detects beta-lactam antibiotics in milk. Both of these products are AOAC certified.

(610) 363-3100,
(800) 877-6250
Fax: (610) 363-3284

See our ad on poge 643.

Sparta Brush Co., Inc.

Sparta, WI **Sustaining Member**
Since 1908, praven Sparta Brush quality excels thraughout food service and food processing. Sparta Brush manufactures custom-designed brushes and accessories for each specific cleaning applicatian, food manufacturing process ar preparatian and uses only the highest quality and best suited materials for efficient use and durability. Ask about our "Calar-Code" system.

Phone: (800) 356-8366,
(608) 269-2151
Fax: (608) 269-3293

Spiral Biotech, Inc.

Bethesda, MD
Spiral Biotech featured the NEW spiral plater, the AP 3000 (for eliminating serial dilutians); newly redesigned ASAP and Diluflo (for fast, accurate, computer monitored sample dilutions); NEW low cost automated bacteria colony counters; MikroClave (6-7 min sterilization of media); and portable air samplers.

Phone: (301) 657-1620
Fax: (301) 652-5036

The Sterilex Corporation

Owings Mills, MD **Sustaining Member**
Sterilex has developed a new generation of patented products far safely decontaminating

and manitoring faad pracessing plants, farms, and hatcheries. Praven more effective and less corrosive than other products, Sterilex's unique technologies have been demonstrated to penetrate biofilms and pravide superior protection even against the most challenging cantaminants.

Phone: (410) 581-8860
Fax: (410) 581-8864

UniPath

Nepean, Ontario **Sustaining Member**
We manufacture a complete range of dehydrated culture media for the detection of microarganisms. We intraduced Anacrogen – a gas generating system that does not require the addition of water or the use of a catalyst. Diagnostic kit for detection of *Listeria* from enrichment brath within 15 min.

Phone: (800) 567-8378,
(613) 226-1318
Fax: (613) 226-3728

Vicam

Watertown, MA **Sustaining Member**
Vicam manufactures micrabialagical and mycotoxin testing systems far the food industry. Vicam's Listertest, a *Listeria* testing system uses immunomagnetic bead technology, is easy to use and provides quantitative, econamical detectian of *Listeria* in environmental and food samples within 24 h. No enrichment is required. Vicam alsa manufactures rapid quantitative mycataxin testing kits far aflataxin, fumonisin, ochratoxin and zearalanone.

Phone: (617) 926-7045,
(800) 338-4381
Fax: (617) 923-8055

See our od on the inside front cover.

Weber Scientific

Hamilton, NJ **Sustaining Member**
Weber Scientific features products used in the analysis of dairy, food and water/wastewater. Weber Scientific specializes in equipment for bacteria and antibiotic residue detectian, butterfat, temperature and sanitarian testing, as well as general laboratory equipment. Featured were many "Hard-to-find" items.

Phone: (800) 328-8378,
(609) 584-7677
Fax: (609) 584-8388

West Agro, Inc.

Kansas City, MO
West Agro, a Tetra Laval Campany, is dedicated to serving the food, dairy, and beverage industries with a complete line af high quality chemicals. Our products complement your processing without campramising yaur equipment. Our booth featured "indicate acid," a unique soil indicating system that highlights residual protein soils for ease of inspection and correction.

Phone: (816) 891-1600,
(816) 891-1558
Fax: (816) 891-1606

Zep Manufacturing Company

Atlanta, GA
National manufacturer of specialty chemicals for all food industries. Over 1,300 technical representatives and forty-six distribution centers. Major supplier of hand soaps, drain maintenance, restroom disinfectants, insecticides, cleaners, faaming and C.I.P. acid sanitizers.

Phone: (404) 352-1680
Fax: (404) 351-6232

Dairy, Food and Environmental Sanitation, Vol. 14, No. 11, Pages 700-714

Holders of 3-A Symbol Council Authorization on November 1994

Questions or statements concerning any of the holders authorizations listed below, or the equipment fabricated, should be addressed to: Administrative Officer, 3-A Symbol Council, 3020 Bluff Rd., Columbia, SC 29209; phone (803) 783-9258; FAX (803) 783-9265.

01-07 Storage Tanks for Milk and Milk Products

2 APV Crepaco, Inc. (5/1/56)
100 South CP Ave.
Lake Mills, Wisconsin 53551

28 Cherry-Burrell Corporation (10/3/56)
(A Unit of AMCA Int'l., Inc.)
575 E. Mill St.
Little Falls, New York 13365

117 DCI, Inc. (10/28/59)
P.O. Box 1227, 600 No. 54th Ave.
St. Cloud, Minnesota 56301

76 Damrow Company (10/31/57)
(A Div. of DEC Int'l., Inc.)
196 Western Ave., P.O. Box 750
Fond du Lac, Wisconsin 54935-0750

127 Paul Mueller Co. (6/29/60)
P.O. Box 828
Springfield, Missouri 65801

440 Scherping Systems (3/1/85)
801 Kingsley St.
Winsted, Minnesota 55395

571 Viatec Process/Storage Systems (8/21/89)
500 Reed St.
Belding, Michigan, 48809

31 Walker Stainless Equipment Co., Inc. (10/4/56)
Elroy, Wisconsin 53929

02-08 Pumps for Milk and Milk Products

63R APV Crepaco, Inc. (4/29/57)
100 South CP Ave.
Lake Mills, Wisconsin 53551

636 Abel Pumps Corporation (7/10/91)
79 North Industrial Park
511 North Avenue
Sewickley, Pennsylvania 15143-2339
(Mfr: Abel Pumps, Buchen, Germany)

214R Ben H. Anderson Manufacturers (5/20/70)
Box A
Morrisonville, Wisconsin 53571

212R Babson Brothers Company (2/20/70)
Dairy Systems Division
1400 West Gale
Galesville, Wisconsin 54630

205R Boumatic (5/22/69)
1919 S. Stoughton Rd., P.O. Box 8050
Madison, Wisconsin 53716

739 CSF Inox S.P.A. (6/25/93)
Strada per Bibbiano
7 - Montecchio E. (RE)
Italy
(U.S. Rep: Sanchelima Intl.
1781-83 N.W. 93rd Avenue
Miami, Florida 33172)

709 Conexiones Inoxidables (01/18/93)
de Puebla S.A. de C.V.
Vicente Guerrero No. 211
Xicotepec de Juarez
Edo, Puebla, Mexico
(U.S. Rep: Ben Dolphin
Consulting, 4735 Lansing Drive
North Olmsted, Ohio 44070)

671 Flowtech, Inc. (4/1/92)
1900 Lake Park Drive
Smyrna, Georgia 30080

466 Fluid Metering, Inc. (1/10/86)
29 Orchard St.
Oyster Bay, New York 11771

306 Fristam Pumps, Inc. (5/2/78)
2410 Parview Road
Middleton, Wisconsin 53562

65R G & H Products Corp. (5/22/57)
7600-57th Avenue
P.O. Box 1199
Kenosha, Wisconsin 53141

325 Highfield Industrial Estate (8/16/90)
Edison Road, Eastbourne
East Sussex, England BN23 6PT
(U.S. Rep: Johnson Pump of America, Inc.
4825 Scott Street, Suite 306
Schiller Park, Illinois 60176)

145R ITT Jabsco Products (11/20/63)
1485 Dale Way
Costa Mesa, California 92626
(Mfg. by ITT Jabsco, England)

502 Inoxpa, s.a. (9/16/92)
C/. Telers, 54
17820 Banyoles
Gerona, Spain

314 Len E. Ivarson, Inc. (12/22/78)
3100 W. Green Tree Rd.
Milwaukee, Wisconsin 53209

603 Johnson Pumps (U.K.) Ltd. (8/16/90)
Highfield Industrial Estate
Edison Road, Eastbourne
East Sussex, England BN23 6PT
(Not Available in the U.S.A.)

604 Johnson Pumps (U.K.), Ltd. (8/16/90)
Highfield Industrial Estate
Edison Road, Eastbourne
East Sussex, England BN23 6PT
(Not Available in the U.S.A.)

673 MGI Pumps, Inc. (4/16/92)
9201 Wilmot Road
Kenosha, Wisconsin 53141

654 Mono Pumps Ltd., Dresser Pump Division (10/22/91)
Martin Street
Audenshaw, Manchester
England M34 5DQ
(U.S. Rep: MonoFlo, Dresser Pump Division
Dresser Industries
821 Live Oak Drive
Chesapeake, Virginia 23320-2601)

400 Netzsch Incorporated (8/15/83)
119 Pickering Way
Exton, Pennsylvania 19341-139

684 PCM.POMPES (7/9/92)
17 Rue Ernest Laval
B. P. 35 - 92173 Vanves Cedex, France
(U.S. Rep: MGI Pumps
9201 Wilmot Road
Kenosha, WI 53141-1426)

701 Pierre Guerin SA (10/27/92)
BP. 12 - 79210
Mauze-Sur-Le-Mignon
France
(U.S. Rep: Alfa Technical Group, Inc.
601 Thompson Road N.
Syracuse, New York)

241 Puriti, S.A. de C.V. (9/12/72)
Alfredo Nobel 39
Industrial Puente de Vigas
Tlalnepantla, Mexico
(U.S. Rep: Top Line Corporation)

148R Robbins & Myers, Inc. (4/22/64)
1895 Jefferson St.
Springfield, Ohio 45506

364 Roper Pump Company (7/28/82)
P.O. Box 269
Commerce, Georgia 30529

595 Seepex, Inc. (3/16/90)
(Formerly Pumpen-und Maschinenbau)
1834 Valley Street
Dayton, Ohio 45405

568 Shanley Pump & Equipment, Inc. (5/15/89)
2525 S. Clearbrook Dr.
Arlington Heights, Illinois 60005
(Mfg. by Allweiler, West Germany)

678 Shanley Pump & Equipment, Inc. (5/11/92)
2525 S. Clearbrook Dr.
Arlington Heights, Illinois 60005
(Mfg. by Allweiler, West Germany)

507 Sine Pump (7/21/87)
Division of The Kontro Co., Inc.
500 West River Street
Orange, Massachusetts 01364

567 Stainless Products, Inc. (4/4/89)
1649-72nd Ave.
P.O. Box 169
Somers, Wisconsin 53171

72R L.C. Thomsen Inc. (9/14/57)
1303-43rd St.
Kenosha, Wisconsin 53140

26R Tri-Clover, Inc. (9/29/56)
9201 Wilmot Road
Kenosha, Wisconsin 53141

609 Tuthill Corp. (12/12/90)
Tuthill Pump Division
12500 S. Pulaski Road
Alsip, Illinois 60658

175R Universal Dairy (10/25/56)
11100 N. Congress Ave.
Kansas City, Missouri 64153

52R Viking Pump, Inc. (12/31/56)
A Unit of IDEXX Corporation
406 State St., P.O. Box 8
Cedar Falls, Iowa 50613
(Manufactured by: Johnson Pump
Highfield Ind. Estate, Edison Road
Eastbourne, E. Sussex
UK BN 23 6PT)

29R Waukesha Fluid Handling (10/3/76)
(Formerly Cherry-Burrell
Fluid Handling Division)
611 Sugar Creek Road
Delavan, Wisconsin 53115

04-03 Homogenizers and High Pressure Pumps of the Plunger Type

37 APV Crepaco, INC. (10/19/56)
100 South CP Ave.
Lake Mills, Wisconsin 53551

75 APV Gaulin, Inc. (6/26/57)
500 Research Dr.
Wilmington, Massachusetts 01887

309 APV Homogenizer, Div., Rannie Products (7/19/78)
(Formerly APV Rannie, Inc.)
445 Etna Street, Suite 57
St. Paul, Minnesota 55106

722 APV Rannie AS (03/23/93)
Roholmsvej 8, DK-2620
Albertslund, DENMARK
(Not Available in U.S.A.)

247 Alfa-Laval (4/14/73)
8400 Lake View Parkway
Suite 500
Pleasant Prairie, Wisconsin 53158

390 American Lewa, Inc. (6/9/83)
132 Hopping Brook Road
Holliston, Massachusetts 01760
(Mfg. by Lewa, Germany)

247 Bran & Luebbe, Inc. (4/14/73)
1025 Busch Parkway
Buffalo Grove, Illinois 60015

486 Fowler Products Company (11/18/86)
150 Collins Industrial Blvd.
P.O. Box 80268
Athens, Georgia 30608-0268

657 Microfluidics Corp. (11/4/91)
P.O. Box 9101
30 Ossipee Road
Newton, Massachusetts 02164-9101

558 Niro Soavi S.p.A. (1/3/89)
43100 Parma (Italy)
VIA M. Da Erba Edoari, 29/A
Distributed in the U.S. by
Niro Hudson, Inc.
1600 Country Road F
Hudson, Wisconsin 54016

770 Tetra Pak Processing Systems (6/13/94)
8400 Lakeview Parkway, Ste. 500
Pleasant Prairie, Wisconsin 53158
(Manufactured by: Tetra Pak-Stainless Equipment AB
Lund, Sweden)

714 Union Homogenizer (02/25/93)
4600 W. Dickman Road
Battle Creek, MI 49015

87 Waukesha Fluid Handling (12/29/57)
(Formerly Cherry-Burrell
Fluid Handling Division)
611 Sugar Creek Road
Delavan, Wisconsin 53115

05-14 Stainless Steel Automotive Milk Transportation Tanks for Bulk Delivery and/or Farm Pick-up Service

379 Bar-Bel Fabricating Co., Inc. (3/15/83)
N. 3760 Hwy. 12 & 16
Mauston, Wisconsin 53948

756 Beall Trailers of California (2/21/94)
9801 Moffat Blvd.
Manteca, California 95336

70R Brenner Tank, Inc. (8/5/57)
450 Arlington Ave., P.O. Box 670
Fond du Lac, Wisconsin 54936

40 Hills Stainless Steel & Equipment Co., Inc. (10/20/56)
505 W. Koehn Street
Luverne, Minnesota 56156

201 Paul Krohnert Mfg. Ltd. (4/1/68)
811 Steeles Ave., P.O. Box 126
Milton, Ontario, Canada L9T 2Y3
(Not available in U.S.A.)

513 Nova Fabricating, Inc. (8/24/87)
404 City Rd.
P.O. Box 231
Avon, Minnesota 56310

85 Polar Tank Trailer, Inc. (12/20/57)
Holdingford, Minnesota 56340

653 Tremar (10/10/91)
(Not available in the U.S.A.)
1, Tougas Street
Iberville, Quebec, Canada J2X 2P7

25 Walker Stainless Equip. Co., Inc. (9/28/68)
625 State Street
New Lisbon, Wisconsin 53950

623 Walker Stainless Eq. Co., Inc. (3/28/91)
560 E. Burleigh Blvd.
P.O. Box 358
Tavares, Florida 32778

437 West-Mark (11/30/84)
2704 Railroad Ave., P.O. Box 418
Ceres, California 95307

09-09 Instrument Fittings and Connections Used on Milk and Milk Products Equipment

32 ABB Kent-Taylor, Inc. (10/4/56)
(Formerly Taylor Instruments)
P.O. Box 20550
Rochester, New York 14602-0550

428 ARI Industries, Inc. (9/12/84)
381 ARI Court
Addison, Illinois 60101

747 Alloy Engineering Co., Inc. (1/11/94)
304 Seaview Avenue
Bridgeport, CT 06607

321 Anderson Instrument Co., Inc. (6/14/79)
156 Auriesville Road
Fultonville, New York 12072

586 Beta Technology, Inc. (12/14/89)
105 Harvey West Blvd.
Santa Cruz, California 95060

315 Burns Engineering, Inc. (2/5/79)
10201 Bren Rd., East
Minnetonka, Minnesota 55343

763 EG & G Berthold Laboritorium Prof. (4/21/94)
Berthold GmbH & Co. KG
Calmbacher Str. 22
D-7547 Bad Wildbad 1, Germany
(U.S. Representative:
Berthold Systems, Inc.
101 Corporation Drive
Aliquippa, Pennsylvania 15001-4863)

206 The Foxboro Company (8/11/69)
33 Commercial Street
Foxboro, Massachusetts 02035

592 Claud S. Gordon Co. (2/27/90)
5710 Kenosha St.
P.O. Box 500
Richmond, Illinois 60071

620 Larad Equipment (2/25/91)
26 Pearl Street
Bellingham, Massachusetts 02019

588 Minco Products, Inc. (12/20/89)
7300 Commerce Lane
Minneapolis, Minnesota 55432

418 Niro Hudson (4/2/84)
(Formerly Niro Atomizer Food & Dairy)
1600 County Road F
Hudson, Wisconsin 54016

487 Pyromation, Incorporated (12/16/86)
5211 Industrial Road
Fort Wayne, Indiana 46825

367 RDF Corporation (10/2/82)
23 Elm Ave.
Hudson, New Hampshire 03051

495 Rosemount Analytical Division (2/13/87)
2400 Barranca Pkwy.
Irvine, California 92714

732 SensorTec, Inc. (05/18/93)
16335-7 Lima Road
Huntertown, Indiana 46748

420 Stork Food Machinery, Inc. (4/17/84)
P.O. Box 1258/Airport Parkway
Gainesville, Georgia 30503

32 Taylor Instrument (10/4/56)
Combustion Engineering, Inc.
400 West Avenue, P.O. Box 110
Rochester, New York 14692

690 Texas Thermowell, Inc. (8/25/92)
P.O. Box 1535
Hwy. 96 North
Silsbee, Texas 77656

444 Tuchenhagen North America (6/17/85)
8949 Deerbrook Trail
Milwaukee, Wisconsin 53223

612 Viatran Corp & Haenni Druckmittler (12/13/90)
300 Industrial Drive
Grand Island, New York 14072

522 Weed Instrument Company, Inc. (12/28/87)
707 Jeffrey Way
Round Rock, Texas 78664

10-03 Milk and Milk Products Filters Using Disposable Filter Media, as Amended

371 Alloy Products Corp. (12/10/82)
1045 Perkins Ave., P.O. Box 529
Waukesha, Wisconsin 53187

593 Filtration Systems (3/2/90)
Div. of Mechanical Mfg. Corp.
10304 N.W. 50th St.
Sunrise, Florida 33351

704 Pall Trinity Micro Corp. (11/6/92)
3643 State Route 281
Cortland, NY 13045-0930

720 R-P Products (03/19/93)
Box 388, 407 Jefferson Street
Three Rivers, Michigan 49093

435 Sermia International (11/27/84)
740-212 Boul. Industriel
Blainville, Quebec
Canada J7C 3V4
(U.S. Rep: United Dairy
Machinery Corp.
301 Meyer Road
Buffalo, New York 14224)

296 L. C. Thomsen, Inc. (8/25/77)
1303 43rd St.
Kenosha, Wisconsin 53140

35 Tri-Clover, Inc. (10/15/56)
9201 Wilmot Road
Kenosha, Wisconsin 53141

11-05 Plate-type Heat Exchangers for Milk and Milk Products

365 APV Baker AS (9/8/82)
Platinvej, 8
P.O. Box 329
DK-6000 Kolding
Denmark
(Not available in U.S.A.)

20 APV Crepaco, Inc. (9/4/56)
395 Fillmore Ave.
Tonawonda, New York 14150

120 Alfa-Laval, Agri, Inc. (12/3/59)
11100 No. Congress Ave.
Kansas City, Missouri 64153

17 Alfa-Laval Food & Dairy Co. (7/28/82)
(Div. of Alfa-Laval Inc.)
8400 Lake View Parkway
Pleasant Prairie, Wisconsin 53158

718 Babson Bros. Co. (03/08/93)
Dairy Systems Div.
1400 West Gale Avenue
Galesville, Wisconsin 54630

30 Cherry-Burrell Corp. (10/2/56)
Process Equipment Division
P.O. Box 35600
Louisville, Kentucky 40232-5600

14 Chester-Jensen Co., Inc. (8/15/56)
5th & Tilghman Sts., P.O. Box 908
Chester, Pennsylvania 19016

468 GEA Food and Process Systems, Inc. (2/2/86)
8940 Route 108
Columbia, Maryland 21045

622 ITT Standard (2/25/91)
175 Standard Parkway
Cheektowaga, New York 14227
P.O. Box 1102
Buffalo, New York 14240-1102

15 Kusel Equipment Co. (8/15/56)
820 West St., P.O. Box 87
Watertown, Wisconsin 53094

360 Laffranchi Wholesale Co. (7/12/82)
P.O. Box 1273
Ferndale, California 95536

657 Microfluidics Corp. (11/4/91)
90 Oak Street
P.O. Box 9101
Newton, Massachusetts 02164-9101

414 Paul Mueller Co. (12/13/83)
P.O. Box 828
Springfield, Missouri 65801

491 On-Line Instrumention (1/12/94)
P.O. Box 541
Route 376
Hopewell Junction

279 The Schlueter Company (8/30/76)
3410 Bell Street, P.O. Box 548
Janesville, Wisconsin 53547-0548
(Mfg. by Samuel Parker, New Zealand)

650 Schmidt-Bretten, Inc. (10/3/91)
20475 Woodingham Drive
Detroit, Michigan 48221

670 Skellerup Engineering, Ltd. (4/1/92)
2 Robert Street
P.O. Box 11-020
Ellerslie, Auckland 5
New Zealand
(U.S. Rep: Masport, Inc.
6140 McCormick Drive
Lincoln, Nebraska 68507)

658 Thermaline (11/15/91)
180-37th Street
Auburn, Washington 98001

610 Universal Dairy Equipment (12/13/90)
Auckland, New Zealand
11100 N. Congress Avenue
Kansas City, Missouri 64153
(Mgr. Skellerup Engineering,
Ellersie, Auckland 5,
New Zealand)

12-05 Tubular Heat Exchangers for Milk and Milk Products

438 APV Crepaco, Inc. (12/10/84)
395 Fillmore Avenue
Tonawanda, New York 14150

248 Allegheny Bradford Corp. (4/16/73)
P.O. Box 200, Route 219 South
Bradford, Pennsylvania 16701

243 Babson Brothers Company (10/31/72)
Dairy Systems Division
140 West Gale
Galesville, Wisconsin 54630

734 Berdell Industries (05/19/93)
62 Scott Avenue
Brooklyn, New York 11237

605 Cherry-Burrell (8/30/90)
Process Equipment Division
P.O. Box 35600
Louisville, Kentucky 40232-5600

103 Chester-Jensen Co., Inc. (6/6/58)
5th & Tilghman Sts., P.O. Box 908
Chester, Pennsylvania 19016

613 Efrex Corp. (12/27/90)
11 Kitty Hawk Drive
Pittsford, NY 14534-1620

712 Enerquip, Inc. (02/24/93)
611 North Road
P.O. Box 368
Medford, WI 54451

298 Feldmeier Equipment, Inc. (1/28/85)
6800 Town Line Road
P.O. Box 474
Syracuse, New York 13211

307 G & H Products Corp. (5/2/78)
7600-57th Avenue
P.O. Box 1199
Kenosha, Wisconsin 53141

217 Girton Manufacturing Co. (1/31/71)
Millville, Pennsylvania 17846

616 ITT Standard
175 Standard Pkwy
P.O. Box 1102
Buffalo, New York 14240-1102

711 Kusel Equipment Co. (02/24/93)
820 West Street
Watertown, WI 53094

238 Paul Mueller Co. (6/28/72)
P.O. Box 828
Springfield, Missouri 65801

96 C. E. Rogers Co. (3/31/64)
So. Hwy #65, P.O. Box 118
Mora, Minnesota 55051

532 Scherping Systems (6/8/88)
801 Kingsley St.
Winsted, Minnesota 55395

392 Stork Food Machinery, Inc. (6/9/83)
(Mfg. by Stork, Netherlands)
P.O. Box 1258/Airport Parkway
Gainesville, Georgia 30503

614 Tetra Pak Processing Systems (12/27/90)
P.O. Box 179
8400 Lake View Parkway, Suite 500
Pleasant Prairie, Wisconsin 53158
(Mfg. by Tetra Pak Stainless Equipment AB,
P.O. Box 64
Bruggaregatan 23, S-221 00
Lund, Sweden)

591 Thermotech/Div. of Fristam Pumps, Inc. (2/8/90)
2410 Parview Rd.
Middleton, Wisconsin 53562

632 Yula Corporation (6/4/91)
330 Bryant Avenue
Bronx, New York 10474

13-09 Farm Milk Cooling and Holding Tanks

240 Babson Brothers Company (9/6/72)
Dairy Systems Division
1400 West Gale
Galesville, Wisconsin 54630

4R Dairy Equipment Co. (6/15/56)
1919 S. Stoughton Rd.
Madison, Wisconsin 53716

179R Heavy Duty Products (Preston) Ltd. (3/8/66)
1261 Industrial Rd.
Cambridge (Preston)
Ontario, Canada N3H 4W3
(Not available in U.S.A.)

12R Paul Mueller Co. (7/31/56)
1600 W. Phelps, P.O. Box 828
Springfield, Missouri 65801

611 Universal Dairy Equipment (12/13/90)
11100 N. Congress Avenue
Kansas City, Missouri 64153

16-05 Evaporators and Vacuum Pans for Milk and Milk Products

254 APV Crepaco, Inc. (1/7/74)
165 John L. Dietsch Square
Attleboro Fall, Massachusetts 02763

132 APV Crepaco, Inc. (10/26/60)
395 Fillmore Ave.
Tonawanda, New York 14150

277 Contherm, Inc. (8/19/76)
P.O. Box 352, 111 Parker St.
Newburyport, Massachusetts 01950

500 Dedert Corporation (4/9/87)
20000 Governors Drive
Olympia Fields, Illinois 60461

186R Marriott Walker Corp. (9/6/66)
925 E. Maple Rd.
Birmingham, Michigan 48011

273 Niro Evaporators, Inc. (5/20/76)
(Formerly Niro Atomizer
Food and Dairy)
9165 Rumsey Road
Columbia, Maryland 21045

639 Niro-Sterner, Inc. (7/10/91)
421-6th Street South
Winsted, Minnesota 55395

107R C.E. Rogers Co. (7/31/58)
So. Hwy #65, P.O. Box 118
Mora, Minnesota 55051

17-07 Formers, Fillers and Sealers of Single Service Containers for Milk and Milk Products

366 Autoprod, Inc. (9/15/82)
(An Alcoa Subsidiary)
5355 115th Avenue N.
Clearwater, Florida 34620

382 Combibloc, Inc. (4/15/83)
4800 Roberts Rd.
Columbus, Ohio 43228
(Mfg. by Jagenberg, West Germany)

192 Evergreen Packaging (1/3/67)
2400-6th St. S.W., P.O. Box 3000
Cedar Rapids, Iowa 52406

488 Fords Holmatic, Inc. (12/22/86)
1750 Corporate Dr., Suite 700
Norcross, Georgia 30093

619 Hassia Verpackungsmaschinen GmbH (2/22/91)
63691 Ranstadt 1/Hessen Germany
(Hassia U.S.A., Inc. 39 Plymouth St.
Fairfield, New York 07007)

473 International Paper Company (6/12/86)
Extended Shelf-Life Division
4020 Stirrup Creek Drive, Bldg. B200
Durham, North Carolina 27703

735 Kvalitetsproduktion AB 6/11/93)
S-693 29 Degerfors, Sweden
(U.S. Rep: Flowtech, Inc.
1900 Lake Park Drive, Ste. 345
Smyrna, Georgia 30080)

731 LIEDER-Maschinenbau Gmbh & Co. KG (05/18/93)
Postfach 1252/Im Laab 3
3033 Schwarmstedt, Germany

743 Liqui-Box Corporation (11/16/93)
6950 Worthington-Galena Road
Worthington, Ohio 43085

330 Milliken Packaging (8/26/80)
White Stone, South Carolina 29353
(Mfg. by Chubukkikai, Japan)

442 Milliken Packaging (2/21/85)
White Stone, South Carolina 29386

137 Pure-Pak, Inc. (10/17/62)
30000 South Hill Road
New Hudson, MI 48165

281 Purity Packaging Corp. (11/8/76)
800 Kaderly Road
Columbus, Ohio 43228

723 James River Corporation (03/26/93)
One Better Way Road
Milford, Ohio 45150
(Mfg. by Thimonnier, France)

746 Septipack, Inc. (1/11/94)
2313 Benson Mill Rd.
Sparks, Maryland 21152
(Mfg. by Remy Equipment, Druex, France)

482 Serac, Inc. (8/25/86)
300 Westgate Drive
Carol Stream, Illinois 60188

681 Shikoku Kakoki Co., Ltd. (6/8/92)
No. 10-01 Nishinokawa
Tarohachisu, Kitajima-Cho
Itanogun, Tokushima, Japan
(U.S. Rep: Pure-Pak, Inc.
30000 South Hill Road
New Hudson, Michigan 48165)

351 Tetra Pak, Inc. (1/7/82)
909 Asbury Drive
Buffalo Grove, IL 60089
(Mfg. by A. B. Tetra, Italy)

220 Tetra Rex Packaging Systems (4/24/71)
(formerly TetraPak/EquipUS)
909 Asbury Drive
Buffalo Grove, Illinois 60090

19-04 Batch Continuous Freezers for Ice Cream, Ices, and Similarly Frozen Dairy Foods, as Amended

141 APV Crepaco, Inc. (4/15/63)
100 South CP Ave.
Lake Mills, Wisconsin 53551

146 Cherry-Burrell Corp. (12/10/63)
P.O. Box 35600
Louisville, KY 40232-5600

286 Hoyer, Inc. (12/8/76)
201 Broad Street
Lake Geneva, Wisconsin 53147
(Mfg. by O. G. Hoyer A/S, Denmark)

465 Leon's Frozen Custard (12/17/85)
3131 S. 27th Street
Milwaukee, Wisconsin 53151

573 Processing Machinery & Supply Company (9/28/89)
1108 Frankford Ave.
Philadelphia, Pennsylvania 19125
(Mfg. by PMS Italiana, Italy)

355 Emery Thompson Machine & Supply Co. (3/9/82)
1349 Inwood Ave.
Bronx, New York 10452

22-04 Silo-type Storage Tanks for Milk and Milk Products

154 APV Crepaco, Inc. (2/10/65)
100 South CP Ave.
Lake Mills, Wisconsin 53551

168 Cherry-Burrell Corp. (6/16/65)
(A Unit of AMCA Int'l, Inc.)
575 E. Mill Street
Little Falls, New York 13365

160 DCI, Inc. (4/5/65)
P.O. Box 1227, 600 No. 54th Ave
St. Cloud, Minnesota 56301

181 Damrow Co. (5/18/66)
(Div. of DEC Int'l., Inc.)
196 Western Ave., P.O. Box 750
Fond du Lac, Wisconsin 54935-0750

312 Feldmeier Equipment, Inc. (9/15/78)
6800 Town Line Road
P.O. Box 474
Syracuse, New York 13211

439 JV Northwest, Inc. (1/22/85)
28120 S.W. Boberg Rd.
Wisonville, Oregon 97070

702 Paul Krohnert Manufacturing, Ltd. (11/6/92)
P.O. Box 126
811 Steeles Avenue
Milton, Ontario, Canada L9T 2Y3
(Not available in the U.S.A.)

155 Paul Mueller Co. (2/10/65)
1600 W. Phelps, P.O. Box 828
Springfield, Missouri 65801

503 Ripley Stainless, Ltd. (5/1/87)
RR #3, Site 41
Summerland, British Columbia V0H 1Z0
(Not available in U.S.A.)

479 Scherping Systems (8/3/86)
801 Kingsley Street
Winsted, Minnesota 55395

675 Stainless Fabrication, Inc. (4/22/92)
620 North Prince Lane
Springfield, Missouri 65802

165 Walker Stainless Equipment Co., Inc. (4/26/65)
Elroy, Wisconsin 53929

23-02 Equipment for Packaging Frozen Desserts, Cottage Cheese and Similar Milk Products

174 APV Rockford, Inc. (9/28/65)
Filling & Wrapping Systems Div.
1303 Samuelson Road
Rockford, Illinois 61109

209 Doboy Packaging Machinery Incorp. (7/23/69)
869 S. Knowles Ave.
New Richmond, Wisconsin 54017

674 Hayssen Manufacturing (4/20/92)
5300 Highway 42 North
P.O. Box 571
Sheboygan, Wisconsin 53082-0571

343 O.G. Hoyer, Inc. (7/6/81)
201 Broad St.
Lake Geneva, Wisconsin 53147
(Mfg. by Alfa Hoyer, Denmark)

679 Ice Cream Novelties (6/1/92)
Division of Popsicle Inc., Ltd.
5305 Fairview Street
P.O. Box 610
Burlington, Ontario, Canada L7R 3Y5
(U.S. Rep: Sunshine Biscuits
100 Woodbridge Center Drive
Woodbridge, New Jersey 07095-1196)

635 Interbake Dairy Ingredients Div. (7/10/91)
2220 Edward Holland Drive
Suite 301
Richmond, Virginia 23230

760 Jordan Manufacturing, Inc. (2/23/94)
Rt. 1, Box 42 A 1
Crossville, Alabama 35962

537 Osgood Industries, Inc. (7/19/88)
601 Burbank Rd.
Oldsmar, Florida 34677

666 Rapidpak (3/5/92)
1725 West 8th Street
Appleton, Wisconsin 54911

740 Raque Food Systems, Inc. (6/25/93)
11002 Decimal Drive
Louisville, Kentucky 40299

222 Sweetheart Packaging (11/15/71)
(Formerly Fort Howard Pkg. Corp.)
10100 Reistertown Road
Owing Mills, Maryland 21117

24-02 Non-coil Type Batch Pasteurizers

158 APV Crepaco, Inc. (3/24/65)
100 South CP Ave.
Lake Mills, Wisconsin 53551

161 Cherry-Burrell Corp. (4/5/65)
(A Unit of AMCA Int'l., Inc.)
575 E. Mill St.
Little Falls, New York 13365

187 DCI, Inc. (9/26/66)
P.O. Box 1227, 600 No. 54th Ave.
St. Cloud, Minnesota 56302

519 Feldmeier Equipment, Inc. (10/22/87)
6800 Town Line Road
P.O. Box 474
Syracuse, New York 13211

166 Paul Mueller Co. (4/26/65)
P.O. Box 828
Springfield, Missouri 65801

25-02 Non-coil Type Batch Processors for Milk and Milk Products

159 APV Crepaco, Inc. (3/24/65)
100 South CP Ave.
Lake Mills, Wisconsin 53551

162 Cherry-Burrell Corp. (4/5/65)
(A Unit of AMCA Int'l., Inc.)
575 E. Mill St.
Little Falls, New York 13365

188 DCI, Inc. (9/26/66)
P.O. Box 1227, 600 No. 54th Ave.
St. Cloud, Minnesota 56301

725 Inox-Tech, Inc. (04/14/93)
6705 Route 132
Ville Ste-Catherine
Quebec, Canada J0L 1E0
(U.S. Rep: Michael Ripka, Pres., Bionex
12615 E. Meridian Avenue
Payallup, Washington 98373)

710 Lee Industries, Inc. (02/10/93)
P.O. Box 687
514 West Pine Street
Phillipsburg, Pennsylvania 16866

167 Paul Mueller Co. (4/26/65)
P.O. Box 828
Springfield, Missouri 65801

687 SANIFAB (8/3/92)
528 North Street
Stratford, Wisconsin 54484

448 Scherping Systems (8/1/85)
801 Kingsley Street
Winsted, Minnesota 55395

520 Stainless Fabrication, Inc. (12/8/87)
4455 W. Kearney
Springfield, Missouri 65801

202 Walker Stainless Equip. Co., Inc. (9/24/68)
625 State St., P.O. Box 202
New Lisbon, Wisconsin 53950-0202

26-03 Sifters for Dry Milk and Dry Milk Products

752 Andritz Sprout-Bauer (1/28/94)
Sherman Street
Muncy, Pennsylvania 17756

634 Great Western Mfg. Co. (7/10/91)
2017 South Fourth Street
P.O. Box 149
Leavenworth, Kansas 66048

363 Kason Corp. (7/28/82)
1301 East Linden Ave.
Linden, New Jersey 07036

430 Midwestern Industries, Inc. (10/11/84)
915 Oberlin Rd., P.O. Box 810
Massillon, Ohio 44648-0810

185 Rotex, Inc. (8/10/66)
1230 Knowlton St.
Cincinnati, Ohio 45223

656 Separator Engineering, Ltd. (11/4/91)
810 Ellingham Street
Pointe Clair, Quebec, Canada H9R 3S4
(U.S. Rep: Kason Corp.
1301 E. Linden Avenue
Linden, NJ 07036)

172 Sweco, Inc. (9/1/65)
7120 Buffington Rd.
Florence, KY 41042

27-02 Equipment for Packaging Dry Milk and Dry Milk Products

353 All-Fill, Inc. (3/2/82)
418 Creamery Way
Exton, Pennsylvania 19341

618 Hayssen Manufacturing Company (2/18/91)
5300 Highway 42 North
P.O. Box 571
Sheboygan, Wisconsin 53082-0571
(Manufactured by Yamato Scale Co.
Akasi, 673, Japan)

625 Ishida Scales Mfg. Co., Inc. (4/2/91)
44, Sanno-Cho, Shogoin
Sakyo-Ku, Kyoto, Japan
(U.S. Rep: Heat & Control
225 Shaw Rd.
S. San Francisco, CA 94080)

409 Mateer-Burt Co. (10/31/83)
436 Devon Park Dr.
Wayne, Pennsylvania 19087

476 Stone Container Corporation (7/17/86)
1881 West North Temple
Salt Lake City, Utah 84116-2097

497 Triangle Package Machinery Co. (2/26/87)
6655 West Diversey Ave.
Chicago, Illinois 60635

28-02 Flow Meters for Milk and Milk Products

270 ABB Kent-Taylor, Inc. (2/9/76)
(Formerly Taylor Instruments)
P.O. Box 20550
Rochester, New York 14602-0550

272 Accurate Metering Systems, Inc. (4/2/76)
1651 Wilkening Court
Schaumburg, Illinois 60173

253 Badger Meter, Inc. (1/2/74)
4545 W. Brown Deer Road
P.O. Box 23099
Milwaukee, Wisconsin 53223

359 Brooks Instruments (6/11/82)
407 West Vine St.
Hatfield, PA 19440

660 Danfoss A/S (11/20/91)
DK-6430
Nordborg, Denmark
(U.S. Rep: Danfoss Electronics
2995 Eastrock Drive
Rockford, Illinois 61109)

469 Endress & Hauser, Inc. (3/3/86)
2350 Endress Place
Greenwood, Indiana 46142

692 Endress & Hauser Flowtec AG (9/14/92)
Kagenstrasse 7
Ch - 4153 Reinach, Switzerland

226 Fischer & Porter Co. (12/9/71)
County Line Rd.
Warminster, Pennsylvania 18974

477 Flowdata, Inc. (7/31/86)
1784 Firman Drive
Richardson, TX 75081

506 Flow Technology, Inc. (6/17/87)
4250 East Broadway Road
Phoenix, Arizona 85040

224 The Foxboro Company (11/16/71)
33 Commercial Street
Foxboro, Massachusetts 02035

717 Gemu Valves, Inc. (03/04/93)
3800 Camp Creek Parkway
Ste. 102, Bldg. 2400
Atlanta, Georgia 30331

649 Geo Technology (10/2/91)
12312 E. 60th Street
Tulsa, Oklahoma 74146

661 G/H Products Corp. (11/21/91)
7600-57th Avenue
P.O. Box 1199
Kenosha, Wisconsin 53142

562 Great Lakes Instruments, Inc. (2/6/89)
8855 North 55th Street
Milwaukee, Wisconsin 53223

630 Halliburton Services (5/28/91)
Drawer 1431
Duncan, Oklahoma 73536-0602

574 Hersey Measurement Co., Inc. (10/12/89)
150 Venture Blvd.
P.O. Box 4585
Spartanburg, South Carolina 29305

512 Hoffer Flow Controls, Inc. (8/17/87)
107 Kitty Hawk Lane
Elizabeth City, NC 27909

744 Honeywell (11/16/93)
Industrial Controls Div.
1100 Virgina Drive
Fort Washington, Pennsylvania 19034

733 Honeywell, Inc. (05/18/93)
14841 Black Canyon Highway
Phoenix, Arizona 85023

474 Hydril Production (6/30/86)
Technology Division
330 North Belt East
Houston, Texas 77032-3411

265 GH Flow Automation (3/10/75)
(formerly Tekheim Automation)
9303 Sam Houston Parkway
Houston, Texas 77099-5298

535 Invalco, Inc.
P.O. Box 556
Tulsa, Oklahoma 74101

764 Johnson Yokogawa
4 Dart Road
Newnan, Georgia 30265-1040
(Mfg. by Yokogawa Electric Corp.
2-9-32 Nakacho
Musashino-shi, Tokyo,
180 Japan

760 Jordan Manufacturing, Inc. (2/23/94)
Rt. 1, Box 42 A 1
Crossville, Alabama 35962

529 Krohne America, Inc. (5/18/88)
7 Dearborn Road
Peabody, Massachusetts 01960
(Mfg. by Altometer, Holland)

755 Liquid Controls Corporation (2/21/94)
105 Albrecht Drive
Lake Bluff, Illinois 60044
(Mfg. by Processautomatic
Box 117,
61070 Vagnharad, Sweden)

378 Micro Motion, Inc. (2/16/83)
7070 Winchester Circle
Boulder, Colorado 80301

729 Peek Measurement, Ltd. (04/14/93)
Kings Worthy, Winchester
Hampshire, England S023 7QA
(U.S. Rep: Peek Measurement
10335 Landsbury, Ste. 300
Houston, Texas 77099-3407)

490 Rosemount, Inc. (1/8/87)
12001 Technology Dr.
Eden Prairie, Minnesota

585 Schlumberger Industries, Ltd. (12/7/89)
11321 Richmond Ave.
Houston, Texas 77082-2615
(Mfg. by Schlumberger, England)

587 Schlumberger Ind., Measurement Div. (12/18/89)
1310 Emerald Rd.
Greenwood, South Carolina 29646
(Mfg. by Schlumberger, France)

550 Sparling Instruments Co., Inc. (10/26/88)
4097 N. Temple City Blvd.
P.O. Box 5988
El Monte, California 91731

715 Thermal Instrument Co. (02/25/93)
217 Sterner Mill Road
Trevose, Pennsylvania 19053

386 Turbo Instruments, Inc. (5/11/83)
4 Vashell Way
Orinda, California 94563
(Mfg. by Turowerk, West Germany)

664 XO Technologies, Inc. (12/16/91)
28020 Avenue Stanford
Valencia, California 91355

29-01 Air Eliminators for Milk and Fluid Milk Products

340 Accurate Metering Systems, Inc. (6/2/81)
1651 Wilkening Court
Schaumburg, Illinois 60173

662 G/H Products Corp. (11/21/91)
7600-57th Avenue
P.O. Box 1199
Kenosha, Wisconsin 53142

436 Scherping Systems (11/27/84)
801 Kingsley Street
Winsted, Minnesota 55395

30-01 Farm Milk Storage Tanks

421 Paul Mueller Co. (4/17/84)
P.O. Box 828
Springfield, Missouri 65801

31-02 Scraped Surface Heat Exchangers

290 APV Crepaco, Inc. (6/15/77)
100 South CP Ave.
Lake Mills, Wisconsin 53551

323 Cherry-Burrell Corp. (7/26/79)
Process Equipment Division
P.O. Box 35600
Louisville, KY 40232-5600

274 Contherm, Inc. (6/25/76)
P.O. Box 352, 111 Parker St.
Newburyport, Massachusetts 01950

496 FR Mfg. Corp. (2/23/87)
2807 South Highway 99
Stockton, California 95202

361 N.V. Terlet (7/12/82)
P.O. Box 62
7200 AB Zutphen
Netherlands
(US Agent Manning & Lewis-NJ)

32-01 Uninsulated Tanks for Milk and Milk Products

397 APV Crepaco, Inc. (6/21/83)
100 South CP Ave.
Lake Mills, Wisconsin 53551

264 Cherry-Burrell Corp. (1/27/75)
(A Unit of AMCA Int'l., Inc.)
575 E. Mill St.
Little Falls, New York 13365

268 DCI, Inc. (11/21/75)
600 No. 54th Ave., P.O. Box 1227
St. Cloud, Minnesota 56301

708 Lee Industries, Inc. (01/12/93)
P.O. Box 688
Phillipsburg, PA 16866

354 C.E. Rogers Co. (3/3/82)
S. Hwy. #65, P.O. Box 118
Mora, Minnesota 55051

683 SANIFAB (7/9/92)
A Division of A&B Process Systems Corp.
528 North Street
Stratford, WI 54484

441 Scherping Systems (3/1/85)
801 Kingsley St.
Winsted, Minnesota 55395

339 Walker Stainless Equip. Co., Inc. (6/2/81)
618 State St.
New Lisbon, Wisconsin 53950

33-00 Polished Metal Tubing for Dairy Products

310 Allegheny Bradford Corp. (7/19/78)
P.O. Box 200 Route 219 South
Bradford, Pennsylvania 16701

413 Azco, Inc. (12/8/83)
P.O. Box 567
Appleton, Wisconsin 54912

736 Kvalitetsproduktion AB (6/11/93)
S-693 29 Degerfors, Sweden
(U.S. Rep: Flowtech, Inc.
1900 Lake Park Drive, Ste. 345
Smyrna, Georgia 30080)

308 Rath Manufacturing Co., Inc. (6/20/78)
2505 Foster Ave.
Janesville, Wisconsin 53545

368 Rodger Industries Inc. (10/7/82)
P.O. Box 186, R.R. 1
Blenheim, Ontario
Canada N0P 1A0
(Not available in U.S.A.)

335 Stainless Products, Inc. (12/18/80)
1649 72nd Ave., Box 169
Somers, Wisconsin 53171

289 Tri-Clover, Inc. (1/21/77)
9201 Wilmot Road
Kenosha, Wisconsin 53141

331 United Industries, Inc. (10/23/80)
1546 Henry Ave.
Beloit, Wisconsin 53511

34-02 Portable Bins

647 Thomas Conveyor Company (9/18/91)
Tote System Division
555 I-35 South
Burleson, Texas 76028

35-00 Continuous Blenders

527 Arde Barinco, Inc. (3/15/88)
500 Walnut Street
Norwood, New Jersey 07648

526 Bepex Corp./Schugi (3/15/88)
333 Taft St. N.E.
Minneapolis, Minnesota 55413
(Mfg. by Lelystad, Netherlands)

590 Chemineer, Inc. (1/23/90)
125 Flagship Dr.
North Andover, Massachusetts 01845

417 Cherry-Burrell (2/7/84)
Process Equipment Division
P.O. Box 35600
Louisville, Kentucky 40232-5600

642 Mondomix Holland b.v. (8/7/91)
Reeweg 13
P.O. Box 98
1394 ZH Nederhorst den Berg
The Netherlands
(U.S. Rep: Carrier Assoc.
50 Dunnell Lane
Pawtucket, Rhode Island 02860-5828)

680 Quadro Engineering, Inc. (6/3/92)
613 Colby Drive
Waterloo, Ontario
Canada N2V 1A1

766 Semi-Bulk Systems (4/28/94)
1812 Walton Road
St. Louis, Missouri 63114

724 Silverson Machines, Inc. (04/14/93)
P.O. Box 589
355 Chestnut Street
East Longmeadow, Massachusetts 01028
(Mfg. by Silverson Machines,
Chesham, England)

36-00 Colloid Mills

608 Kinematica (10/17/90)
170 Linden Street
Wellesley, Massachusetts 02181
(Mfg. by Kinematica AG,
CH-6014 Littau/Lucerne, Switzerland)

293 Waukesha Fluid Handling (8/25/77)
611 Sugar Creek Road
Delavan, Wisconsin 53115

37-01 Liquid Pressure and Level Sensing Devices

738 ABB Kent-Taylor, Inc. (6/25/93)
1175 John Street
Rochester, New York 14602-0550

576 Ametek/Mansfield & Green Division (10/13/89)
8600 Somerset Dr.
Largo, Florida 34643

318 Anderson Instrument Co., Inc. (4/9/79)
156 Auriesville Road
Fultonville, New York 12072

659 Bindicator Company (11/20/91)
1915 Dove Street
Port Huron, Michigan 48060

525 Caldwell Systems Corporation (3/4/88)
(Formerly Zantel Instruments)
1323 Sherman Drive
Longmont, Colorado 80501

672 Computer Instruments Corp. (4/3/92)
1000 Shames Drive
Westbury, New York 11590

706 CTI Celtek Electronics (12/29/92)
136 Merizzi Street
St. Laurent, Quebec, Canada H4T 1S4
(U.S. Rep: CTI Celtek Electronics, Inc.
1000 Leonidas Street
New Orleans, Louisiana 70118)

640 Dresser Industries (7/16/91)
Instrument Division
250 East Main Street
Stratford, Connecticut 06497

663 Dresser Industries (12/4/91)
Instrument Division
210 Old Gate Lane
Milford, Connecticut 06460

405 Drexelbrook Engineering Co. (9/27/83)
205 Keith Valley Rd.
Horsham, Pennsylvania 19044

459 Endress + Hauser, Inc. (10/17/85)
2350 Endress Place
Greenwood, Indiana 46142
(Mfg. by Endress + Hauser GmbH,
Hauptstrasse 1,
D-79689 Maulburg, Germany)

524 Flow Technology, Inc. (1/14/88)
4250 E. Broadway Road
Phoenix, Arizona 85040

463 The Foxboro Company (12/6/85)
33 Commercial Street
Foxboro, Massachusetts 02035

668 GP: 50 New York, Ltd. (3/30/92)
2770 Long Road
P.O. Box 805
Grand Island, New York 14072

651 Granzow, Inc. (10/3/91)
2300 CrownPoint Executive Drive
Charlotte, North Carolina 28227
(Mfr: Kubler AG
Baar, Switzerland)

633 Griffith Industrial Products Company (6/21/91)
P.O. Box 111
Putnam, CT 06260

749 Haenni Cie & AG (1/17/94)
CH-3303
Jegenstorf, Switzerland
(U.S. Representative: Viatran Corporation
300 Industrial Drive
Grand Island, NY 14072)

771 Hawk America (6/13/94)
1741 W. Rose Garden Lane
Phoenix, Arizona 85027

557 Honeywell, Inc. (12/21/88)
Industrial Controls Div.
1100 Virginia Drive
Fort Washington, Pennsylvania 19034

629 Intrinsic Safety Equipment of Texas (5/20/91)
907 Bay Star
Webster, TX 77598-1531

598 Invalco, Inc. (3/22/90)
P.O. Box 1183
Hutchinson, Kansas 67504-1183

572 ITT Conoflow (9/25/89)
P.O. Box 768, Rt. 78
St. George, South Carolina 29477

396 King Engineering Corp. (6/13/83)
P.O. Box 1228
Ann Arbor, Michigan 48106

501 Lumenite Electronic Company (4/27/87)
2331 N. 17th Avenue
Franklin Park, Illinois 60131

768 MTS Sensors Division (6/6/94)
3001 Sheldon Drive
Cary, North Carolina 27513

596 Magnetrol International (3/20/90)
5300 Belmont Rd.
Downers Grove, Illinois 60515

627 Milltronics, Inc. (4/12/91)
730 The Kingsway
Peterborough, Ontario
Canada K9J 7B1
(U.S. Rep: Milltronics, Inc.
709 E. Stadium Drive
Arlington, Texas 76011)

419 Niro Hudson (4/2/84)
(Formerly Niro Atomizer Food & Dairy)
1600 County Road F
Hudson, Wisconsin 54016

597 NUOVA FIMA S.p.A. (3/20/90)
Via C. Battisti 59
28045 - INVORIO (N0) Italy
(Not Available in U.S.A.)

523 Paper Machine Components, Inc. (1/3/88)
Miry Brook Road
Danbury, Connecticut 06810

554 Par Sonics, Inc. (11/30/88)
R.D. #1 - Box 505
Centre Hall, Pennsylvania 16828

563 PI Components Corp. (2/13/89)
10825 Barely Lane, Suite H
Houston, Texas 77070

644 Princo Instruments, Inc. (8/22/91)
1020 Industrial Highway
Southampton, Pennsylvania 18966-4095

328 Rosemount, Inc. (5/22/80)
12001 Technology Dr.
Eden Prairie, Minnesota

515 Setra Systems, Inc. (9/14/87)
45 Nagag Park
Acton, Massachusetts 01720

583 S.J. Controls, Inc. (11/11/89)
2248 Obispo Ave. #203
Long Beach, California 90806

638 Span Instruments (7/10/91)
1497 Avenue "K"
Plano, Texas 75074

285 Tank Mate Div./Monitor Mfg. Co. (12/7/76)
P.O. Box AL
Elburn, Illinois 60119

641 Tempress A/S (7/16/91)
Engtoften 6, DK-8260
Viby J, Denmark

765 Tri-Clover, Inc. (4/27/94)
9201 Wilmot Road
Kenosha, Wisconsin 53141

754 Valmet Automation (2/15/94)
30 Thomas Drive
Westbrook, Maine 04092
(Mfg. by Valmet-Finland
P. O. Box 237 SF-33101
Tampere, Finland)

410 Viatran Corporation (11/1/83)
300 Industrial Drive
Grand Island, New York 14072

569 WEISS Instruments, Inc. (5/24/89)
85 Bell St.
West Babylon, New York 11704
(Mfg. by Nuova-Fima, Italy)

600 Weksler Instruments Corporation
800 Mill Rd.
Freeport, NY 11520-0808

646 WIKA Instrument Corp. (9/10/91)
1000 Wiegand Blvd.
Lawrenceville, Georgia 30243

685 Winter's Thermogauges, Ltd. (8/3/92)
2220-3 Midland Avenue
Scarborough, Ontario
Canada M1P 3E6
(U.S. Rep: Winter's Thermogauges, Inc.
100 Sonwil Drive
Buffalo, New York 14225)

38-00 Cottage Cheese Vats

541 Kusel Equipment Company (9/16/88)
820 West St.
Watertown, Wisconsin 53094

385 Stoelting, Inc. (5/5/83)
P.O. Box 127
Kiel, Wisconsin 53042-0127

40-01 Bag Collectors for Dry Milk and Dry Milk Products

504 General Resource Corporation (5/15/87)
201 3rd Street South
Hopkins, Minnesota 55343

453 Hosokawa MikroPul E. Systems (9/4/85)
102 American Road
Morris Plains, New Jersey 07950

381 Marriott Walker Corp. (4/12/83)
925 E. Maple Rd.
Birmingham, Michigan 48011

456 C. E. Rogers Company (9/25/85)
P.O. Box 118
Mora, Minnesota 55051

41-00 Mechanical Conveyors

631 Flexicon Corporation (5/28/91)
1375 Stryker's Road
Phillipsburg, NJ 08865

42-00 In-Line Strainers

606 Cherry-Burrell/Superior Stainless (9/18/90)
Fluid Handling Division
611 Sugar Creek Road
Delavan, Wisconsin 53115

655 Tri-Clover, Inc. (10/23/91)
9201 Wilmot Drive
Kenosha, Wisconsin 53141

44-01 Air Driven Diaphragm Pumps

624 Granzow, Inc. (4/1/91)
Manufactured by KWW-DEPA in Germany
2300 Crown Point
Executive Drive
Charlotte, NC 28227

713 Warren Rupp, Inc. (02/05/93)
800 North Main Street
P.O. Box 1568
Mansfield, Ohio 44905

669 Skellerup Engineering, Ltd. (3/30/92)
2 Robert Street
P.O. Box 11-020
Ellerslie, Auckland 5
New Zealand
(U.S. Rep: Masport, Inc.
6140 McCormick Drive
Lincoln, Nebraska 68507)

46-00 Refractometers and Optical Sensors

737 Katrina, Inc. (6/17/93)
91 Western Maryland Pkwy
Hagerstown, Maryland 21740

697 Liquid Solids Control, Inc. (10/21/92)
P.O. Box 259
Farm Street
Upton, MA 01568

751 Maselli Misure S.p.A. (1/20/94)
Via Baganza, 4/3
43100 Parma, Italy
(U.S. Representative: Maselli Measurements, Inc.
P. O. Box 7571
7746 Lorraine Avenue
Stockton, California 95267)

767 NIRSystems/Perstorp (6/6/94)
12101 Tech Road
Silver Spring, Maryland 20904

750 PT Papertech, Inc. (1/20/94)
4850 The Dale
West Vancouver
B. C. Canada V7W 1K3
(U.S. Representative: BD Services Corporation
300 North Commercial Street
Bellingham, Washington 98227)

742 Reflectronics, Inc. (9/15/93)
3009 Montavesta Road
Lexington, Kentucky 40502

50-00 Level Sensing Devices

705 CTI Celtek Electronics (12/29/92)
136 Merizzi Street
St. Laurent, Quebec, Canada H4T 1S4
(U.S. Rep: CTI Celtek Electronics, Inc.
1000 Leonidas Street
New Orleans, Louisiana 70118)

51-00 Plug-Type Valves (formerly 08-17R)

772 G & H Products (6/13/94)
7600 - 57th Avenue
Kenosha, Wisconsin 53141

759 VNE Corporation (3/16/94)
1149 Barberry Drive
Janesville, Wisconsin 53545

761 Waukesha Fluid Handling (12/17/93)
611 Sugar Creek Rd.
Delavan, Wisconsin 53115

52-00 (formerly 08-17H) Thermoplastic Plug Type Valves

577 Ralet-Defay (11/2/89)
66, Blvd. Poincare
1070 Brussels, Belgium
(U.S. Agent GENICANAM, Chazy, NY)

53-00 (formerly 08-17A) Compression Type Valves

533 APV Crepaco, Inc. (5/21/75)
100 S. CP Ave.
Lake Mills, Wisconsin 53551

484 APV Crepaco, Inc. (10/22/86)
100 South CP Avenue
Lake Mills, Wisconsin 53551

730 APV Rockford, Inc. (04/21/93)
1303 Samuelson Road
Rockford, Illinois 61109

552 Alloy Products Corp. (11/23/57)
1045 Perkins Ave.
P.O. Box 529
Waukesha, Wisconsin 53187

245 Babson Brothers Company (2/12/73)
Dairy System Division
1400 West Gale Ave.
Galesville, Wisconsin 54630

443 Badger Meter, Inc. (4/30/85)
6116 East 15th Street
P.O. Box 581390
Tulsa, Oklahoma 74158-1390

686 Bardiani Valvole S.R.L. (8/3/92)
Via G. Vittorio, 53
43045 Fornovo (PR) Italy
(U.S. Rep: Sanchelima Int.
1763 Northwest 93rd Ave.
Miami, Florida 33172)

538 Cipriani, Inc. (7/31/86)
23195 La Cadena Drive, Suite 103
Laguna Hills, California 92653
(Mfg. by Fratelli Tassalini, Italy)

716 Conexiones Inoxidables (03/04/93)
de Puebla S.A. de C.V.
Vicente Guerrero No. 211
Xicotepec de Juarez
Edo, Puebla MEXICO
(U.S. Rep: Ben Dolphin
Consulting, 4735 Lansing Drive
North Olmsted, Ohio 44070)

691 Definox Division (9/13/93)
Defontaine, Inc.
17044 W. Victor Road
New Berlin, Wisconsin 53151

530 G & H Products Corp. (6/10/57)
7600-57th Ave.
P.O. Box 1199
Kenosha, Wisconsin 53141

480 GEA Food and Process Systems Inc. (8/8/86)
8940 Route 108
Columbia, Maryland 21045

607 Kammer Valve, Inc. (9/25/90)
510 Parkway View Drive
Pittsburgh, Pennsylvania 15205
(Mfg. by: Kammer Ventile GmbH
Manderscheidtstr. 19
4300 Essen 1
Germany)

570 LUMACO (8/9/89)
9-11 East Broadway
Hackensack, New Jersey 07601

594 Oden Corp. (3/6/90)
255 Great Arrow Ave.
Buffalo, New York 14207

483 On-Line Instrumentation, Inc. (10/15/86)
Rt. 376, P.O. Box 541
Hopewell Junction, New York 12533

652 Pierre Guerin SA (10/4/91)
BP.12 - 79210
Mauze-Sur-Le-Mignon
France
(U.S. Rep: Alfa Technical Group, Inc.
601 Thompson Road N.
Syracuse, New York 13211)

551 Puriti, S.A. de C.V. (9/12/72)
Alfredo Nobel 39
Fracc. Ind. Puente de Vigas
Tlalnepantla, Mexico

149R Q-Controls (5/18/64)
Subsidiary of Cesco Magnetics
93 Utility Court
Rohnert Park, California 94928

748 Richards Industries (1/11/94)
3170 Wasson Road
Cincinnati, Ohio 45209-2381

762 Stainless Products, Inc. (12/18/80)
P.O. Box 169
1649 - 72nd Avenue
Somers, Wisconsin 53171-0169

542 L.C. Thomsen, Inc. ((8/31/57)
1303-43rd. St.
Kenosha, Wisconsin 53140

34A Tri-Clover, Inc. (10/15/56)
9201 Wilmot Rd.
Kenosha, Wisconsin 53141

467 Tuchenhagen North America, Inc. (1/13/86)
(Mfg. by Otto Tuchenhagen, West Germany)
8949 Deerbrook Trail
Milwaukee, Wisconsin 53223

561 VACU-PURG, Inc. (1/26/89)
214 West Main St.
P.O. Box 272
Fredericksburg, Iowa 50630

584 Valvinox, Inc. (11/27/89)
654 1ere Rue.
Iberville-QUE-Canada J2X 3B8

555 Waukesha Fluid Handling (12/11/57)
(Formerly Cherry-Burrell
Fluid Handling Division)
611 Sugar Creek Road
Delavan, Wisconsin 53115

86R Waukesha Specialty Co., Inc. (12/20/57)
P.O. Box 160, Hwy. 14
Darien, Wisconsin 53144

54-00 (formerly 08-17B) Diaphragm-Type Valves

565 APV Rosista, Inc. (10/22/86)
1325 Samuelson Rd.
Rockford, Illinois 61109
(Mfg. by APV Rosista, Inc., W. Germany & Denmark)

615 AsepCo (1/4/91)
1101 San Antonio
Mountain View, California 94043

745 Cashco, Inc. (12/9/93)
P.O. Box 6, Hwy. 140 West
Ellsworth, Kansas 67439-0006

617 Definox Division (2/1/91)
Defontaine, Inc.
17044 W. Victor Road
New Berlin, Wisconsin 53151

637 Gemu Valves, Inc. (7/10/91)
3800 Camp Creek Parkway
Bldg. 2400, Suite 102
Atlanta, Georgia 30331

514 H. D. Bauman Assoc., Ltd. (8/24/87)
35 Mirona Road
Portsmouth, New Hampshire 03801

203R ITT Grinnell Valve Co., Inc. (11/27/68)
Dia-Flo Division
33 Centerville Rd.
Lancaster, Pennsylvania 17603

494 Saunders Valve, Inc. (2/10/87)
15760 W. Hardy, #440
Houston, Texas 77060

56-00 (formerly 08-17E) Inlet and Outlet Leak-Protector Plug Valve

34E Tri-Clover, Inc. (10/15/56)
9201 Wilmot Rd.
Kenosha, Wisconsin 53141

556 Waukesha Fluid Handling (12/12/57)
611 Sugar Creek Road
Delavan, Wisconsin 53115

57-00 (formerly 08-17F) Tank Outlet Valve

531 G & H Products Corp. (6/10/57)
7600 57th Ave.
P.O. Box 1199
Kenosha, Wisconsin 53141

534 Lumaco (6/30/72)
9-11 East Broadway
Hackensack, New Jersey 07601

643 Paul Mueller Company (8/22/91)
1600 West Phelps
Springfield, Missouri 65801

58-00 (formerly 08-17M) Vacuum Breakers and Check Valves

376 Definox Division (1/25/83)
Defontaine, Inc.
17044 W. Victor Road
New Berlin, Wisconsin 53151

689 VNE Corporation (8/17/92)
1149 Barberry Drive
Janesville, Wisconsin 53547

59-00 (formerly 08-17D) Automatic Positive Displacement Sampler

291 Accurate Metering Systems Inc. (6/22/77)
(Mfg. by Diessel, Germany)
1650 Wilkening Ct.
Schaumburg, Illinois 60173

284 Bristol Engineering Co. (11/18/76)
210 Beaver St.
P.O. Box 696
Yorkville, Illinois 60560

693 Micropure Filtration, Inc. (9/17/92)
2323 6th Street, P.O. Box 7007
Rockford, Illinois 61125
(Mfg. by: Olper Maschinen & Armaturen
Olpe, Germany)

60-00 (formerly 08-17G) Rupture Discs

422 BS & B Safety Systems, Inc. (6/12/84)
7455 E. 46th St.
Tulsa, Oklahoma 74133

407 Continental Disc Corp. (10/14/83)
3160 W. Heartland Dr.
Liberty, Missouri 64068

61-00 (formerly 08-17I) Steam Injected Heaters

728 APV Crepaco, Inc. (04/14/93)
395 Fillmore Avenue
Tonawanda, New York 14150

560 Pick Heaters, Inc. (1/19/89)
P.O. Box 516
West Bend, Wisconsin 53095

62-00 (formerly 08-17L) Hose Assemblies

758 Crouch Supply Co. (2/22/94)
P.O. Box 163829
902 S. Jennings
Ft. Worth, TX 76161

721 Dixon Valve & Coupling Co. (03/23/93)
800 High Street
Chestertown, Maryland 21620

757 Nelson-Jameson, Inc. (2/21/94)
P.O. Box 647
2400 East 5th Street
Marshfield, Wisconsin 54449

727 Pure Fit, Inc. (04/14/93)
924 Marcon Blvd.
Allentown, Pennsylvania 18103

698 Sanitary Couplers, Inc. (10/23/92)
9151 Normandy Lane, S.
Centerville, Ohio 45458

700 Titan Industries, Inc. (10/23/92)
11121 Garfield Avenue
South Gate, California 90280

63-00 Sanitary Fittings

349 APN, Inc. (12/15/81)
921 Industry Rd.
Caledonia, Minnesota 55921

621 Bradford Castmetals (2/25/91)
P.O. Box 33
Elm Grove, Wisconsin 53122

304 VNE Corporation (3/16/78)
1149 Barberry Drive
Janesville, Wisconsin 53547

63-00 Sanitary Fittings (formerly 08-17R)

260 APV Crepaco, Inc. (5/21/75)
100 South CP Avenue
Lake Mills, Wisconsin 53551

470 Advance Stainless Mfg. Corp. (3/30/86)
218 West Centralia Street
Elkhorn, Wisconsin 53121

380 Allegheny Bradford Corp. (3/21/83)
P.O. Box 200 Route 219 South
Bradford, Pennsylvania 16701

79R Alloy Products Corp. (11/23/57)
1045 Perkins Ave., P.O. Box 529
Waukesha, Wisconsin 53187

682 Andron Stainless, Ltd. (6/30/92)
4610 Burgoyne Street
Mississauga, Ontario
Canada L4W 1G1
(U.S. Rep: Andron Stainless Corp.
8901 Farrow Road, #101
Columbia, South Carolina 29223)

688 Cajon Company (8/4/92)
9760 Shepard Road
Macedonia, Ohio 44056

645 Cipriani, Inc. - Tassalini S.P.A. (8/27/91)
23195 LaCadena Drive
Suite #103
Laguna Hills, California 92653

696 Conexiones Inoxidables (10/1/92)
de Puebla S. A. de C. V.
Vicente Guerrero No. 112
Xicotepec de Juarez
Edo. Puebla, Mexico

528 Dayco Products, Inc. (3/16/88)
333 West First Street
Dayton, Ohio 45402-3042

677 EXCEL-A-TEC, Inc. (5/8/92)
W141 N5984 Kaul Avenue
Menomonee Falls, Wisconsin 53051

455 Flowtech, Inc. (9/17/85)
1900 Lake Park Dr. Suite 345
Smyrna, Georgia 30080

271 The Foxboro Company (3/8/76)
33 Commercial Street
Foxboro, Massachusetts 02035

67R G & H Products Corp. (6/10/57)
P.O. Box 1199
7600-57th Avenue
Kenosha, Wisconsin 53141

369 IMEX, Inc. (11/3/82)
4040 Del Ray Ave., Unit 9
Marina del Rey, California 90292
(Mfg. by Lube Corp., Japan)

454 Jensen Fittings Corp. (9/11/85)
107-111 Goundry St.
North Tonawanda, New York 14120-5998

389 Lee Industries, Inc. (5/31/83)
P.O. Box 688
Philipsburg, Pennsylvania 16866

239 Lumaco, Inc. (6/30/72)
P.O. Box 688
Teaneck, New Jersey 07666

703 Parker Hannifin Corp. (11/6/92)
Instrument Connectors Div.
9400 South Memorial Pkwy.
Huntsville, AL 35803

200R Paul Mueller Co. (3/5/68)
1600 W. Phelps St., Box 828
Springfield, Missouri 65801

726 Pure Fit, Inc. (04/14/93)
924 Marcon Blvd.
Allentown, Pennsylvania 18103

242 Puriti, S.A. de C.V. (9/12/72)
Alfredo Nobel 39
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Tlalnepantla, Mexico

424 Robert-James Sales, Inc. (8/31/84)
699 Hertel Ave., Suite 260
Buffalo, New York 14207

699 Rodger Industries, Inc. (10/23/92)
P.O. Box 186
Blenheim, Ontario
Canada N0P 1A0
(Not available in the U.S.A)

334 Stainless Products, Inc. (12/18/80)
1649-72nd Ave., Box 169
Somers, Wisconsin 53171

741 Steel & O'Brien Mfg., Inc. (8/26/93)
545 South Route 219
Springville, New York 14141

391 Stork Food Machinery, Inc. (6/9/83)
P.O. Box 1258/Airport Parkway
Gainesville, Georgia 30503
(Mfg. by Stork Amsterdam, Netherlands)

357 Tanaco Products (4/16/82)
3860 Loomis Trail Rd.
Blaine, Washington 98230

449 Tech Controls Enterprise Co., Ltd. (8/2/85)
2940 S.E. 200th Avenue
Issaquah, Washington 98027
(Mfg. in Taiwan)

73R L.C. Thomsen, Inc. (8/31/57)
1303-43rd. St.
Kenosha, Wisconsin 53140

34R Tri-Clover, Inc. (10/15/56)
9201 Wilmot Rd.
Kenosha, Wisconsin 53141

707 Valvinox, Inc., SGRM Div. (01/05/93)
650 - 1st Street
Iberville, Quebec, Canada J2X 3B8
(Not available in U.S.A.)

82R Waukesha Fluid Handling (12/17/93)
611 Sugar Creek Road
Delavan, Wisconsin 53115

64-00 Pressure Reducing and Back Pressure Regulating Valve (formerly 08-17N)

753 G & H Products (2/1/94)
7600 - 57th Avenue
P.O. Box 1199
Kenosha, WI 53141

769 Richards Industries Valve Group (6/6/94)
3170 Wasson Road
Cincinnati, Ohio 45209

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Amy Johnson
A. J. Enterprises, Watertown

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Services / Products

Coming Events

NOVEMBER

•**14-18, Maintenance and Management,** Manhattan, KS; a course offered by the American Institute of Baking. For more information, call (800) 633-5137 or (913) 537-4750.

•**17-18, ISO 9000 Registration Workshop,** Manhattan, KS; a course offered by the American Institute of Baking. For more information, call (800) 633-5137 or (913) 537-4750.

•**30-Dec. 2, Muffin and Doughnut Technology;** Manhattan, KS; a course offered by the American Institute of Baking. For more information, call (800) 633-5137 or (913) 537-4750.

DECEMBER

•**5-7, SERVSAFE® Serving Safe Food Seminar,** in Chicago, IL. Co-sponsored by the Illinois Restaurant Association, held at the Midland Hotel. For additional information or to register, contact The Educational Foundation's customer service department at (800) 765-2122.

•**5-7, Food Ingredient Technology,** East Brunswick, NJ, a course offered by The Center for Professional Advancement. For more information, call (908) 613-4500.

•**5-7, Good Manufacturing Practice (GMP) for the Food Industry,** East Brunswick, NJ; a course offered by The Center for Professional Advancement. For more information, call (908) 613-4500.

Employment Opportunities

•**5-8, Toxics Release Inventory Data Use Conference 1994: Building TRI and Pollution Prevention Partnerships,** The Park Plaza Hotel, Boston, MA. For more information, contact Madsen Marketing Strategies, 31 Kidder Avenue, Somerville, MA 02144; phone (617) 666-1431; FAX (617) 628-9297.

•**6-7, Understanding Industrial Motor Controls,** Chicago, IL; a course offered by the American Institute of Baking. For more information, call (800) 633-5137 or (913) 537-4750.

•**6-7, Hazard Analysis Critical Control Points (HACCP) — A Basic Concept for Food Protection...,** to be held at the University of California, Davis, CA. For more information, call (800) 752-0881 in California; (916) 757-8777 outside of California; or FAX (916) 757-8558.

•**7-9, Basic Safety School,** Phoenix, AZ; a course offered by the American Institute of Baking. For more information, call (800) 633-5137 or (913) 537-4750.

•**8-9, "The Challenge Before Us" National Livestock Identification Symposium;** Stouffer Concourse Hotel, St. Louis, MO. Facilitated by the Livestock Conservation Institute. For more information, call (502) 782-9798, or FAX (502) 782-0188.

•**12-13, Thermal Processing of Foods I: Operation of Pasteurizer Equipment**. Fee to be established. For more information, contact Mr. A. W. Hydamaka at (204) 474-9621; FAX (204) 261-1488.

•**13-14, Understanding Industrial Motor Controls,** Kansas City, MO; a course offered by the American Institute of Baking. For more information, call (800) 633-5137 or (913) 537-4750.

•**14-15, Farm Personnel Management Workshop,** LaCrosse, WI; offered by extension services of Iowa State University, University of Illinois, University of Minnesota and University of Wisconsin. For more information, call (608)263-3485.

•**14-15, Thermal Processing of Foods II: Testing of Pasteurizer Equipment and Controls**. Fee to be established. For more information, contact Mr. A. W. Hydamaka, at (204) 474-9621; FAX (204) 261-1488.

•**28-Jan. 1, National Milk Producers Federation Annual Meeting,** Dallas, TX; For more information, call National Milk Producers Federation at (703) 243-6111.

1995

JANUARY

•**3-5, Milling for Cereal Chemists,** sponsored by the American Association of Cereal Chemists, will be held in Kansas State University, Manhattan, KS. For more information, contact Marie McHenry, AACC Short Course Coordinator, 3340 Pilot Knob Road, St. Paul, MN 55121. Phone (612) 454-7250; FAX (612) 454-0766.

•**9-Feb. 10, Dairy Technology Module II — Technology of Cheese and Concentrated Milk Products**; the principles and practices relating to the manufacture of cheese. Includes selection and evaluation of raw materials plus lactic cultures, processing, packaging, storage and distribution. Aspects of quality control, product testing, judging and grading associated with cheese production. Cost: $873.00 For more information, contact Mr. A. W. Hydamaka, at (204) 474-9621; FAX (204) 261-1488.

•**10-12, Introduction to Food Chemistry,** sponsored by the American Association of Cereal Chemists will be held in Los Angeles, CA. For more information, contact Marie McHenry, AACC Short Course Coordinator, 3340 Pilot Knob Road, St. Paul, MN 55121; phone (612) 454-7250; FAX (612) 454-0766.

•**16-17, Wheat Gluten: Chemistry and Technology,** sponsored by the American Association of Cereal Chemists, will be held in Kansas City, MO. For more information, contact Marie McHenry, AACC Short Course Coordinator, 3340 Pilot Knob Road, St. Paul, MN 55121; phone (612) 454-7250; FAX (612) 454-0766.

•**18, Dough Modifiers,** sponsored by the American Association of Cereal Chemists, will be held in Kansas City, MO. For more information, contact Marie McHenry, AACC Short Course Coordinator, 3340 Pilot Knob Road, St. Paul, MN 55121; phone (612) 454-7250; FAX (612) 454-0766.

•**18-21, U.S. Dairy Forum,** sponsored by the International Dairy Foods Association, will be held at La Quinta Resort and Club in Palm Springs, CA. For more information, call (202) 737-IDFA.

•**19, Food Surfactants,** sponsored by the American Association of Cereal Chemists, will be held in Kansas City, MO. For more information, contact Marie McHenry, AACC Short Course Coordinator, 3340 Pilot Knob Road, St. Paul, MN 55121; phone (612) 454-7250; FAX (612) 454-0766.

•**23-25, The 1995 Conference on Sustainable Agriculture,** sponsored by The Council for Agricultural and Sciene Technology (CAST), is the premier event of 1995 that will bring together scientists, producers, interest groups, industry, and federal policy makers to address the critical social, economic and political issues facing sustainable development in and around agriculture. For more information, contact Richard E. Stuckey at (515) 292-2125.

FEBRUARY

•**6-9, Freezing Technology Short Course,** on the UC-Davis Campus. This intensive course teaches the fundamentals of freezing specific commodities and includes hands-on demonstrations. To enroll or request more information, call toll-free in California (800) 752-0881. Outside of California, call (916) 757-8777.

•**8-10, Eighth Australian Food Microbiology Conference** to be held in Melbourne. Utilizing a mixture of local and international speakers, drawn from the key areas of the industry, Academia and Research, the aim of this conference is to provide a wide range of topics of interest to the Food Microbiology Industry. In addition, a poster session will be conducted. For more information, contact Kim King, Conference Secretariat, Food Micro '95, GPO Box 128, Sydney NSW 2001, Australia; phone 61-2-262-2277; FAX 612-262-2323.

•**12-15, International Symposium on Computer Mapping in Epidemiology and Environmental Health,** Tampa, FL; hosted by the World Computer Graphics Foundation — The University of South Florida. For more information, call (813) 974-2386.

•**13-14, 4th Annual Cheese Symposium to Introduce Product Research Results,** to be held in Burlingame, CA. The conference focuses on the latest developments in cheese science and technology, and introduces the results of dairy products related research. To enroll or request more information, call toll-free in California (800) 752-0881. Outside of California, call (916) 757-8777.

MARCH

•**2-4, Introduction to Statistical Methods for Sensory Evaluation of Foods;** a course to be offered at the UC-Davis campus. The fee is $575.00 and includes one dinner, two lunches and the course text or manual. For more information or to enroll, call toll-free in California (800) 752-0881. Outside California, call (916) 757-8777.

•**6-8, Principles of Cereal Science,** a short course sponsored by American Association of Cereal Chemists will be held in Los Angeles, CA. For more information, contact Marie McHenery, AACC Short Course Coordinator, 3340 Pilot Knob Road, St. Paul, MN 55121; phone (612) 454-7250; FAX (612) 454-0766.

•**6-8, Sensory Evaluation: Overview and Update,** an additional course offered at the UC-Davis campus. The fee is $575.00, or $1,000 to attend both this and the "Introduction to Statistical Methods for Sensory Evaluation of Foods." For more information or to enroll, call toll-free in California (800) 752-0881. Outside California, call (916) 757-8777.

•**9-10, Fats, Oils and Substitutes in Baked Products,** a short course sponsored by American Association of Cereal Chemists will be held in Chicago, IL. Contact Marie McHenery, AACC Short Course Coordinator, 3340 Pilot Knob Road, St. Paul, MN 55121; phone (612) 454-7250; FAX (612) 454-0766.

MAY

•**8-11, International Symposium: Bovine Tuberculosis in Animals and Human Beings;** University of Maryland, College Park, MD. For more information, please contact Yolanda Hunt or Robert Werge, USDA-ARS-BARC-W, Bldg. 005, Room 203, Beltsville, MD 20705; phone (301) 504-5774; FAX (301) 504-5467.

ADVERTISING INDEX

To assure that your meeting time is published, send announcements at least 90 days in advance to: IAMFES, 6200 Aurora Avenue, Suite 200W, Des Moines, IA 50322-2838.

IAMFES Offers the Northeast Dairy Practices Council (NDPC) *"Guidelines for the Dairy Industry"*

At the urging of our **Dairy Quality and Safety Professional Development Group,** IAMFES has entered into an agreement with the Northeast Dairy Practices Council (NDPC) to distribute their *"Guidelines for the Dairy Industry."* NDPC is a non-profit organization of education, industry and regulatory personnel concerned with milk quality and sanitation throughout 15 northeastern/mid-Atlantic states. Interestingly, its membership and subscriber rosters list individuals and organizations throughout the United States, Canada and Japan.

For the past 25 years, NDPC's primary mission has been the development and distribution of educational guidelines directed to proper and improved sanitation practices in the production, processing, and distribution of high quality fluid milk and manufactured dairy products.

The NDPC Guidelines are written by professionals who comprise five permanent Task Forces. Prior to distribution, every Guideline is submitted for approval to the key milk control sanitarian in each of the 15 states which are now active participants in the NDPC process. Should any official have an exception to a section of a proposed guideline, that exception is noted in the final document.

Although the Guidelines are developed east of the Mississippi River, clearly they have a high degree of applicability wherever cows are milked and milk is transported, processed and distributed.

The Guidelines are renown for their common sense and useful approach to proper and improved sanitation practices. We think that they will be a valuable addition to your professional reading library.

The entire set consists of 48 guidelines including:

1 Dairy Cow Free Stall Housing
2 Effective Installation, Cleaning and Sanitizing of Milking Systems
3 Selected Personnel in Milk Sanitation
7 Sampling Fluid Milk
8 NE Ext. Publ., Conferences, Short Courses, Correspondence Courses and Visual Aids in Dairying
9 Fundamentals of Cleaning and Sanitizing Farm Milk Handling Equipment
10 Fluid Milk Shelf-Life
11 Sediment Testing and Producing Clean Milk
13 Environmental Air Control & Quality for Dairy Food Plants
14 Clean Room Technology
16 Handling Dairy Products From Processing to Consumption
17 Causes of Added Water in Milk
18 Abnormal Milk--Fieldman's Approach
21 Raw Milk Quality Tests
22 Control of Antibacterial Drugs and Growth Inhibitors in Milk and Milk Products
23 Preventing Rancid Flavors in Milk
24 Troubleshooting High Bacteria Counts of Raw Milk
25 Cleaning and Sanitizing Bulk Pickup and Transport Tankers
28 Troubleshooting Residual Films on Dairy Farm Milk Handling Equipment
29 Cleaning and Sanitizing in Fluid Milk Processing Plants
30 Potable Water on Dairy Farms
31 Composition and Nutritive Value of Dairy Products
32 Fat Test Variations in Raw Milk
33 Brucellosis and Some Other Milkborne Diseases
34 Butterfat Determinations of Various Dairy Products
35 Dairy Plant Waste Management
36 Dairy Farm Inspection
37 Planning Dairy Stall Barns
38 Preventing Off-flavors in Milk
39 Grade A Fluid Milk Plant Inspection
40 Controlling Fluid Milk Volume and Fat Losses
41 Milkrooms and Bulk Tank Installation
42 Stray Voltage on Dairy Farms
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44 Troubleshooting Dairy Barn Ventilation Systems
45 Gravity Flow Gutters for Manure Removal in Milking Barns
46 Dairy Odor Control
47 Naturally Ventilated Dairy Cattle Housing
48 Cooling Milk on the Farm
49 Postmilking Teat Dips
50 Farm Bulk Milk Collection Procedures
51 Controlling the Accuracy of Electronic Testing Instruments for Milk Components
52 Emergency Action Plan for Outbreak of Milkborne Illness in the Northeast
53 Vitamin Fortification of Fluid Milk Products
54 Selection and Construction of Herringbone Milking Parlors
56 Dairy Product Safety (Relating to Pathogenic Bacteria)
57 Dairy Plant Sanitation
58 Sizing Dairy Farm Water Heater Systems

If purchased individually, the entire set would cost $174. We are offering the set, packaged in three loose leaf binders for $125 plus $9 shipping and handling (outside the U.S., $21 for shipping and handling).
Information on how to receive new and updated Guidelines will be included with your order.
To purchase this important source of information, complete the order form below and mail or FAX (515-276-8655) to IAMFES.

Please enclose $125 plus $9 shipping and handling for each set of Guidelines. Shipments outside the U.S. are $125 plus $21 shipping and handling.

Payment in U.S. $ drawn on a U.S. Bank or by credit card.

Name: _____ Phone No. _____

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International Association of Milk, Food and Environmental Sanitarians, Inc.

IAMFES Booklets

New Prices Effective May 1, 1994

Quantity		Total $
_____	Procedures to Investigate Waterborne Illness $6.00/member; $9.00/non-member	_____
_____	Procedures to Investigate Foodborne Illness - 4th Edition $6.00/member; $9.00/non-member	_____
_____	Procedures to Investigate Arthropod-borne and Rodent-borne Illness $6.00/member; $9.00/non-member	_____
_____	Procedures to Implement the Hazard Analysis Critical Control Point System $6.00/member; $9.00/non-member	_____
_____	Pocket Guide To Dairy Sanitation $.50/member; $.75/non-member (minimum order of 10) ($2.50 shipping for each order of 10)	_____

Multiple copies available at reduced prices.
Phone our order desk for pricing information on quantities of 11 or more.

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U.S. $2.00 for first item. $1.00 for each additional item
Outside U.S. $4.00 for first item. $1.00 for each additional item _____

Booklet Total _____

3-A Sanitary Standards

New Prices Effective May 1, 1994

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_____	Complete set 3-A Dairy Standards $48 member; $72 non-member	_____
_____	Complete set 3-A Dairy & Egg Standards $70 member; $105 non-member	_____
_____	3-A Egg Standards $40 member; $60 non-member	_____
_____	Five-year Update Service on 3-A Sanitary Standards 3-A Dairy & Egg Standards $62 member; $93 non-member	_____

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Outside U.S. $10.25 each item _____

3-A Sanitary Standards Total _____

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11/94

International Association of Milk, Food and Environmental Sanitarians Inc

The Advertisements included herein are not necessarily endorsed by the International Association of Milk, Food and Environmental Sanitarians, Inc.

Reader requests for information are sent to the appropriate company. Follow-up on reader requests are the responsibility of the company advertising.

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112	125	138	151	164	177	190	203	216	229	242	255	268	281	294	307	320	333	346	359
113	126	139	152	165	178	191	204	217	230	243	256	269	282	295	308	321	334	347	360

This second Reader Service Card is provided to allow co-workers to also respond to companies of interest.

IAMFES

DFES
11/94

International Association of Milk, Food and Environmental Sanitarians Inc

The Advertisements included herein are not necessarily endorsed by the International Association of Milk, Food and Environmental Sanitarians, Inc.

Reader requests for information are sent to the appropriate company. Follow-up on reader requests are the responsibility of the company advertising.

Name _____ Title _____

Company _____

Address _____

City _____ State/Prov. _____

Country _____ Zip _____

Phone Number _____

Please send information on items circled below: Deadline 60 days from issue date

101	114	127	140	153	166	179	192	205	218	231	244	257	270	283	296	309	322	335	348
102	115	128	141	154	167	180	193	206	219	232	245	258	271	284	297	310	323	336	349
103	116	129	142	155	168	181	194	207	220	233	246	259	272	285	298	311	324	337	350
104	117	130	143	156	169	182	195	208	221	234	247	260	273	286	299	312	325	338	351
105	118	131	144	157	170	183	196	209	222	235	248	261	274	287	300	313	326	339	352
106	119	132	145	158	171	184	197	210	223	236	249	262	275	288	301	314	327	340	353
107	120	133	146	159	172	185	198	211	224	237	250	263	276	289	302	315	328	341	354
108	121	134	147	160	173	186	199	212	225	238	251	264	277	290	303	316	329	342	355
109	122	135	148	161	174	187	200	213	226	239	252	265	278	291	304	317	330	343	356
110	123	136	149	162	175	188	201	214	227	240	253	266	279	292	305	318	331	344	357
111	124	137	150	163	176	189	202	215	228	241	254	267	280	293	306	319	332	345	358
112	125	138	151	164	177	190	203	216	229	242	255	268	281	294	307	320	333	346	359
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IAMFES

200W Merle Hay Centre
6200 Aurora Ave.
Des Moines, Iowa 50322

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200W Merle Hay Centre
6200 Aurora Ave.
Des Moines, Iowa 50322

This is Your Personal Invitation to Join

The International Association of Milk, Food and Environmental Sanitarians, founded in 1911, is a non-profit educational association of food protection professionals. The IAMFES is dedicated to the education and service of its members, specifically, as a well as industry personnel in general. Through membership in the Association, IAMFES members are able to keep informed of the latest scientific, technical and practical developments in food protection. IAMFES provides its members with an information network and forum for professional improvement through its two scientific journals, educational annual meeting and interaction with other food safety professionals.

Who are IAMFES Members?

The Association is comprised of a diverse membership of over 3,500 from 38 nations. IAMFES members belong to all facets of the food protection arena. The main groups of Association members fall into three categories: Industry Personnel, Government Officials and Academia.

Why are They IAMFES Members?

The diversity of its membership indicates that IAMFES has something to offer everyone involved in food protection and public health. INFORMATION is that offering.

Your Benefits as an IAMFES Member

Dairy, Food and Environmental Sanitation — Published monthly, this is the official journal of IAMFES. Its purpose is the disseminating of current information of interest to the general IAMFES membership. Each issue contains three to five informational applied research or general interest articles, industry news and events, association news, columns on food safety and environmental hazards to health, a food and dairy industry related products section, and a calendar of upcoming meetings, seminars and workshops. All regular IAMFES members receive this publication as part of their membership.

Journal of Food Protection — A refereed monthly publication of scientific research and authoritative review articles. Each issue contains 12 to 15 technical research manuscripts and one to five articles reporting a wide variety of microbiological research pertaining to food safety and quality. The *Journal of Food Protection* is internationally recognized as one of the leading publications in the food and dairy microbiology fields. This journal is available to all individuals with the Member *Plus* option.

The IAMFES Annual Meeting — Held in a different city each year, the IAMFES Annual Meeting is a unique educational event. Three days of technical sessions, scientific symposia and commercial exhibits provide members and other industry personnel with over 100 presentations on the most current topics in food protection. It offers the opportunity to discuss new technologies and innovations with leading authorities in various fields concerned with food safety. IAMFES members receive a substantially reduced registration fee.

To Find Out More...

To learn more about IAMFES and the **many** other benefits and opportunities available to you as a member, please call (515) 276-3344.