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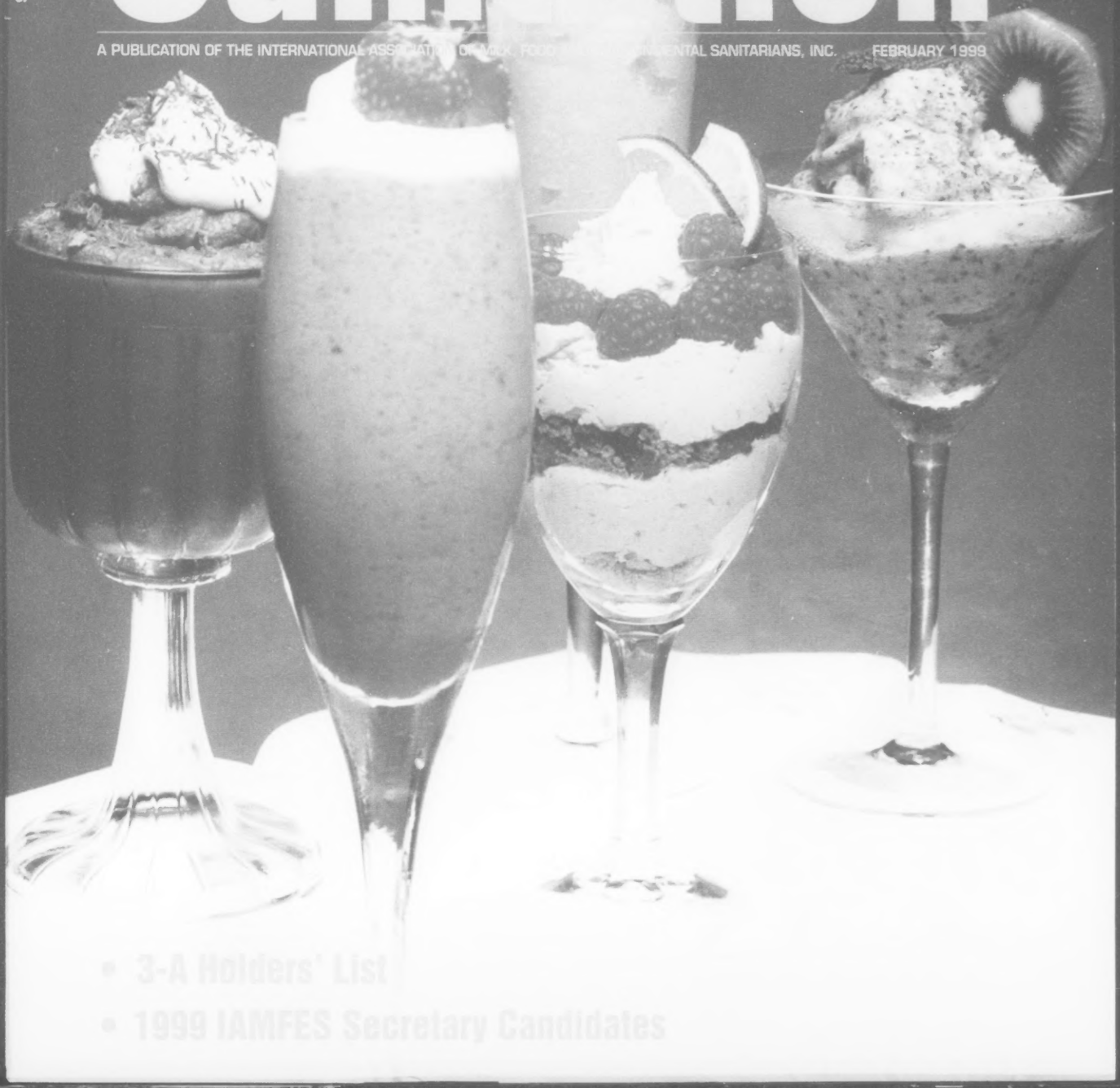
DAIRY, FOOD AND ENVIRONMENTAL

Sanitation

A PUBLICATION OF THE INTERNATIONAL ASSOCIATION OF MILK, FOOD AND ENVIRONMENTAL SANITARIANS, INC. FEBRUARY 1999



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- 1999 IAMFES Secretary Candidates

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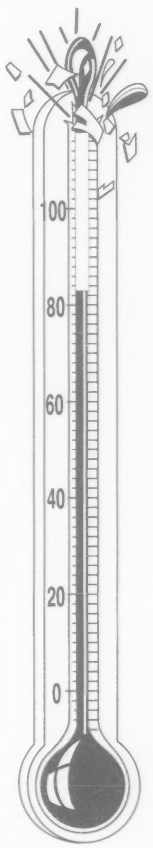

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INTERNATIONAL ASSOCIATION OF MILK, FOOD AND ENVIRONMENTAL SANITARIANS, INC.
6200 Aurora Avenue, Suite 200W
Des Moines, Iowa 50322-2863, USA
800.369.6337 or 515.276.3344; Fax: 515.276.8655

Executive Director: David W. Tharp
E-mail: dtharp@iamfes.org

Administrative Assistant: Tami J. Schafroth
E-mail: tschafroth@iamfes.org

COMMUNICATIONS

Director of Communications: Tamara L. Kuhn
E-mail: tkuhn@iamfes.org

Publications Specialist: Donna A. Bahun
E-mail: dbahun@iamfes.org

Publication Assistant: Bev Corron
E-mail: bcorron@iomfes.org

Publications Proofreader: Pam J. Wanninger
E-mail: pwanninger@iomfes.org

ADMINISTRATION

Director of Finance and Administration: Lisa K. Hovey
E-mail: lhovey@iomfes.org

Accounting Assistant: Nina L. Dao
E-mail: ndao@iamfes.org

Order Fulfillment/Receptionist: Karla K. Jordan
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MEMBERSHIP

Membership/Meeting Coordinator: Julie A. Cattanach
E-mail: jcattanach@iomfes.org

ADVERTISING

McCleery Communications
Ward E. McCleary
Phone: 515.271.0543
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1999

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2000

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VIEWS

FROM YOUR PRESIDENT

By ROBERT E. BRACKETT
IAMFES President

"Pay no attention to that man behind the curtain!"

The Wizard of Oz is one of my favorite old classic movies. In particular, I like the scene where Dorothy and her friends finally get their audience with the Wizard. They are cowering in the great hall, in awe of the "great Oz." It is only when Dorothy's dog Toto pulls back the curtain that they realize that the "Wizard" is actually an intricate production put on by a frantically working but ordinary man. Embarrassed, the man yells into the microphone, "Pay no attention to that man behind the curtain!" But it is too late, Dorothy and friends already know the truth. Believe it or not, this scene has some similarities to IAMFES. That is, what the average IAMFES Member perceives as IAMFES is actually the culmination of (often frantic) human efforts. If you have been following this column the past few months, you may notice that I have tried to play the role of Toto by revealing many of the "behind-the-scene" workings and issues that go into making IAMFES what it is. This is intended. I think Members should know as much about their organization as possible. This month, I will continue with that theme by revealing the workings of two "behind-the-scenes" groups, your Executive Board and the Program Committee (formerly known as PAC).

I occasionally get asked, "Exactly what does the IAMFES Executive Board DO?" About the only time that most IAMFES Members see the Board in action is at the Business Meeting and the Annual Awards Banquet. However, these two events, although important, represent only relatively minor activities. The majority of Board activities are unseen and occur at other times throughout the year. In fact, your Executive Board meets face-to-face at least four times per year. The winter Board meeting is the first meeting of the new calendar year. The meeting is held in late January or early February at the venue of the upcoming Annual Meeting, this year at the Hyatt Regency Hotel in Dearborn, Michigan. A spring meeting is held in April or early May at the IAMFES office in Des Moines. The summer meeting is held in conjunction with the IAMFES Annual Meeting, and the fall meeting is again held in October or November in Des Moines.

The overall purpose or "theme" of each meeting varies depending on the season. The winter meeting allows the Board to visit the facilities for the upcoming Annual Meeting, meet with the hotel management, and plan activities related to the Annual Meeting. The spring Board meeting focuses more on routine business as well as finalizing plans for the upcoming Annual Meeting. The summer meeting is focused almost exclusively on the Annual Meeting. The fall meeting focuses on fiscal year-end matters, review of the past Annual Meeting, long-range planning, and meeting with the IAMFES office staff. Regardless of the season and location of the meeting, there is much work that MUST get done during the Board's brief time together. Meetings typically start at 8:00 a.m. and continue until 5:00 or 6:00 p.m., and occasionally we

meet in the evenings as well! The agenda for Board meetings follows the usual Robert's Rules of Order and typically involves discussions of various topics related to IAMFES policy, decisions regarding upcoming events, and reports from the IAMFES office. In addition to meeting in person, your Executive Board also "meets" throughout the year via E-mail and conference calls, as needed.

Another important group that is often hidden from the average IAMFES Member is the Program Committee. The Program Committee consists of four members each from industry, academia, and government and is charged with all aspects related to the technical program for the Annual Meetings. The Program Committee first gathers at the Annual Meeting to identify potential topics for symposia and workshops. The list of proposed symposia may be suggested by the Program Committee itself, or come from Professional Development Groups or individual attendees wishing to organize a symposium. During the Annual Meeting, the Program Committee selects symposia and workshops they feel would best serve the Membership at the following year's Annual Meeting. The selected symposia are then returned to symposium or workshop organizers for further development.

The Program Committee next meets immediately before, and in conjunction with, the winter Executive Board meeting at the location for the upcoming Annual Meeting. It is at this meeting that all the details of the upcoming technical program are decided. The Program Committee reviews and accepts or rejects submitted poster and oral presentations, places selected presentations into appropriate sessions, and decides when and in which rooms the sessions, symposia and workshops will take place. As you can imagine, this is no easy task! It requires long hours of hard work, good judgment, and fairness on the part of Program Committee Members. However, the Program Committee performs their duties in a dedicated and professional manner, as evidenced by the excellent and improving quality of our Annual Meeting technical program.

It is my hope that this brief summary of your Executive Board and Program Committee leaves you with a better understanding of your Association so that you can get more out of it. After all, it was not until AFTER Dorothy and her friends understood the truth about the Wizard of Oz that they received what they had hoped for.

FOUNDATION FUND SILENT AUCTION

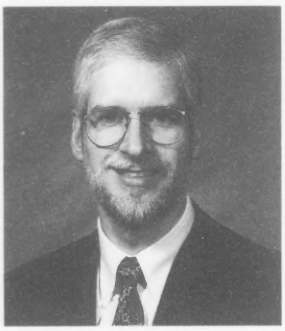
The Second Annual Foundation Fund Silent Auction will be held at the IAMFES 86th Annual Meeting in Dearborn, Michigan, August 1-4, 1999. The Foundation benefits the Ivan Parkin Lecture, the Developing Scientist Competition, the Audiovisual Library and co-sponsorship of the Crumbine Award. It also provides surplus *JFP* and *DFES* journals to developing countries.

Items donated last year include California wine, a Carolina sweet grass basket, food safety videos, Tennessee Smoked Country Ham, a gift certificate from Omaha Steaks International and imported cigars. Donations are accepted from individuals and groups. Last year's auction raised over $2,000 for the Foundation Fund. Promote your state or organization by donating items now to help the Foundation exceed its goal of $100,000 in 2000.

To donate items to the Silent Auction, contaet Lisa Hovey at the IAMFES office 800.369.6337; E-mail: lhovey@iamfes.org.

COMMENTARY

FROM THE EXECUTIVE DIRECTOR



By DAVID W. THARP
IAMFES Executive Director

"The time is right for a new name for IAMFES"

We enter into February with another column to report progress on changing our Association name to the "International Association for Food Protection." The Executive Board is dedicated to keeping you informed about the process and is openly soliciting your input and support. As promised in the January 1999 issue of *Dairy, Food and Environmental Sanitation*, the survey results are in and tabulated.

During November and December, IAMFES surveyed Members to gain their thoughts and insight. We were happy to see an excellent return rate of more than 30 percent from the sample sent out. About 1 out of 3 respondents provided their names, which was optional. This, combined with the return rate, is a sign of an active, involved membership.

A few general points about respondents are:

1. 70% were male and 30% female.
2. Age range:

20-29	3.5%
30-39	20.0%
40-49	39.0%
50-59	24.2%
60+	13.7%

3. Years an IAMFES Member:

Less than 1 year	11.63%
1-5 years	26.74%
6-10 years	30.23%
11-15 years	10.47%
16-20 years	13.95%
21-25 years	3.48%
Over 25 years	6.98%

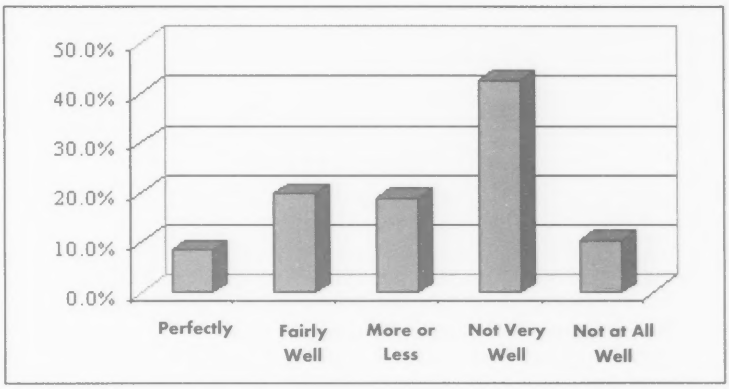
The key finding in the survey was the answer to a question about how well our current name, "The International Association of Milk, Food and Environmental Sanitarians" fits the mission of our Association. Only 8 percent answered "perfectly" and about 20 percent said "fairly well," while more than 53 percent said "not very well" or "not at all." This echoes the recommendation to update IAMFES' name to more accurately reflect the activities and responsibilities our Membership represents today.

An even stronger vote of confidence for the name "International Association for Food Protection" was evident in the answers to the following question: "How does the alternative name fit or reflect the Association's mission of providing food safety professionals worldwide with a forum to exchange information on protecting the food supply?" When the answers were tallied, nearly 75 percent answered "perfectly" or "fairly well" while only 14 percent answered "not very well" or "not at all." More than 65 percent of the respondents said the proposed name was an "excellent" or a "good" choice.

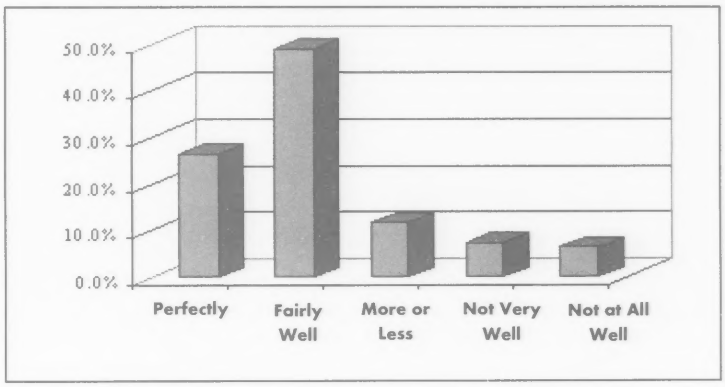
We are certainly happy to see such strong support for the name, "International Association for Food Protection." Most Members recognize that this has been a long process. The Executive Board and many other Members have discussed this issue for many years and a plan of action was developed more than two years ago to allow for plenty of Member discussion and input. The survey Members participated in helped confirm this is worth the effort. We can continue to move ahead knowing full well that the time is right for a new name for IAMFES.

The new name in no way closes the door on the past. We will continue to have interest in all current areas and provide educational programs to address our Members' needs. The new name allows us additional opportunities to expand our Membership. Our name may change, but our mission will remain the same. With your support, we will become the "International Association for Food Protection," and our mission will remain "to provide food safety professionals with a forum to exchange information on protecting the food supply."

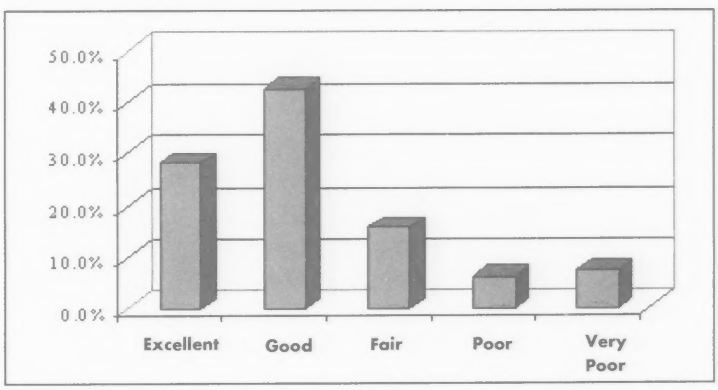
HOW WELL DOES THE NAME "IAMFES" FIT THE MISSION?



HOW WELL DOES THE NAME "INTERNATIONAL ASSOCIATION FOR FOOD PROTECTION" FIT THE MISSION?



HOW GOOD OF A NAME DO YOU THINK "INTERNATIONAL ASSOCIATION FOR FOOD PROTECTION" IS?



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

Dairy, Food and Environmental Sanitation, Vol. 19, No. 2, Pages 90-94

Listeria Species in Fresh Rainbow Trout Purchased from Retail Markets

F. Ann Draughon,* Brian A. Anthony, and Melissa E. Denton

SUMMARY

Rainbow trout samples (n=74), purchased at 31 retail markets, were surveyed for the presence of *Listeria.* Samples were direct plated and enriched in accordance with USDA and FDA protocols. Plating was performed on PALCAM and Modified Oxford Agar (MOX) directly without enrichment and after 24 and 48 hours enrichment. A total of 40 samples (54.1%) tested positive for *Listeria* by at least one protocol. Eight positive *L. monocytogenes* (20%) trout samples were detected by direct plating onto MOX agar; seven (17.5%) were detected on PALCAM. Thirty-seven of 40 positive samples (92.5%) were detected by the FDA procedure, while the USDA procedure detected 30 positive samples (75%). Neither the FDA nor the USDA procedure detected all of the positive samples at each enrichment period. PALCAM was more selective and resulted in more isolated colonies after 24 h enrichment, but was not as effective as MOX with direct plating. From these data, it was apparent that *Listeria* species were frequently present in fresh trout. Ninety percent (90%) of the fresh retail trout samples having a coliform count of log 5.0 CFU/g or higher were positive for *Listeria.* Fifty percent (50%) of the trout samples having an APC greater than log 5.0 CFU/g were positive for *Listeria*. Mean APC for all fresh trout samples collected was log 6.2 CFU/g, with a mean coliform count of log 3.2 CFU/g. Optimal recovery of *Listeria* species in trout was obtained by use of multiple enrichment and plating media.

INTRODUCTION

Listeria monocytogenes has been a known human and animal pathogen for over 50 years. Outbreaks of foodborne listeriosis have involved a variety of food products including pasteurized milk *(6)*, Mexican-style cheese *(11)*, turkey frankfurters *(1)* and coleslaw *(14)*. *L. monocytogenes* has also been found in uncooked frankfurters and undercooked chicken; however, HACCP procedures have significantly reduced the frequency of isolation of *L. monocytogenes (15).* One outbreak of listeriosis in New Zealand was associated with fish and fish products *(5)*. It is still unknown how many cases of listeriosis go unreported when a mild or flu-like gastrointestinal illness occurs; however, these numbers may be quite high *(4)*. *Listeria* has created concern within the food industry because it is a psychrotrophic bacterium that survives well in the environment and grows well at refrigeration temperatures. These characteristics enable it to compete with many spoilage microorganisms and cause public health problems with refrigerated foods that are normally not cooked prior to consumption *(16)*.

The concern over *Listeria* is also due to the potential for very severe symptoms associated with listeriosis, which may include encephalitis, septicemia, endocarditis, neonatal complications, and abortion in pregnant

TABLE 1. Aerobic plate count (APC) and coliform counts of trout purchased at retail markets

Grocery store chain	No. of samples	Aerobic Plate Count (Log CFU/g)		Coliform Count (Log CFU/g)	
		Range	Mean	Range	Mean
A	6	4.5-7.1	5.9	1.8-4.3	3.0
B	24	5.0-8.1	6.6	0.0-6.9	4.1
C	14	4.2-8.6	6.7	0.0-6.6	4.0
D	2	5.0-5.1	5.1	0.0-2.5	1.3
E	9	4.4-7.1	5.7	1.8-4.6	3.4
F	16	5.3-8.3	6.0	0.0-4.3	2.1
G	3	2.4-5.8	3.6	0.0-4.3	1.8
TOTAL	74	2.4-8.6	6.2	0.0-6.9	3.2

women. People at highest risk include pregnant women, alcoholics, drug users, diabetics, and individuals with other chronic illnesses or immunodeficiency. *Listeria* is common in the environment and has been isolated from soil, sewage, animal feed, water, vegetation, fresh and frozen poultry, slaughterhouse waste, and the feces of healthy individuals and animals *(17)*.

The occurrence of *Listeria* in fish products, particularly aquaculture fish, has not been as widely examined as its occurrence in other foods. Farber *(4)* found *L. monocytogenes* on ready-to-eat shrimp, crab, and salmon at the wholesale level; shrimp was the most likely seafood product to be contaminated at the retail level. The incidence of *Listeria* species in frozen fish was examined by Weagant et al. *(16)*, who found 35 of 57 samples (61.4%) tested positive for *Listeria* species and 15 of 57 samples (26.3%) tested positive for *L. monocytogenes*. Raw shrimp, cooked and peeled shrimp, cooked crab meat, raw lobster, and surimi-based seafood products have tested positive for *L. monocytogenes (16)*.

Considerable research has focused on development of more rapid methods for detecting *L. monocytogenes (2, 3, 7)*. Most of the newer methods work well with foods containing a moderately high inoculum (>log 3.0 CFU/g) of *Listeria* and limited background microflora. However, if inoculum is low or if large populations of competing microorganisms are present, methods differ markedly in the efficiency with which *Listeria* is recovered from different foods *(5)*.

The objective of this study was to determine the incidence of *Listeria* spp. and *L. monocytogenes* in fresh trout purchased at the retail level and to compare the efficiency of two of the more common isolation methods for detection of *Listeria* spp. and *L. monocytogenes* in fresh uncooked rainbow trout purchased in retail markets.

MATERIALS AND METHODS

Trout samples

Rainbow trout were purchased at retail markets in the East Tennessee area. Samples were purchased as fillets or whole gutted fish. Samples were held on ice during transport; upon arrival in the laboratory, they were immediately refrigerated and sampled within 12 h.

Bacterial cultures

L. monocytogenes strain Scott A (clinical isolate, serotype 4b, (departmental collection) and *Listeria innocua* (ATCC 33090, American Type Culture Collection, Rockville, MD) were used for confirmation of isolation and biochemical reactions. Cultures were kept on tryptic soy agar slants (Difco, Detroit, MI) and in lyophilized culture storage.

Microbiological analysis

Serial dilutions were made using a 25 g fresh trout sample (fillet only) diluted in 225 ml of 0.1% peptone. Samples were mixed using a Model 400 Stomacher® Lab Blender (Stewart, London, England). Aerobic Mesophilic Plate Count (APC) and Coliform Counts were performed using the pour plate method and incubated at 32°C on Tryptic Soy Agar (48 h) and Violet Red Bile Agar (24 h), respectively.

Direct *Listeria* counts (no enrichment) were performed by spread plating 0.2 ml of the initial dilution on both PALCAM and MOX agars. Agar plates were incubated at 32°C for 24 and 48 h *(10, 12)*. PALCAM and Modified Oxford Medium (MOX) were used for differential plating and isolation of *Listeria* spp. (Oxoid, Hampshire, England). MOX was modified by adding 20 mg/l sodium moxalactam and 10 mg/l colistin sodium methanesulfonate after sterilization and tempering of culture medium to <50°C. PALCAM was prepared as directed by the manufacturer.

Two enrichment procedures were used for all trout samples collected. A 25-g sample was placed into a Stomacher® bag and mixed with 225 ml UVM I for 2 min (USDA Method). This enrichment was incubated at 30°C for 24 h, after which a 0.1 ml sample was transferred to 10 ml UVM II secondary enrichment medium. Duplicate samples were streaked onto MOX and PALCAM agar. The 24 h UVM II enrichment was incubated at 30°C for another 24 h, after which duplicate samples were again streaked onto MOX and PALCAM agar. MOX and PALCAM agar were incubated at 32°C and checked at both 24 and 48 h for typical *Listeria* isolates.

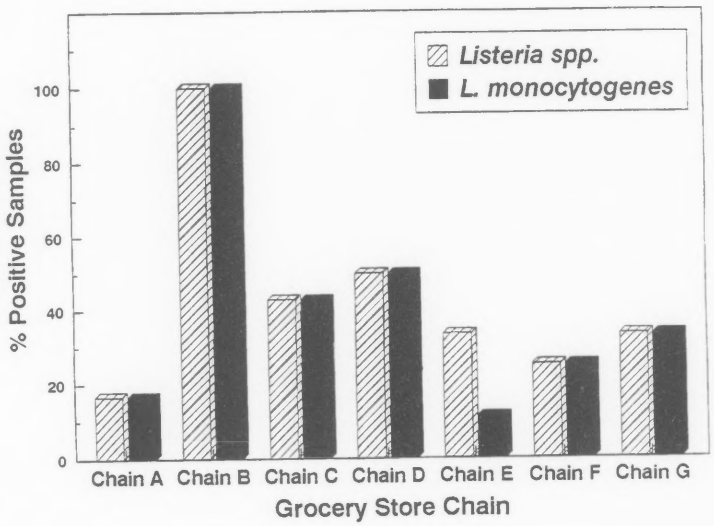
For the second type of enrichment procedure (modified FDA protocol), *(9)* a 50 g sample was placed

TABLE 2. Incidence of *Listeria* spp. in grocery store chains[1]

Grocery store chain	No. of samples	*L. monocytogenes* # positive (%)	Other *Listeria* spp. # positive (%)	Total Incidence of *Listeria* spp. # positive (%)
A	6	1 (16.7)	0 (0.0)	1 (16.7)
B	24	24 (100.0)	22 (91.7)	24 (100.0)
C	14	6 (42.9)	2 (14.3)	6 (42.9)
D	2	1 (50.0)	1 (50.0)	1 (50.0)
E	9	1 (11.1)	3 (33.3)	3 (33.3)
F	16	4 (25.0)	3 (18.9)	4 (25.0)
G	3	1 (33.3)	1 (33.3)	1 (33.3)
TOTAL	74	38 (51%)	32 (43%)	40 (54%)

[1]Two samples contained *Listeria* spp. other than *L. monocytogenes* and eight samples contoined only *L. monocytogenes*. The remoinder of the samples contained *L. monocytogenes* in combinotion with onother *Listeria* spp.

Figure 1. Percentoge of samples found to contoin *Listerio* from different grocery store choins



into a Stomacher® bag and blended with 225 ml of Listeria Enrichment Broth (Oxoid). This enrichment was incubated at 30°C and streaked onto MOX and PALCAM agar at both 24 and 48 h. Agar plates were incubated at 32°C and checked at 24 and 48 h for typical *Listeria* isolates. Presumptive positives were confirmed by Grain stain, test for motility, and the following biochemical tests: rhamnose, xylose, mannitol, catalase, nitrate reduction, and hemolysis on blood agar.

RESULTS AND DISCUSSION

Seventy-four fresh rainbow trout samples were purchased at 31 grocery stores representing seven major grocery store chains in the East Tennessee area. Aerobic plate counts of freshly purchased trout ranged from log 2.4 to log 8.6 CFU/g, with a mean of log 6.2 CFU/g (Table 1). Coliform counts varied widely from one retail store to another and ranged from less than log 1.0 to log 6.9 CFU/g, with a mean of log 3.2 CFU/g, (Table 1). Forty (54%) of these samples contained *Listeria* species. Thirty-eight retail trout samples (51.4%) contained *L. monocytogenes*, while 32 trout samples (43.2%) contained other *Listeria* species (Table 2). *L. monocytogenes* occurred in combination with other *Listeria* species in 81.6% of positive samples (31 of 38). *L. innocua* occurred with *L. monocytogenes* (LM) in 68.4% (26 of 38) of the positive LM samples and did not occur in the absence of *L. monocytogenes*. Two trout samples contained other species of *Listeria* and no *L. monocytogenes*.

At least one sample of fresh trout from every grocery store chain, was found to contain *L. monocytogenes*. The incidence of *L. monocytogenes* ranged from 16.7% for chain A to 100% for chain B (Fig. 1). The incidence of *Listeria* isolation also tended to increase as either the coliform or APC count increased. As APC/g of fresh trout increased from log 4.1 to log 7.0 CFU/g, incidence of *Listeria* isolation increased from 33.3% to 75% (Table 3). Fresh trout with less than log 4.0 APC/g had no detectable *Listeria* spp. *Listeria* were detected in all fish samples having positive coliform counts. Incidence of *Listeria* in fresh trout increased from 22.2% for trout having less than log 2.0 CFU/g coliforms to more than 90% positive *Listeria* in fresh trout having log 5.0 CFU/g coliforms (Table 4). These results indicate that *Listeria* is probably present in fish at low levels initially and increases as fish begin to deteriorate in refrigerated (or on ice) storage. The high incidence of coliforms in *Listeria*-positive fresh trout shows that good sanitation is important for reduction of *Listeria* species in fresh fish.

Direct plating was not effective in detecting *Listeria* from raw rainbow trout. Only 15.8 to 21.1% of the positive *Listeria* samples were detected by direct plating on MOX or PALCAM agar. MOX was less selective and yielded more positive results than

TABLE 3. Relationship between aerobic plate count and presence of *Listeria*

APC range (Log CFU/g)	No. of samples	% Positive for *Listeria*	% Positive for *L. monocytogenes*
≤3.0	2	0.0	0.0
3.1-4.0	0	0.0	0.0
4.1-5.0	12	33.3	16.7
5.1-6.0	24	50.0	50.0
6.1-7.0	16	75.0	75.0
> 7.0	20	60.0	60.0

TABLE 4. Relationship between coliform counts and presence of *Listeria*

Coliform range (Log CFU/g)	No. of samples	% Positive for *Listeria*	% Positive for *L. monocytogenes*
≤1.0	9	22.2	22.2
1.1-2.0	9	22.2	22.2
2.1-3.0	22	54.5	50.0
3.1-4.0	13	61.5	53.8
4.1-5.0	11	63.6	63.6
> 5.0	10	90.0	90.0

did the PALCAM medium (Table 5). Little difference was seen in results with the two plating media after enrichment, although isolation of colonies on PALCAM was better (cleaner, more well defined) after 24 h enrichment than on MOX (data not shown). This was probably because non-*Listeria* colonies interfered with growth of *Listeria* colonies on the MOX agar. After 48 h enrichment, both PALCAM and MOX yielded well-isolated colonies. *Listeria* colonies were easily distinguished from non-*Listeria* colonies by the depressed center and darkening of the medium surrounding colonies.

After only 24 h, the FDA enrichment protocol (LEB) and the USDA protocol (UVM) detected *Listeria* in fresh trout in 82.5% and 72.5%, respectively, of the positive samples detected. After 48 h enrichment, LEB and UVM enrichments detected *Listeria* in 92.5% and 75%, respectively, of positive samples (Table 5). The results of our study show that neither the LEB nor UVM enrichment method detected all positive samples, although the FDA enrichment protocol (LEB) detected all but three positive samples after the 48 h enrichment. The differences in recovery after 24 h compared with 48 h were very small; however, recovery was slightly higher after 48 h. The plating media consistently detected positive samples after enrichment; however, in several instances, only one medium had typical colonies. Because this occurred with both plating media and no pattern was associated with it, a combination of plating media appears to be very useful for obtaining optimal recovery of *Listeria* in trout. Detection of *Listeria* spp. in fresh trout by direct plating cannot be recommended, since recovery ranged from only 15.8 to 21% when compared with results of enrichment techniques. For detection of *Listeria* in fresh trout samples by direct plating, high counts, generally exceeding log 4.0 CFU/g, on MOX or PALCAM, were required.

L. monocytogenes was isolated from pond-raised catfish as early as 1966 *(8)*; therefore, it was not surprising to find *Listeria* species present in trout purchased in local markets, which were also pond raised. The range of occurrence at the different markets suggests that *Listeria* may be a natural contaminant of ponds where the fish are raised. Since the fish in the Eastern Tennessee markets came from a variety of producers, we were unable to test water samples from ponds of all producers. However, at one trout farm, when water samples were collected on ten occasions and tested for the presence of *Listeria* spp. by the FDA and USDA enrichment protocols, only one water sample (one liter) was positive for *Listeria*. This suggests that the *Listeria* could also be contaminating fish at the marketplace or during cleaning.

The results of our study show that this organism is typically present at relatively low levels compared to other microflora because of the difficulty of detecting it by direct plating. Of course, this could also be due to possible injury of *Listeria* during handling of trout, since both PALCAM and MOX have powerful selective agents in their formula. The incidence of *Listeria* increased with an increase in aerobic plate count and coliform counts, presumably due to growth (and/or recovery) of initially undetectable numbers of *Listeria* on trout. The increased incidence in fish with higher counts indicates that *Listeria* is able to grow in rainbow trout in the presence of high levels of spoilage bacteria.

With thorough cooking to an internal temperature of 71.1°C (160°F), as recommended by the USDA guidelines for fish products (personal communication with Gail Disney, UT Agricultural Extension Service), *Listeria* should be destroyed and would not survive to have public health significance. However, a popular cookbook, "Joy of Cooking," recommends cooking fish to a tempera-

TABLE 5. Positive *Listeria* samples on trout fillet detected with direct plating and after 24 and 48 h enrichment by the USDA (UVM) and FDA (LEB) protocols[1]

Organism Detected	Total Samples Positive	Direct Plating		24 Hour Enrichment[2]		48 Hour Enrichment	
		MOX # (%)	PAL #(%)	USDA #(%)	FDA #(%)	USDA #(%)	FDA #(%)
L. mono.	38	8 (21)	6 (15.8)	26 (68)	27 (71)	21 (55.3)	31 (81.6)
Other *Listeria* spp.[3]	34	0	1 (2.9)	13 (38)	17 (44)	20 (58.8)	21 (61.8)
Any *Listeria* spp.	40	8 (20)	7 (17.5)	29 (72.5)	33 (82.5)	30 (75)	37

[1]Numbers listed in the table are the number of positive samples and the percentage based on the total number of positive samples for each category.

[2]Data from MOX and PALCAM plates was combined to obtain the percent positive samples after enrichment culture and isolation with UVM and LEB.

[3]Percent positive samples that contained *Listeria* spp. other than *L. monocytogenes*.

ture of 145°F and says that at temperatures as low as 150°F the fish tissue begins to break down and much of the juiciness and flavor can be lost *(13)*. Because of information like this, it is likely that many consumers do not cook fish to a temperature high enough to destroy *Listeria*, particularly in grilled fish. Individuals in high risk groups for listeriosis should be aware of the presence of *Listeria* in fresh trout and the need for thorough cooking to destroy this organism. More research is needed to determine the significance of the levels of *Listeria* present in fish and if traditional cooking methods are adequate to destroy it.

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ABOUT THE AUTHORS

*The Department of Food Science and Technology, The University of Tennessee, P. O. Box 1071, Knoxville, TN 37901-1071; Telephone: 423.974.7425; Fax: 423.974.7332; E-mail: draughon@utk.edu.

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Dairy, Food and Environmental Sanitation, Vol. 19, No. 2, Pages 95-103

Analysis of Foodservice Sanitation Inspection Reports from 1990 through 1994 in a Midwestern City

Doris M. Adera,[1] Nancy E. Brown,[2*] and Kevin F. Anderson[3]

SUMMARY

The purpose of this study was to analyze sanitation inspection reports from 1990 through 1994 for 171 currently licensed foodservice establishments in a midwestern city. All inspections had been conducted by one sanitarian. Violations of noncritical items were more frequent than violations of critical items. Sanitation requirements on reuse of single-service articles, water source, and sewage and waste water disposal were not violated by any of the restaurants over the 5-year period. The highest mean violation rate (49%) for the 171 foodservice establishments was for cleanliness of non-food contact surfaces of equipment and utensils; differences were significant only by years of operation. Significant differences by type of establishment were found in the critical requirement for storage, labeling, and usage of toxic items. Significant differences by type of production and service were found in time-temperature control of hazardous foods and employee hygienic practices; both are critical items. Violation of the requirement on floor condition and maintenance was the only one that differed significantly between male and female managers. There were no significant differences by stability of management in the number and type of violations over the 1990-1994 period of inspection.

INTRODUCTION

Foodborne disease surveillance serves three purposes: to prevent and control foodborne disease; to identify the pathogens transmitting the diseases; and to assess trends and encourage proper sanitary practices *(2)*. Sanitation inspections of foodservice establishments have been used to curb the incidence of foodborne diseases. A Model Food Service Sanitation Ordinance and Code was recommended in 1962 by the Food and Drug Administration (FDA) under authority of the Public Health Service to provide a uniform system to assist state and local governments in initiating and maintaining effective programs for prevention of foodborne illness. A second edition was published in 1976 *(13)*, and it is this edition that is authorized by law for use in Iowa. Food Code 1993 *(5)* is the third update and incorporates Hazard Analysis Critical Control Point (HACCP) principles for assuring food safety.

From 1983 through 1992, the leading factor contributing to reported foodborne outbreaks was improper holding temperature followed by poor personal hygiene,

inadequate cooking, contaminated equipment, and food from unsafe sources *(2, 3, 7)*. Foodborne disease outbreaks reported to the Centers for Disease Control (CDC) were 2,397 from 1983 through 1987 *(3)* and 2,423 from 1988 through 1992 *(2)*. During these years, the place where the contaminated food was most often eaten was restaurants, followed by the home and schools *(2, 3, 7)*. It is conceded that foodborne disease outbreaks reported to the CDC represent only a small proportion of the outbreaks that occur *(2)*.

Many customers expect to be served safe and wholesome food within a short period of time, and front-line foodservice employees are therefore under constant pressure to work quickly and efficiently to meet customer needs. Food handlers need training in the basic techniques of food safety to promote sanitary practices even under stressful conditions. High labor turnover rates within the foodservice industry could have a negative impact on the quality of job training employees receive, and this may be reflected in the sanitation practices of food handlers.

The purpose of this study was to analyze inspection reports of 171 licensed foodservice establishments in a midwestern city for a 5-year period, 1990 through 1994. All inspections had been conducted by one city sanitarian. Mean scores for each sanitation requirement, with special attention to critical violations, and mean total scores were calculated and analyzed by type of establishment, type of production and service, years of operation, stability of management, and gender of the manager.

These foodservice establishments had been inspected approximately twice a year from 1990 through 1994, using the 1976 edition of the Food Code *(6)*. During each unannounced visit, 44 potential food contamination points were inspected. Each of the requirements has a weighted value; thirteen items that are considered critical requirements are given weighted values of 4 or 5, whereas less critical violations have values of 1 or 2. The sum of values of all violations is subtracted from 100, and the result is the sanitation rating for the establishment.

METHODS

The 171 licensed foodservice establishments were categorized by major characteristics. Foodservice establishments were classified first by type of establishment: franchise commercial, independent commercial, occasional, or institutional. A franchise commercial foodservice establishment was part of a chain operation, whereas an independent commercial foodservice establishment was a privately owned operation not affiliated with a chain or franchise. An occasional foodservice establishment served food to its members or raised money for organizational activities on an irregular basis. An institutional foodservice was a not-for-profit operation that served food to a captive consumer group.

A second classification of foodservice establishments was by type of production and service. Categories were full service (preparing and serving a variety of hot and cold food products), limited service (preparing and serving primarily cold foods such as sandwiches, using a minimum of heating), or minimal service (serving primarily pre-packaged snacks or ice cream). Information concerning other major characteristics of the establishments in the study (years of operation, stability of management during the 5-year period, and gender of management) was either verified or obtained from the city sanitarian.

Data were taken directly from the State Department of Inspections and Appeals foodservice establishment inspection form and entered into a computer spreadsheet. There were 1,343 inspection reports. The number of reports varied from 1 to 13 for each of the 171 establishments. To meet the requirement of independent observations for each establishment, data from all inspections for an establishment were combined, and the percentage of violations for each item on the report form was calculated. A mean total score for each establishment was computed in the same manner. All analyses were based on these mean percentages and totals for the 171 establishments.

Data were analyzed using the SPSS Data Analysis System for Microsoft Windows, Release 6.1 *(12)*. Data were analyzed across all establishments and by type of establishment, type of production and service, years of operation, stability of management, and gender of the manager. Frequency data were obtained. Kruskal-Wallis one-way ANOVA, a nonparametric statistical test, was performed. This test does not assume normal distribution of data. The chi-square statistic was calculated to detect differences in proportions. The Bonferroni method of multiple comparisons (alpha = .05) was used to determine significance of differences *(1)*.

RESULTS AND DISCUSSION

Of the 171 foodservice establishments, 53% were independent commercial restaurants. Sixty-five percent of the establishments were full-service operations. Three-fourths had been in operation for 5 years or more, and there had been no change of managers in 78% of the establishments during the 5-year period of the study. Three-fourths of the establishments had male managers.

The mean percentage of violations of the 44 sanitation requirements across the 171 foodservice establishments ranged from 0 to 49%. Requirements related to reuse of single-service articles (item 26), water source (item 27), and sewage and waste water disposal (item 28) were not violated by any of the establishments over the 5-year period; establishments that used disposable single-service articles did not reuse them, and all establishments used the same city water source and were connected to the city sewage system.

The three critical requirements with mean violations of 10% or more over the 5-year period in the 171 establishments were related to storage, labeling, and use of toxic materials (item 41, 23%); temperatures of potentially hazardous

TABLE 1. Sanitation requirements violated most frequently by 171 foodservice establishments over a 5-year period

Item[a]	Description[a]	%	SE[b]
23	Non-food contact surfaces of equipment and utensils clean	49.3	2.7
8	Food protection during storage, preparotion, display, service, transportation	41.9	2.8
32	Toilet rooms enclosed, self-closing doors, fixtures, good repoir, clean: hond cleaner, sanitary towels/hond-drying devices provided, proper woste receptacles	35.7	2.5
22	Food-contact surfaces of equipment ond utensils clean, free of abrasives, detergents	33.9	2.4
15	Non-food contact surfaces: designed, constructed, maintained, installed, located	33.5	2.3
38	Lighting provided os required, fixtures shielded	33.4	2.5
36	Floors: constructed, drained, clean, good repoir, covering instollotion, dustless cleaning methods	26.9	2.3

[a]Item number ond description match the inspection form

[b]Stondord error

foods (item 3, 14%); and presence of rodents and insects (item 35, 13%). Each of these requirements demands constant attention by management to assure compliance on a daily basis.

Table 1 shows the seven requirements with mean violations of at least 25% over the 5-year period. With two exceptions, they related to installation and cleanliness of non-food contact surfaces and features such as toilet rooms, lighting, and floors. Restaurant workers may neglect to clean the exterior surfaces of equipment and utensils after each use because of job pressures or an expectation that someone else will do it. Responsibility for cleaning and supplying toilet rooms may be unclear, which leads to their neglect. Some restaurants had broken or missing shields on light fixtures.

Lack of proper protection of food and unclean food contact surfaces were found on average during 42% and 34% of the inspections, respectively. Food should be protected from contamination by employees and by dirty equipment and utensils, or from cross-contamination with raw foods. Food contact surfaces of equipment and utensils were not washed thoroughly. Data reported by the CDC indicated that contaminated equipment was one of the contributors to foodborne disease outbreaks *(2, 3, 7)*.

Table 2 shows inspected items in which mean percentage of violations differed significantly when the 171 foodservice establishments were classified by type of establishment, type of production and service, years of operation, and gender of the manager. There were no significant differences based on stability of management. For 17 of the 44 items (39%), there were significant differences for at least one classification, although differences for 12 of the 17 items were significant for only one type of classification. Type of establishment (8 items) and type of production and service (9 items) had greater impact on adherence to sanitation requirements than years of operation (5 items), gender of the manager (1 item), or management stability (none).

Four of the 13 critical sanitation requirements are included in Table 2. Six of the seven requirements with high frequency of violations (Table 1) also appear in Table 2. Tables 3 and 4 indicate the types of establishments and types of production and service, respectively, between which the significant differences occurred.

Significant differences were found in violations of the requirement for protection of food during storage, preparation, display, and service (item 8), both by type of establishment and type of production and service. Independent commercial restaurants violated the requirement on average 51% of the time, which was much higher than the rate in occasional (8%) and institutional (23%) foodservice establishments. Franchise commercial foodservice establishments, with mean violations of 40%, also were significantly different from occasional foodservices. By type of production and service, significant differences were found between full- and minimal-service establishments (49% and 23%, respectively). The same cutting board should not be used for preparing both raw and ready-to-eat foods, and food should be cooked and served using clean equipment and service articles.

There were significant differences in storage of utensils used to dispense food and ice (item 10). The mean percentage of violations by franchise commercial foodservice establishments was 19%, which was significantly higher than the figures

TABLE 2. Inspected items with probability values* indicating significant differences in mean percentage of violations found in 171 foodservice establishments over a 5-year period

Item	Description	Type of establishment[a]	Type of production and service[b]	Years of operation[c]	Gender of manager[d]
2	Original container, properly labeled	ns[e]	0.0000	ns	ns
3[f]	Potentially hazardous food meets temperature requirements during storage, preparation, display, service, transportation	ns	0.0000	ns	ns
8	Food protection during storage, preparation, display, service, transportation	0.0001	0.0008	ns	ns
10	In use food (ice) dispensing utensils properly stored	0.0000	ns	ns	ns
12[f]	Hands washed and clean, good hygienic practices	ns	0.0000	ns	ns
16	Dishwashing facilities designed, constructed, maintained, installed, located	ns	0.0002	ns	ns
21	Wiping cloths: clean, use restricted	0.0000	0.0000	ns	ns
22	Food-contact surfaces of equipment and utensils clean, free of abrasives, detergents	0.0000	ns	ns	ns
23	Non-food contact surfaces of equipment and utensils clean	ns	ns	0.0000	ns
24	Storage, handling of clean equipment/utensils	ns	0.0000	0.0001	ns
32	Toilet rooms enclosed, self-closing doors, fixtures, good repair, clean: hand cleanser, sanitary towels/ hand-drying devices, waste receptacles provided	0.0000	ns	ns	ns
33	Garbage and refuse: containers or receptacles, covered: adequate number, insect-/rodent proof, frequency, clean	0.0004	0.0001	0.0005	ns
35[f]	Presence of insects/rodents – outer opening protected, no birds, turtles, other animals	ns	ns	0.0001	ns
36	Floors constructed, drained, clean, good repair, covering installation, dustless cleaning methods	0.0000	ns	ns	0.0001
37	Walls, ceiling attached equipment: constructed, good repair, clean, surfaces, dustless cleaning methods	ns	ns	0.0000	ns
38	Lighting provided as required, fixtures shielded	ns	0.0007	ns	ns
41[f]	Necessary toxic items properly stored, labeled, used	0.0000	ns	ns	ns

*Differences are significant when $P \leq 0.0011$ (error probability calculated 0.05/44)

[a]Types of establishment: franchise commercial (n = 45), independent commercial (n = 91), occasional (n = 10), institutional (n = 25)

[b]Types of production and service: full (n = 111), limited (n = 40), minimal (n = 20)

[c]Years of operation: > 5 years (n = 38), ≤ 5 years (n = 133)

[d]Gender of manager: male (n = 131), female (n = 40)

[e]ns = not significant

[f]Critical item

TABLE 3. Probability values* indicating significant differences in mean percentage of violations by type of foodservice establishment over a 5-year period

Item	Franchise vs. Independent	Independent vs. Occasional	Occasional vs. Institutional	Franchise vs. Occasional	Institutional vs. Franchise	Institutional vs. Independent
8	ns[a]	0.0008	ns	0.0013	ns	0.0008
10	0.0053	ns	ns	0.0009	0.0000	0.0001
21	ns	ns	ns	0.0029	0.0000	0.0001
22	ns	0.0017	ns	0.0006	0.0000	0.0002
32	ns	0.0008	ns	ns	ns	0.0000
33	0.0008	ns	ns	0.0028	ns	ns
36	ns	0.0014	ns	0.003	0.0002	0.0000
41[b]	ns	ns	ns	0.0002	0.0000	ns

*Differences are significant when $P \leq 0.0063$ (error probability calculated 0.05/8)

[a]ns = not significant

[b]Critical item

TABLE 4. Probability values* indicating significant differences in mean percentage of violations by type of production and service over a 5-year period

Item	Full-service vs. Limited	Limited vs. Minimal	Minimal vs. Full-service
2	0.0000	ns[a]	ns
3[b]	0.0000	0.0050	ns
8	ns	ns	0.0016
12[b]	0.0000	0.0000	ns
16	0.0000	0.0018	ns
21	0.0000	0.0000	ns
24	0.0000	ns	ns
33	0.0000	ns	ns
38	0.0001	ns	ns

*Differences are significant when $P \leq 0.0056$ (error probability calculated 0.05/9)

[a]ns = not significant

[b]Critical item

for independent commercial (13%), occasional (3%), and institutional (1%) foodservice establishments. Most violations involved the service of ice; ice scoops were found inside the ice machine with the handle in the ice, or the service glass was used instead of a service utensil. The high volume of cold drinks purchased in franchise commercial establishments probably led to the greater numbers of violations. The option to purchase self-serve ice dispensing machines is expected to lower the number of incidents in the future.

Significant differences in the use of wiping cloths (item 21) were found by type of establishment and type of production and service. Franchise commercial and independent commercial establishments both had mean violations of 17%, which was significantly higher than the occurrences in occasional (4%) and institutional (1%) establishments. Limited service establishments had significantly fewer violations of this stan-

dard than did either full- or minimal-service establishments (5%, 16%, and 20%, respectively). The sanitarian noted violations such as soiled wiping cloths left on working surfaces; wiping cloths should be rinsed and kept in sanitizing solutions between uses. Cloths for wiping food contact surfaces were used to clean non-food contact surfaces, as in cleaning food spills on the floor, which is not allowed.

Significant differences were found on cleanliness and handling of food contact surfaces of equipment and utensils (item 22). Food contact surfaces should be cleaned frequently and thoroughly. Franchise and independent commercial restaurants had significantly more violations than occasional and institutional establishments (43% and 38% vs. 7% and 12%, respectively), which may relate to volume of business.

Significant differences in violations regarding toilet rooms (item 32) were found. Independent commercial establishments had significantly higher mean violations (46%) than either occasional (11%) or institutional (16%) foodservice establishments. Franchise commercial restaurants, with 31% mean violations, did not have significantly lower or higher violations than any of the other types of establishments. Because toilet rooms of commercial restaurants may be used by both customers and employees, heavy use may lead to overflowing waste receptacles and to insufficient hand cleaning agents and hand-drying towels. If no one is scheduled to clean and resupply the toilet rooms on a regular basis during the day, or the activity is scheduled but not performed, the potential for violations of this requirement is high.

There were significant differences in violations of the requirement relating to garbage and refuse disposal containers (item 33) in three classifications: type of establishment, type of production and service, and years of operation. Garbage containers should be in good condition, tight-fitting lids are required if containers are located outside the premises, and the containers should be emptied and cleaned frequently to prevent odors and insect infestations. Violations differed significantly between franchise commercial (15%) and both independent commercial (6%) and occasional (0%) establishments. Significant differences were found only between full-service (11%) and limited-service (1%) production and service establishments. Establishments in operation for 5 years or more violated this requirement (9%) more than newer establishments (2%).

Significant differences were found in violations of requirements on floor maintenance and cleanliness (item 36) by type of establishment and gender of the manager. Floors should be cleaned frequently, especially in high traffic areas and hard-to-reach areas (such as below, between, and behind large equipment) and no litter should be on the floor. Occasional and institutional foodservice establishments did not differ significantly from each other and had lower mean violations (6%) than either franchise (26%) or independent commercial restaurants (35%), which were not significantly different from each other. Floor condition was the only requirement that significantly differentiated foodservice establishments on the basis of gender of the manager; restaurants with male managers had significantly higher violations (31%) than restaurants with female managers (13%).

Violations of requirements for labeling and storage of toxic items (item 41) differed significantly only by type of establishment. Mean violations were 23%. Significant differences in violations related to labeling and storage of toxic items were found between franchise commercial foodservice establishments (33%) and both occasional (7%) and institutional establishments (12%). Secondary containers for toxic items were labeled using non-waterproof markers, and the markings faded and became illegible as the result of constant handling. Franchise commercial restaurants often are constructed with inadequate space, which may hinder separation of the three categories of toxic materials from each other as well as from food. Plans for new construction and major renovation projects are checked for adequate storage facilities, which may reduce the incidence of violations in future inspections.

There were significant differences in violations of some requirements based on type of production and service. Mean violations on use and labeling of original food containers (item 2) were more frequent for full-service establishments (14%) than either limited (1%) or minimal (4%) production and service establishments. Proper tags or product identification information are needed on all food, and the food should be retained in original containers until it is ready to be prepared or served to customers.

Frequency of violations of temperature requirements for potentially hazardous foods differed significantly by type of production and service. Temperature requirements for potentially hazardous foods (item 3) were violated 14% of the time. Food temperature control was a significantly greater problem in full-service than in limited-service restaurants (19% vs 2% violations, respectively). Minimal-service establishments had 10% violations. Common problems were various types of hot-holding equipment that were not hot enough to maintain food temperature at a minimum of 60°C (140°F). Storing large quantities of hot food makes it difficult to keep food cold at 7°C (45°F) or to reduce food temperature quickly through the danger zone. Food Code 1993 *(5)* lowers the standard to 5°C (41°F), which will require even greater attention to the cooling of food. Stored food items should be placed in shallow pans to hasten cooling. Improper holding temperature has been the leading contributing factor to foodborne disease outbreaks since 1982 *(2, 3, 7)*.

Type of production and service was the only classification associated with significant differences in violations of hygienic practices, a critical requirement (item 12), with 9% mean

violations. Food handlers need to wash their hands frequently and avoid touching their bodies when handling food. Food Code 1993 *(5)* stresses the importance of either wearing gloves or using clean utensils when handling food that does not require further heat treatment before being served to customers. Limited-service establishments had significantly fewer violations than full- or minimal-service restaurants (2% vs 11% and 12%, respectively). Poor personal hygiene was the second most frequent contributing factor to foodborne disease outbreaks during the period from 1983 through 1992 *(1, 2)*.

Significant differences were found in violations related to dish-washing facilities (item 16) by type of production and service. Limited service establishments had significantly fewer violations (1%) than both full-service (14%) and minimal-service (8%) establishments. Limited-service establishments handle very little food, and minimal-service establishments serve mostly pre-packaged products and use single-use service articles extensively and therefore have few items of equipment and utensils to wash. Full-service restaurants engage in a full range of food production and service activities requiring equipment and utensils that must be cleaned frequently and may have less time for cleaning dish-washing facilities thoroughly and frequently.

Significant differences were found in violation of requirements for storage and handling of clean equipment and utensils (item 24) by type of production and service and by years of operation. Full-service establishments had significantly more violations (15%) than limited-service (1%) but not minimal-service (6%) establishments. Establishments in operation 5 years or more had on average 12% violations, whereas restaurants less than 5 years old had only 4% mean violations. Equipment and utensils should be allowed to air dry after washing and should be inverted or covered when dry to protect from dust.

Full-service establishments had significantly higher mean violations (39%) for their lighting systems (item 38) than limited-service (18%) but not minimal service (34%) establishments. Restaurants should provide proper light intensity in cleaning and food preparation areas for the safety of workers and to aid in sanitary food preparation. Light bulbs should have shields to protect against breakage and to prevent broken glass from falling into food.

Years of operation was the classification that was statistically significant for violations related to cleanliness of non-food contact surfaces of equipment and utensils (item 23). Mean violations were 49%. Establishments with 5 years or more of operation violated this item 56% of the time, compared with 24% mean violations for newer establishments. Non-food contact surfaces should be cleaned frequently to prevent accumulation of fixed dirt and grease. New facilities may be constructed of materials that are easier to clean, and the motivation is there to keep a new facility in good condition. Some new facilities have incorporated cleaning facilities and cleaning methods that make the activity easier to execute.

Insect, rodent, and animal control (item 35) is a critical item that showed significant differences in violations by years of operation. Mean violations were 14% for foodservice establishments in operation 5 years or more and 8% for those operated less than 5 years. Rodents enter buildings through holes, cracks, and crevices in floors, ceiling boards, and walls that are poorly constructed, maintained, and cleaned. Insects come into a facility unseen on delivered boxes and bags. The sanitarian found insects and rodents in some restaurants. One establishment had to be shut down because of a serious roach infestation. Integrated pest management systems may be incorporated into operating procedures of new facilities to prevent pest problems from arising.

Violations relating to construction and cleanliness of walls and ceilings (item 37) averaged 23% in establishments in operation for 5 years or more, compared with 7% in establishments in operation a shorter period. Wall areas exposed to food splash should be cleaned frequently. Materials used in construction of new facilities may be easier to clean, and there may be more incentive to keep a new facility clean.

Mean total sanitation scores ranged from 77% to 100% for the 171 establishments and differed significantly over the 5-year period by type of establishment and by type of production and service. Differences in mean total scores were not significant when analyzed by years of operation, management stability, and gender of the manager. Data are shown in Table 5.

Franchise and independent commercial foodservice establishments had lower mean total scores than occasional and institutional foodservice establishments. Full-service restaurants scored lower than either limited- or minimal-service restaurants, perhaps because full-service establishments are engaged in more food production and service activities than either limited- or minimal-service restaurants. Commercial foodservice establishments and full-service restaurants are likely to have extended hours of operation, which create extended opportunities for violation of sanitation ordinance requirements. Long hours of operation and minimal labor coverage on some work shifts may make it difficult to schedule thorough cleaning.

One study reported that foodservice workers in institutional operations generally had a better understanding of safe food handling than workers in temporary foodservice operations *(8)*.

In another study, owners or managers whose restaurants had received favorable health inspection reports were found to have significantly higher levels of knowledge and more positive attitudes toward food safety than owners or managers of those restaurants with less favorable health inspection reports *(4)*. In the mid-

TABLE 5. Mean total scores and range of scores over the 5-year period by classification

Classificotion	Meon totol score	Range of scores	Chi-Square	p-volue*
Type of establishment			25.8214	0.0000
Fronchise commercial (n = 45)	90.0	82.8 - 96.3		
Independent commerciol (n = 91)	89.6	77.3 - 99.7		
Occosionol (n = 10)	96.9	91.1 - 100		
Institutional (n = 25)	93.1	88.8 - 96.8		
Type of production and service			15.7366	0.0004
Full service restouronts (n = 111)	89.4	77.3 - 100		
Limited service restaurants (n = 40)	91.5	84.9 - 96.0		
Minimal service restauronts (n = 20)	93.5	85.5 - 100		
Yeors of operotion			4.1239	0.0423
> 5 yeors (n = 38)	92.1	77.3 - 100		
≤ 5 years (n = 133)	90.2	79.8 - 100		
Stobility of monogement			3.8869	0.0487
No chonge (n = 134)	91.1	77.33 - 100		
Chonge (n = 37)	89.1	82.3 - 98.0		
Gender of manoger			5.0617	0.0245
Mole (n = 131)	90.3	77.3 - 100		
Femole (n = 40)	91.8	81.6 - 98.5		

*Differences ore significont when $P \leq 0.01$ (error probobility colculoted 0.05/5)

western city that is the focus of this study, the city sanitarian reported that employees from all types of foodservice establishments have attended the voluntary 8-hour sanitation course offered. This sanitation program was adapted from the 16-hour course, Applied Foodservice Sanitation *(9)*. Beginning in 1998, the ServeSafe certification course *(10)* is being offered. The sanitarian has found that most franchise commercial restaurants provide some kind of training in sanitation for their employees.

CONCLUSION

Our analysis of inspection reports focused on critical and non-critical violations and total scores, and how these related to type of foodservice establishment, type of production and service, years of operation, stability of management, and gender of the manager. By averaging scores for an establishment to give each establishment equal weight in the analyses, variability of the data was reduced. This also reduced the chances of finding statistically significant differences. However, some significant differences were evident.

In this study of 171 foodservice operations in a midwestern city, mean percentage violations on sanitation requirements were higher for franchise and independent commercial restaurants than for occasional and institutional foodservice establishments. Full-service establishments engaged in more food production and service activities and consequently violated more sanitation requirements than limited- and minimal-service restaurants. A higher proportion of violations were found in older establishments than newer restaurants. Management stability had no significant impact on enforcement of sanitation ordinance requirements within foodservice establishments of all types. In general, male and female managers performed equally well in enforcement of sanitation ordinance requirements. Non-critical sanitation requirements were violated with greater frequency than critical items. Three critical requirements had mean violations of 10% or more and seven non-critical requirements had mean violations of 25% or more over the 5-year period in the 171 establishments. There were no extremes in mean total scores by any of the five classifications.

The city sanitarian focuses on critical violations during inspections and follows up on all violations of critical items. In addition, the city sanitarian performs a minimum of two inspections per year of all commercial establishments. Sanitation certification courses are offered on a voluntary basis to managers and employees of licensed establishments. In general, a high standard of inspection has been established, which, together with training made available to those who wish to take advantage of the opportunity, has resulted in a high level of compliance with the food sanitation ordinance.

The results of this study can be used by regulatory agencies to determine problem areas where guidance to food managers may be needed to

avoid potential foodborne disease outbreaks. The results also may be of interest to educators who are teaching food safety and sanitation to hospitality students and providing training for foodservice managers. Restaurant managers and owners may not be aware of which sanitation requirements are most neglected. The results may compel food managers to pay greater attention to those areas and thus help to promote proper sanitary practices within the restaurant.

As HACCP principles are applied in more foodservice operations, managers take on additional responsibilities for monitoring their own operations. HACCP requires foodservice managers to identify foods and procedures in their establishments that are most likely to cause foodborne illness, establish procedures to reduce the risks of foodborne outbreaks, and monitor compliance with these procedures to ensure food safety *(10)*. Some franchise commercial restaurants have systems in place, such as recording temperatures of potentially hazardous foods every 2 hours, that provide documentation to support compliance with a critical food safety requirement. This is an example of the type of monitoring system that every foodservice manager will be held responsible for establishing in the future.

The implementation of HACCP, which focuses on controlling hazards intrinsic to food materials, does not reduce the importance of sanitation. Sanitation prevents contamination of food by focusing on equipment, facilities, and people that come in contact with food. Both a HACCP system and a sanitation program are needed to ensure the safety of the public *(11)*.

ABOUT THE AUTHORS

[1]1402 1/2 D McNally Dr., Winona, MN 55987; [2]Dept. of Hotel, Restaurant, and Institution Management, 11 MacKay Hall, Iowa State University, Ames, IA 50011-1120; Telephone: 515.294.8474; E-mail: nebrown@iastate.edu; Fax: 515.294.8551; [3]City Sanitarian, Ames City Hall, 515 Clark Ave., Ames, IA 50010.

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California's Dairy Industry Announces Strategic Alliance with Government Agencies

The California dairy industry announced an unprecedented alliance with nine state and federal regulatory agencies for environmental stewardship. During a formal signing, the dairy industry takes great strides in its continued efforts to protect public and animal health and safety. A key component of this newly formed alliance is environmental stewardship certification from the California Dairy Quality Assurance program (CDQA).

The dairy industry created the CDQA as a voluntary means to promote quality dairy products through improved on-farm practices. Its programs will concentrate on the three distinct areas of public health, animal health and environmental stewardship. Dairy producers and industry leaders see the CDQA as an opportunity to distill critical management practices along with the regulations that impact each area, set up protocol for procedures, as well as provide continuing education to all dairy farmers about the most efficient and cohesive manure management operations.

"This voluntary certification program will help regulators do their job and it shows their trust in the dairy industry to do its job in utilizing the most modern manure management practices to help ensure a healthy environment for Californians," said Chuck Ahlem, chair of the CDQA.

The first program to be adopted addresses the environmental stewardship component of dairy farm operations. In order for a dairy producer to earn CDQA certification, three requirements must be completed: an environmental stewardship short course, farm management plan and on-site inspections.

The University of California Cooperative Extension, Davis is coordinating the development of the environmental stewardship education course with significant input from every federal, state and regional regulatory agency involved in environmental issues. The course includes three 2-hour sessions with homework and worksheets between sessions. The workshops and accompanying course notebooks cover water regulations, facility evaluation manure management and storm water pollution prevention plans. It is designed as continuing education for dairy farmers to help them continually improve their manure management practices.

More than 18 courses have been conducted to date. Over 400 producers have graduated from the course with 900 producers having attended at least one class. The goal is 100 percent participation by the more than 2,000 producers in the state.

The second element of certification is the preparation of an environmental stewardship farm management plan prepared by each producer. The plan allows producers to evaluate their specific farm conditions to determine components of their facility that may put them at risk of incorrect manure handling. Risk assessments cover manure storage facilities, corral management, silage storage and application of manure to land. Once high-risk components are identified, producers can prioritize management and facility modifications to further reduce possible risk of water contamination.

Finally, the producer will participate in an on-site evaluation by an independent party. A checklist,

jointly developed by the CDQA, will serve as the evaluation tool. The evaluation will include a visual assessment of key dairy farm operations.

The CDQA is supported by dairy industry leadership including Western United Dairymen, Milk Producers Council, California Manufacturing Milk Advisory Board and the California Farm Bureau. Government agencies include: the California Department of Food and Agriculture, the California Environmental Protection Agency, the State Water Resources Control Board, the California Resources Agency, the Department of Fish and Game, Region 9 of the U.S. Environmental Protection Agency, and the U.S. Department of Agriculture Animal Plant Health Inspection Service, Natural Resources Conservation Service and Farm Services Agencies. Continuing education for dairy farmers is provided by the University of California Cooperative Extension at Davis.

Once the full compliment of the CDQA has been established, the dairy industry will have a single source of guidelines, protocols and certification in environmental stewardship, food safety and animal health. In an industry already proud of its high standards and quality tradition, dairy farmers will have set a new path that many states are expected to follow.

For further information contact: Dairy Issues Forum, 555 Capitol Mall, Suite 785, Sacramento, CA 95814; 916.441.7606; Fax: 916.441.7622.

The Meaning of the 3-A Symbol

Warren S. Clark, Jr., Chairperson
Board of Trustees
3-A Sanitary Standards Symbol Administrative Council

Presented at
IAMFES 84th Annual Meeting
July 6 – 9, 1997
Orlando, Florida

The 3-A Symbol, widely known both domestically and internationally, is assurance that the processing equipment bearing the Symbol has been designed and fabricated using materials that meet exacting sanitary standards. It means the equipment will:

1. be easy to clean, disassemble and inspect,
2. meet criteria of regulatory agencies responsible for the inspection of dairy and food processing operations, and
3. enhance the likelihood of the production of safe and wholesome dairy and food products.

UPON WHAT PRINCIPLES WAS THIS MEANING BUILT?

First, let us review the development of 3-A Sanitary Standards. The first sanitary standards were developed in the late 1920s through the joint efforts of processors of dairy products, manufacturers who fabricate dairy processing equipment, and dairy sanitarians. The modern concept of the 3-A program is based on the purpose of the 3-A Sanitary Standards Committees, which is to formulate sanitary design criteria to cover a single piece of equipment (these are identified as Sanitary Standards) or to develop practices related to processing systems (identified as Accepted Practices). Each Sanitary Standard or Accepted Practice is carefully developed, reviewed, and accepted by representatives of dairy equipment users, dairy equipment manufacturers and sanitarians. Upon formal acceptance by the Chairperson of the Committee on Sanitary Procedures for the International Association of Milk, Food and Environmental Sanitarians (IAMFES), the Chief of the Milk Safety Branch of the U.S. Public Health Service/FDA, and the Chairperson of the Sanitary Standards Subcommittee of the Dairy Industry Committee (DIC), the Sanitary Standards or Accepted Practices are published by IAMFES in its *Dairy, Food and Environmental Sanitation* journal and become effective. Individual pieces of equipment covered by a Sanitary Standard are eligible to be authorized by the 3-A Symbol Council to bear the 3-A Symbol.

Second, we identify a voluntary certification and compliance program participated in by equipment manufacturers and administered by the 3-A Sanitary Standards Symbol Administrative Council, commonly known as the 3-A Symbol Council.

The objectives and purposes of the Symbol Council are to

1. promote the public health,
2. minimize confusion and conflict in the field of standards related to the sanitary performance of dairy equipment, and
3. encourage the use of equipment of sanitary design by administering and supervising the proper use of the 3-A Symbol, emblematic of compliance with standards of sanitary design as promulgated and developed by the 3-A Sanitary Standards Committees.

To meet these objectives, the 3-A Symbol Council

1. formulates procedures for authorizing dairy equipment manufacturers to use the 3-A Symbol,
2. receives and processes applications for 3-A Symbol use,
3. grants authority for use of the 3-A Symbol on equipment complying with the material, design, and fabrication standards for cleanability and inspection of the applicable 3-A Sanitary Standard,
4. publishes names of equipment manufacturers who have been authorized to display the 3-A Symbol on pieces of equipment meeting 3-A Standards, and

5. investigates alleged improper or unauthorized use of the 3-A Symbol and takes appropriate action to prevent such use.

Presently, the Symbol Council consists of an 8-member Board of Trustees with the following representation: four Trustees representing sanitarians (IAMFES), two representing users (DIC), and two representing equipment manufacturers (International Association of Food Industry Suppliers – IAFIS). Trustees serve 2-year terms, with no restriction on their length of service, but for sound legal reasons, they may not serve concurrently on the 3-A Sanitary Standards Committees. This Board of Trustees establishes the rules and regulations governing the award and use of the 3-A Symbol and, as a body, reaches decisions with respect to the denial or revocation of Symbol use. Current Trustees of the Symbol Council are: representing sanitarians – Earl O. Wright, Secretary-Treasurer, David D. Fry, William S. LaGrange and Robert L. Sanders; representing equipment users (i.e., processors of dairy products) – William L. Arledge and Warren S. Clark, Jr., Chairperson; and, representing equipment manufacturers – Reginald C. Hopkinson, Council Vice-Chairperson. Because of the death of Carl F. Nielsen, the second equipment manufacturer Trustee position currently is vacant. Joe W. Hall, Jr., who has had broad experience in the 3-A Sanitary Standards program, is the Council's administrative officer.

HOW DOES THE SYMBOL PROGRAM WORK?

Equipment manufacturers, whether located inside or outside the United States, may apply for Symbol Council authorization to display the 3-A Symbol on equipment they manufacture that meets 3-A Standards. Acting on behalf of the Board of Trustees, the Administrative Officer may grant the authorization, provided formal application is complete, which may include documentation by photographs, blueprints, etc. If the application is incomplete, if a 3-A Standard has not been written that covers the piece of equipment, or if the Administrative Officer is unable to determine that the equipment complies with the given Standard, further information is requested. A decision of the entire Board of Trustees is required to deny authorization of 3-A Symbol use, or, if necessary, to revoke an existing authorization.

As part of the voluntary compliance program, each 3-A Symbol holder maintains an organized system of inspection of units of that equipment. The period authorized for display of the 3-A Symbol is one year. The authorization may be renewed annually; when done it reconfirms that the equipment continues to be in compliance with the applicable 3-A Standard and any amendments thereto.

If a regulatory official or other knowledgeable person believes that equipment authorized to display the 3-A Symbol is not in compliance, a complaint may be filed with the Council. All such complaints are investigated and the matter appropriately resolved by equipment modification (or possibly by a corrected application) or by revocation of the authorization and removal of the 3-A Symbol.

WHAT VOLUME OF EQUIPMENT DISPLAYS THE 3-A SYMBOL?

Nearly 600 authorizations are in effect to display the 3-A Symbol on equipment meeting the 60 standards that have been developed. An equipment manufacturer's use of the 3-A Symbol is voluntary, and 3-A Symbol authorization is not required before the equipment is used. However, because the 3-A Symbol is widely used and is recognized worldwide as a mark of excellence on dairy (and other) processing equipment, the vast majority of equipment for which 3-A Sanitary Standards have been developed is authorized to, and indeed does, bear the 3-A Symbol.

In pursuing the accomplishment of its objectives of promoting public health, encouraging uniform guidelines for equipment standards, and assuring processors that dairy equipment meets sanitary standards, the Symbol Council promotes 3-A Sanitary Standards and Symbol Council programs through

1. educational exhibits at Food & Dairy Expo, and at the Annual Meetings of the IAMFES and IDFA,
2. publishing and distributing biannually a list of the holders of 3-A Symbol authorizations; and,
3. a video presentation that explains the 3-A program; copies are available to technical schools and universities, to sanitarian, dairy technology, and government groups, and to industry to promote a more complete understanding of the entire 3-A program.

In summary, it can be said that display of the 3-A Symbol on a piece of equipment

1. assures processors that the equipment meets strict standards for design, fabrication and cleanability,
2. reflects that equipment manufacturers have applied uniform criteria for sanitary design and fabrication, and
3. establishes for sanitarians guidelines for uniform evaluation and compliance.

The Sanitary Standards program, coupled with the Symbol Council's voluntary compliance program for use of the 3-A Symbol, was a good idea early in the century when it was first developed, is an excellent idea today, and promises to continue to serve the dairy and food industry well in the future.

IAMFES Secretary Candidates

Elizabeth M. Johnson

Elizabeth M. Johnson is Department Manager for the Milk and Food Laboratories of the South Carolina Department of Health and Environmental Control. As Manager of the food lab, Ms. Johnson tests food involved in foodborne outbreaks and assists in investigations conducted by the state epidemiologist. The milk lab is fully certified by the FDA to perform regulatory testing on milk and dairy products. Early in her career, she worked as a microbiologist for Kraft Foods and Johnson & Johnson Baby Products.

An active Member of IAMFES since 1991, Ms. Johnson currently serves as the Chairperson of the IAMFES Affiliate Council. Her IAMFES involvement includes serving as Chairperson of the Applied Laboratory Methods Professional Development Group (PDG), as a member of the Applied Laboratory Methods PDG, and as a member of the Program Committee. She is currently on the editorial board of *Dairy, Food and Environmental Sanitation* and is a member of the Audiovisual Lending Library PDG.

On the local level, Ms. Johnson founded the Carolinas Association of Milk, Food and Environmental Sanitarians (CAMFES). She is a Past President and an IAMFES delegate of CAMFES and is currently serving as Secretary for the organization. She is a member of the American Society for Microbiology and the South Carolina Public Health Association.

Ms. Johnson is a certified public manager with a MA in management. She recently co-authored a chapter of *Standard Methods for the Examination of Dairy Products*. She received her BS in microbiology from the University of Georgia.

Anna M. Lammerding

Anna M. Lammerding, Ph.D., is Chief of the Microbial Food Safety Risk Assessment Unit, Health Protection Branch, Health Canada, in Guelph, Ontario. She is an Associate Member of the Faculty of Graduate Studies at the University of Guelph and was recently elected to the International Commission on Microbiological Specifications for Foods.

In 1998, she was the recipient of the Harry Haverland Citation Award for her contributions to IAMFES. She has been an active IAMFES Member since 1986. Her involvement includes serving on the Editorial Board for the *Journal of Food Protection*, conducting a workshop on Microbial Risk Assessment, organizing symposia for six IAMFES Annual Meetings, and arranging sponsorship for the symposia. She has also served on several committees, including the Nominating Committee, the Program Committee and as Chairperson of the *JFP* Management Committee. She organized the Microbial Food Safety Risk Assessment Professional Development Group (PDG), was Chairperson of the Meat Safety and Quality PDG and the Developing Scientist Awards Committee, and served on the Educator Award Selection Committee.

In 1997, Dr. Lammerding received the Lifetime Achievement Award from the Ontario Food Protection Association (OFPA). She served as President of OFPA in 1994, was Program Chairperson for several OFPA Annual Meetings and a member of the Local Arrangements Committee for the 1992 IAMFES Annual Meeting in Toronto.

Dr. Lammerding received her Ph.D. at the Food Research Institute in Madison, Wisconsin. She received her BS and MS from the University of Guelph. She has authored or co-authored over 30 publications on food safety. During her career, Dr. Lammerding has been invited to speak and serve as a representative to many international organizations including the International Dairy Federation, the World Congress on Meat and Poultry Inspection, the World Health Organization and the Food and Agriculture Organization.

New Members

ARGENTINA

Jamie Estupinan
INPPAZ/PAHO/WHO
Talcahuano

CANADA

Don J. Coady
Marine Institute
St. John's, New Foundland

Carolynn R. Hannon
Maple Leaf Meats
Etobicoke, Ontario

Bernard C. MacLennan
University College of Cape Breton
Sydney, Nova Scotia

Brent Skura
University of British Columbia
Vancouver, British Columbia

GERMANY

Ernst Luecker
Justus-Liebig University
Giessen

GREECE

Maria Roupgidou
Polyphemus S.A.
Komotini, Thrace

HONG KONG

Danny T. L. Cheung
Department of Health
Kowloon Bay, Kowloon

JAPAN

Furuta Taro
Saraya Co., Kashiwara
Osaka

SLOVENIA

Franc Spindler
Scala d.o.o.
Maribor

SOUTH AFRICA

Francina Mosupye
University of Witwatersrand
Wits, Johannesburg

TAIWAN

Christie Sun
Taipei

UNITED STATES

ALABAMA

Tracy Graham
Birmingham Branch Lab
Birmingham

William Smith
Alabama State Health Dept.
Mobile

ARIZONA

Paul S. Knapp
AZ Dept. of Ag
Phoenix

CALIFORNIA

Jean Kigozi
Hansen's Juices
Azusa

Nancy E. Nagle
Nagle Resources
Pleasanton

Jannell Percy
Ocean Mist Farms
Coachella

FLORIDA

Daniel V. Lim
University of South Florida
Tampa

Mark Tamplin
University of Florida
Gainesville

GEORGIA

Sherri L. Murray
Quaker Oats Co.
Atlanta

Cheryl Ramey
Quaker Oats Co.
Atlanta

Peter J. Taormina
University of Georgia
Athens

ILLINOIS

Jimmie D. Bolton
BHC Sanitation Associates
Urbana

Christine R. Blue
Village of Park Forest Health Dept.
Park Forest

Jim Dingman
Underwriters Laboratories, Inc.
Northbrook

Dale A. Seiberling
Electrol Specialties Co.
So. Beloit

INDIANA

Larry Jones
Jay C Foods
Seymour

IOWA

Delaun Messick
Check-All Valve Manufacturing
West Des Moines

KENTUCKY

Nick A. Vaccaro
Intl. Inflight Food Service Assn.
Louisville

MICHIGAN

William C. Schwartz
Bil Mar Foods
Zeeland

MINNESOTA

David Barnes
Schwan's Sales Enterprises
Marshall

NEW JERSEY

Robert R. Friedel
Perritt Laboratories, Hightstown

Catherine B. Lewus
M & M/Mars, Denville

NEW YORK

Dan Grinberg
Island Poly, Westbury

NORTH CAROLINA

Mark A. Cullison
North Carolina State University
Raleigh

OREGON

Eric Pippert
Oregon Health Division, Portland

PENNSYLVANIA

William J. Wise
Mushroom Canning Co.
Kenneth Square

TEXAS

Alfred Willy D. Acuna
Plano Health Department
Plano

WASHINGTON

Anthony R. Blanch
National Food Corporation
Arlington

WISCONSIN

Richard C. Carmichael
Hydrite Chemical
Brookfield

New IAMFES Sustaining Members

Kailash S. Purohit
Process Tek
Prospect Heights, IL

Paul A. Hall
Kraft Foods, Inc.
Glenview, IL

Maria Vallejo
CIAD A.C.
Hermosillo, Mexico

Brad Calkins
Rochester Midland Corp.
Rochester, NY

New Members

ARGENTINA

Jamie Estupinan
INPPAZ/PAHO/WHO
Talcahuano

CANADA

Don J. Coady
Marine Institute
St. John's, New Foundland

Carolynn R. Hannon
Maple Leaf Meats
Etobicoke, Ontario

Bernard C. MacLennan
University College of Cape Breton
Sydney, Nova Scotia

Brent Skura
University of British Columbia
Vancouver, British Columbia

GERMANY

Ernst Luecker
Justus-Liebig University
Giessen

GREECE

Maria Roupgidou
Polyphemus S.A.
Komotini, Thrace

HONG KONG

Danny T. L. Cheung
Department of Health
Kowloon Bay, Kowloon

JAPAN

Furuta Taro
Saraya Co., Kashiwara
Osaka

SLOVENIA

Franc Spindler
Scala d.o.o.
Maribor

SOUTH AFRICA

Francina Mosupye
University of Witwatersrand
Wits, Johannesburg

TAIWAN

Christie Sun
Taipei

UNITED STATES

ALABAMA

Tracy Graham
Birmingham Branch Lab
Birmingham

William Smith
Alabama State Health Dept.
Mobile

ARIZONA

Paul S. Knapp
AZ Dept. of Ag
Phoenix

CALIFORNIA

Jean Kigozi
Hansen's Juices
Azusa

Nancy E. Nagle
Nagle Resources
Pleasanton

Jannell Percy
Ocean Mist Farms
Coachella

FLORIDA

Daniel V. Lim
University of South Florida
Tampa

Mark Tamplin
University of Florida
Gainesville

GEORGIA

Sherri L. Murray
Quaker Oats Co.
Atlanta

Cheryl Ramey
Quaker Oats Co.
Atlanta

Peter J. Taormina
University of Georgia
Athens

ILLINOIS

Jimmie D. Bolton
BHC Sanitation Associates
Urbana

Christine R. Blue
Village of Park Forest Health Dept.
Park Forest

Jim Dingman
Underwriters Laboratories, Inc.
Northbrook

Dale A. Seiberling
Electrol Specialties Co.
So. Beloit

INDIANA

Larry Jones
Jay C Foods
Seymour

IOWA

Delaun Messick
Check-All Valve Manufacturing
West Des Moines

KENTUCKY

Nick A. Vaccaro
Intl. Inflight Food Service Assn.
Louisville

MICHIGAN

William C. Schwartz
Bil Mar Foods
Zeeland

MINNESOTA

David Barnes
Schwan's Sales Enterprises
Marshall

NEW JERSEY

Robert R. Friedel
Perritt Laboratories, Hightstown

Catherine B. Lewus
M & M/Mars, Denville

NEW YORK

Dan Grinberg
Island Poly, Westbury

NORTH CAROLINA

Mark A. Cullison
North Carolina State University
Raleigh

OREGON

Eric Pippert
Oregon Health Division, Portland

PENNSYLVANIA

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Plano Health Department
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CIAD A.C.
Hermosillo, Mexico

Brad Calkins
Rochester Midland Corp.
Rochester, NY

UpDates

FDA Names Dr. Morris Potter First Food Safety Director

Dr. Morris E. Potter has been named Director of the Food and Drug Administration's Food Safety Initiative, a new position that is the result of the Clinton Administration's food safety efforts to lower the number of foodborne illnesses. Potter will be responsible for all of the food safety efforts at FDA's Center for Food Safety and Applied Nutrition, including expanding and improving the FDA's food-related inspection and surveillance. Potter will also coordinate FDA's collaboration with other government agencies in "responding to foodborne illness outbreaks, instituting additional prevention controls and strategies, and conducing nationwide public education campaigns." Potter comes from the Centers for Disease Control and Prevention where he served as Assistant Director for Foodborne Diseases.

Dane Bernard, Vice President of Food Safety Programs at the National Food Processors Association, was cited as calling Potter a good choice, adding, "He has a solid public health background and has been involved in food safety for years. He understands epidemiology and the food industry very well. We're looking forward to working with him in his new capacity."

Mills Named 3-A Symbol Council Administrator

Vince Mills, Cedar Rapids, IA, has been named as the new Administrative Officer of the 3-A Sanitary Standards Symbol Administrative Council. Mills, who recently retired from the Evergreen Packaging Division of International Paper Company has been an active participant in 3-A Sanitary Standards programs for many years. He succeeds Joe W. Hall, Jr., who served as Council Administrative Officer from 1994-1998.

Röhm Enzyme Names West Coast Sales Manager

Röhm Enzyme has named David Kuenzi West Coast Sales Manager. He is responsible for the sale of Röhm Enzyme products to accounts west of the Rocky Mountains.

Mr. Kuenzi, who is charged with establishing and servicing a distributorship and introducing new Röhm Enzyme products, joined the company in June. His background includes quality control/technical services account manager responsibilities for the sale of fruit juice concentrates with International Flavors & Fragrances, Kerr Concentrates Division, Salem, OR, which he joined in 1994.

Mr. Kuenzi graduated from Oregon State University, Corvallis, with a bachelor of science degree in food science technology. He is a member of the National Institute of Food Technologists as well as its Oregon, Washington and California sections.

Walker Stainless Hires Regional Sales Manager for Transportation Products Group

Walker Stainless Equipment Company, Inc. recently announced the hiring of Kenny Brown as a Regional Sales Manager. His territory will include Texas, Louisiana, Oklahoma and Arkansas.

Brown is a mechanical engineer and earned his BSME degree from Texas Tech University. He has over 10 years of experience in the trailer manufacturing industry as a design and sales engineer and as a regional sales manager.

According to Denny Tenhoff, Vice President of the Transportation Products Group, "Kenny will be responsible for direct sales of our stainless steel chemical tanks as well as providing field support for all of our transportation customers within his territory."

Walker Stainless Equipment Company, Inc. is a subsidiary of Carlisle Companies, Inc. of Syracuse, N.Y. Walker's manufacturing and sales operations are headquartered in New Lisbon, Wisconsin with additional facilities in Elroy, Wisconsin and Winsted, Minnesota.

Osmonics Names Dr. William G. Light General Manager of Vista Operations

Osmonics Inc. announced that Dr. William G. Light has been appointed General Manager of the company's Vista, California Operations. Dr. Light is the former President of Fluid Systems Corporation, San Diego, a manufacturer of reverse osmosis and ultrafiltration membrane products with many regional offices around the world.

As General Manager, Dr. Light will oversee all aspects of product engineering, production planning, manufacturing, purchasing and materials. Osmonics' Vista Operations manufactures spiral-wound membrane elements used for

reverse osmosis, plus thin-film composite membrane elements for home reverse osmosis.

Prior to Fluid Systems, Dr. Light held management positions in the R&D division of Koch Membrane Systems.

Dr. Light earned an interdisciplinary Ph.D. in biomedical and environmental health sciences, chemical engineering and materials engineering from the University of California, Berkeley. He holds a master's degree in chemical engineering from Berkeley and a bachelor's degree in chemical engineering from Worcester Polytechnic Institute, Worcester, MA. He has also completed the Executive Program for Growing Company's at Stanford's University's Graduate School of Business. He is widely published and holds five U.S. patents.

Alfa Laval Flow Inc. Names Vice President and General Manager of G&H Division

Alfa Laval Flow Inc. has named David Zonca,Vice President and General Manager, G&H Division.

Zonca, of Highwood, IL, joined G&H Products, now the G&H Division of Alfa Laval Flow Inc., in 1996. He was hired as National Sales Manager, supervising all district sales managers. Zonca will now assume the responsibilities for the G&H inside sales and pump sales departments in addition to outside sales and specialists.

Doug Stover Joins Fristam Pumps, Inc.

Fristam Pumps, Inc. is pleased to announce Doug Stover has joined the company as an Applications Engineer. Doug's responsibilities include in-house and in-field technical support and customer service.

Doug comes to Fristam with over 10 years of pump experience. He previously held positions as a Pump Maintenance Mechanic for the Oakland County Drain Commission in Pontiac, MI and a Pump Technician for Hydronamics, Inc. of Waterford, MI.

Antimicrobial Susceptibility Monitoring Report Available

The Food and Drug Administration (FDA), U.S. Department of Agriculture (USDA), and Centers for Disease Control and Prevention (CDC) report entitled "National Antimicrobial Susceptibility Monitoring Program–Veterinary Isolates, April, 1998" is now available from CVM's Internet Home Page www.fda.gov/cvm. The report is located at the following URL: www.fda.gov/cvm/fda/mappgs/narms.html. Copies are also available by calling or writing CVM's Communications Staff at FDA/Center for Veterinary Medicine, HFV-12, 7500 Standish Place, Rockville, MD 20855; Phone: 301.594.1755. Send one self-addressed adhesive label to assist in processing your requests.

The emergence of resistance to antimicrobials has compromised control of many bacterial pathogens and is a global problem. Additionally, multiple drug resistance has emerged among many bacterial strains, including *Salmonella* species. The development of resistant pathogenic bacteria occurs from the human, animal, and environmental uses of antimicrobials. Food animals are commonly exposed to antimicrobials for therapeutic indications and to improve feed efficiency and weight gain. The intestinal flora of animals that have been exposed to antimicrobial agents can serve as a reservoir of resistant bacteria, and these organisms may be present on animal derived food products.

FDA, USDA, and CDC established the National Antimicrobial Resistance Monitoring System (NARMS) in January 1996 to monitor changes in antimicrobial susceptibilities of zoonotic pathogens from human and animal clinical specimens, from healthy farm animals, and from carcasses of food-producing animals at slaughter.

This report summarizes the percentage of isolates collected during calendar year 1997 that were susceptible, intermediate, or resistant to 17 antimicrobials. These antimicrobials were chosen to be representative of common antimicrobials (or classes of antimicrobials) used in animal and human medicine.

Questions about the report may be directed to Ms. Teresa Thomas, Center for Veterinary Medicine (HFV-218), Food and Drug Administration, 7500 Standish Place, Rockville, MD 20855; 301.827.6741; E-mail: TThomas@bangate.fda.gov.

Protecting Chickens from *Salmonella* Starts with the Egg

A simple three-step process can help poultry producers keep *Salmonella* and other food pathogens out of poultry and may increase profits. It all begins with the egg, according to scientists at the Agricultural Research Service.

"Three simple steps will reduce the *Salmonella* threat for egg-hatching and poultry-production operations," said ARS microbiologist Mark Berrang. "The steps involve cleaning the eggs, treating chicks with a safe spray and using beneficial microbes to protect growing birds."

"Taking these measures can also net higher prices for those who produce fertile eggs for meat production," said Berrang, at the agency's Richard B. Russell Agricultural Research Center in Athens, GA. Berrang outlined the steps as follows:

- Farmers spray freshly laid eggs with a mild detergent and a reliable farm disinfectant chemical. This lowers surface contamination from bacteria.
- Hatcheries spray a fine mist of hydrogen peroxide or other effective chemical in the cabinet while chicks are hatching. This protects the newly hatched chicks from airborne *Salmonella*.
- Benign gut bacteria from healthy mature chickens can be given to young chicks to prevent colonization by *Salmonella* in the grow-out house. As a result, even if chicks come in contact with *Salmonella*, they will not become infected.

Working with a farmer, Berrang confirmed the effectiveness of the first step. This producer found cleaning and disinfecting eggs paid for itself. That's because more of the eggs would could be sold at a higher price. A dozen clean hatching eggs sell for about 30 cents. Dirty or stained eggs sell for only about 7 cents a dozen for use in pasteurized egg products.

The difference can be important to a producer's pocketbook. ARS scientists estimate that a large-scale farm selling millions of eggs annually could recover the cost of the spraying equipment in two years.

E. coli O157:H7: Ontario

Unpasteurized apple cider made from apples from two family farms in Perth County has been linked to an outbreak of *E. coli* O157:H7 in Perth county.

Seventy gallons of cider were custom pressed for the families by a commercial producer on October 15, 1998. Health Unit officials have accounted for all but 1/4 gallon distributed to friends and family. It was shared with 41 households and consumed by 67 people. Fourteen people experienced gastrointestinal illness between October 20 and November 10, 1998, after drinking the cider. Seven of these were confirmed with *E. coli* O157:H7 infection along with one asymptomatic family contact. The cases ranged in age from 1 to 87 years. Children 1 to 4 represented 36% of the cases, adults 20 to 64 represented 43%. No cases have been hospitalized or developed HUS. Testing of the apple cider has found presence of *E. coli*, but VTEC has not been isolated. Samples have been sent to the Health Protection Branch laboratory in Guelph for further testing. The apples used were a combination of dropped and picked apples. Cattle are known to have grazed in one orchard 10 weeks prior to picking. The apples were not washed or inspected before pressing.

Expedited Review Given to Food Additive Petitions that Provide Food Safety Solutions

Under new guidance, top priority will be given by the FDA to reviewing food additive petitions for products designed to decrease the risk of foodborne illness.

Specifically, expedited review will be given to food additives intended to significantly decrease pathogenic strains of *E. coli*, *Salmonella*, *Campylobacter*, *Cyclospora*, and *Listeria* or their toxins that may be present in food. According to statistics from the Centers for Disease Control and Prevention, *Campylobacter* causes the greatest number of foodborne illnesses and *Salmonella* ranks second. All five pathogens are capable of causing serious and even life-threatening illness. While America's food supply is among the safest in the world, every year millions of Americans become ill and thousands die as a result of infections caused by foodborne pathogens.

These expedited petitions will still have to meet the same approval standards that are applied to other food additive petitions, including the need for valid scientific evidence, the need to satisfy the safety standard, and the presentation of data to support the petitions.

Examples of petitions that could be designated for expedited review are those that propose the use of sources of radiation or chemicals such as chlorine dioxide intended to reduce harmful bacteria. This process of expedited review is designed to provide an incentive for manufacturers to develop these critical products and to ensure that such products are available for marketing as soon as possible, with the safety standard and process established by law for food additives.

"Food Additive Petition Expedited Review -- Guidance for Industry and Center for Food Safety and Applied Nutrition Staff" was published in the *Federal Register* on January 5, 1999. Written comments may be submitted at any time to the Dockets Management Branch, Food and Drug Administration, 5630 Fishers Lane, Room 1061, Rockville, MD 20852. Comments will be considered when determining whether to amend the guidance.

More information on this subject is available at the Center for Food Safety and Applied Nutrition's Web site.

John Cady, President and CEO of the National Food Processors Association (NFPA) called the move an "important step forward for food additive reform. It has been NFPA's long-held belief that FDA could and should act more promptly on food additive petitions, particularly those which provide strong food safety benefits for consumers. Lack of timely response to such petitions has underscored the need to reform the review process. We applaud FDA for this important step forward."

Food Safety in FY 2000 Budget Proposal

President Clinton will recommend increasing funds for food safety by $105 million – or 12 percent in his fiscal 2000 budget proposal. If enacted, the budget would result in a third year of significant growth in government efforts to prevent potentially deadly foodborne illness by putting into place a modern, science-based food safety system involving improved inspection, surveillance, research, and education activities. The new funds are to be shared by the Department of Agriculture (USDA), which would receive $65 million, and the Department of Health and Human Services, which would receive $40 million.

The President's proposal would significantly expand inspections of domestic food products. New funds for the Food and Drug Administration (FDA), which protects the safety of all food products except meat and poultry, would enable the agency to use more than 60 new inspectors to inspect, at least once each year, every domestic manufacturer of high-risk food products (generally, products that are not cooked by consumers). Currently, these manufacturers are inspected every three to four years. Additional funds for USDA would permit the broad expansion of its science-based, prevention-oriented meat and poultry inspection system, called Hazard Analysis Critical Control Point (HACCP), which already has significantly reduced contamination in these food products. HACCP is now in effect at the nation's 300 largest meat and poultry facilities. USDA would use the proposed new funds to introduce HACCP at 2,700 smaller plants (those employing 10 to 499 employees), which would

mean that 90 percent of all meat and poultry will be covered.

The President's budget would also increase scrutiny of imported food products. Under the proposal, the FDA would more than double the number of inspections conducted of foreign food processors. In addition, FDA technical experts will work with food safety officials abroad to ensure that their food-growing, processing, and transportation systems meet high standards for safe production. The President will also continue to push Congress to pass legislation enabling the FDA to cut off all imports from foreign countries whose food safety systems are not equivalent to those in this country.

The President's budget includes a significant component for surveillance and research activities. To help officials track pathogens back to their source and prevent outbreaks of foodborne illnesses from spreading, the Centers for Disease Control (CDC) will use new funds to almost double the number of laboratories that do "DNA fingerprinting" of foodborne pathogens. FDA and USDA also will use new funds to expand research to develop more effective ways of testing for and identifying dangerous contaminants such as *Salmonella* and *Cyclospora*.

The President's proposal builds on a strong record of actions to ensure that Americans eat the safest possible food. Last year, the President proposed a $101 million increase in food-safety funding, more than $80 million of which was ultimately approved by Congress in the final budget.

The Administration has put in place improved safety standards for meat, poultry, and seafood product, and has begun the process of developing enhanced standards for fruit and vegetable juices.

Update: Multistate Outbreak of Listeriosis, United States, 1998-1999

From early August 1998 through January 6, 1999, at least 50 illnesses caused by a rare strain of the bacterium *Listeria monocytogenes*, serotype 4b, have been reported to CDC by 11 states. Six adults have died and two pregnant women have had spontaneous abortions. Reported illness onset dates were during August 2–December 13, 1998. CDC and state and local health departments have identified the vehicle for transmission as hot dogs and possibly deli meats produced under many brand names by one manufacturer. This report updates the investigation of this outbreak.

On December 22, the manufacturer, Bil Mar Foods, voluntarily recalled specific production lots of hot dogs and deli meats that might be contaminated. CDC later isolated the outbreak strain of *L. monocytogenes* from an opened and a previously unopened package of hot dogs manufactured at the company's plant in Zeeland, MI. In addition, a different strain of *L. monocytogenes* was isolated from unopened packages of deli meats produced at the same plant.

Six Tips for a Successful Preventative Maintenance Program

Food processors and manufacturers can count on machines breaking down at the wrong time and potentially creating havoc through the loss of production time and costly repairs. So, why wait for a problem to happen? A proactive preventative maintenance program can help you avoid costly breakdowns and overtime maintenance expenses. The following are six tips for executing a successful preventative maintenance program: Analyze the history of regular maintenance problems. Take a look at what parts wear out or break down on a regular basis. This way you'll know what to look for and can update critical points of stress on all of your machines. Determine the various time lines and inventory the parts that should be kept on-hand. Don't forget about the HVAC system and other building-oriented factors that contribute to production; develop staff who are production-minded and understand the bottom-line. If your maintenance staff is as lonely as the Maytag repairman, then they probably don't have a clue regarding their role in creating a well-oiled machine. Regularly inform administrative and production staff of the importance of good recordkeeping, communication, and effort put toward maintaining equipment; communicate with and train your staff to be part of the Preventative Maintenance Program. Rattles, squeaks, and "funny" noises are all indicators that something's wrong. Instruct staff to notify appropriate maintenance people. Communicate the importance of keeping accurate maintenance records and timely preventative maintenance services to ensure ongoing production; plan and implement regular maintenance service calls. Different machines will require different preventative maintenance timetables. Whether it's every 3 days or 6 months, schedule a time for machines to be serviced. And, if possible, stagger maintenance calls in order to keep production rolling; develop a monthly budget for maintenance repairs and preventative maintenance procedures. Anyone who owns a car knows that if you use preventative maintenance as part of your program, you will save three to four times the amount

when something goes wrong and needs fixed. Plan a budget for regular maintenance that is an expected and anticipated expense in addition to adding a little extra for those things that might catch you by surprise; and document maintenance repairs and preventative maintenance procedures. For each machine, keep a log in which you document the date and type of procedure performed, as well as associated costs. This will not only help with regular preventative maintenance procedures, but will also help to determine when and if a machine should be replaced.

Shigella at a Wake in Adelaide

Thirteen out of 32 persons from two states who attended a lunch after a funeral in Adelaide on 2nd June 1998 became ill with diarrhea. Most had onset of illness within three days but one case occurred eight days after and one 28 days after the lunch. The person whose illness commenced eight days after was the sister of one of the early onset cases and it was her boyfriend who became ill after 28 days. The duration of illness ranged from three to 10 days (mean=6.2 days) with reported symptoms in addition to diarrhea being abdominal pain (11), vomiting (7) and macroscopic blood in the stool (3).

Only one person had a history of recent travel outside Australia before the funeral. This had been a medically uneventful trip to the Philippines six weeks previous. Similarly in the two months before the funeral one person had returned from southern Queensland, one from a trip to Western Australia and the Northern Territory and one from Western Australia only. Of these travellers only the third had suffered any illness during their travel. Six people came from Melbourne to Adelaide to attend the funeral.

Most of the food for the function was purchased the day before from the refrigerated counter of a retail outlet, transported for 20 minutes in the boot of a car and then refrigerated overnight in the kitchen of the flat where the lunch was served. During that night one item (sliced ham) was removed from the fridge and some of it used. The remainder of the ham was returned to the fridge. The person who handled the ham during the night had recovered earlier that week from a diarrhea illness contracted in the Kimberleys. The cause of this diarrhea had not been determined. *S. sonnei* Biotype G was grown from the stool of three of the cases (onset 2 days (n=2) and 8 days), *S. sonnei* not biotyped from one case (onset 28 days after the funeral) and *S. dysenteriae* Type 2 from the stool of one other case (onset of diarrhea 1 day after the funeral). None of the other cases provided a stool specimen.

A cohort study implicated only the sliced ham of the foods served at the funeral lunch as a possible vehicle for this outbreak. Even including a probable secondary case (8 day incubation) who did not eat ham as a primary case and counting one of the early cases (who was not completely certain that she had eaten the ham) as a non-consumer, the relative risk was 2.77 (95% confidence limits 1.05–7.27). With these conservative case definitions the attack rate for ham eaters was eight out of 13 (62%). The more likely situation with the late onset case as a secondary case and accepting the history that the uncertain persons belief that she probably had eaten ham gave a relative risk of 5.46 (95% confidence limits 1.40–21.27).The attack rate with these definitions was nine of 14 (64%).

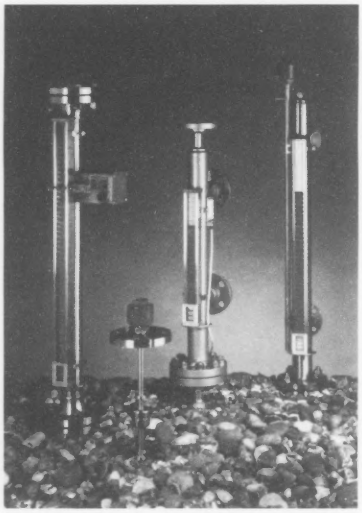
The retailer from whom the ham was purchased is a large supplier which turns over multiple legs each week. Inspection of this premises two weeks after the funeral by an environmental health officer of the Adelaide City Council revealed no poor food handling practices. Laboratory cultures of ham collected at that time did not grow Shigella. If there had been a problem at or before the retail stage we would also have expected more metropolitan cases of Shigella notified unrelated to the funeral.

Our suspicion is that the person recently recovered from diarrhea acquired in the north west of Australia who handled the ham the night before the funeral contaminated it. This person also consumed the ham but did not suffer further illness.

Some person-to-person transmission at the lunch was also possible. The meal was served to a large group of people in a very small flat and one person reported that the hand towel in the bathroom became sodden from hand wiping during the afternoon. The multiple Shigella isolates, especially in a metropolitan outbreak, are surprising but it seems unlikely that there would be multiple sources. Nevertheless the one isolate of *S. dysenteriae* came from a person who did not eat ham and who had a flu-like illness on the day of the funeral but developed prolonged (10 days) of diarrhea the day after.

This is only the second *S. dysenteriae* Type 2 infection notified in South Australia since 1990. By contrast in 1997 and 1998 *S. sonnei* Biotype G has been the most common Shigella notified. Before 1996 most cases of *S. sonnei* Biotype G were acquired overseas, but only four of the 30 notified so far in 1998 had recent travel histories outside Australia.

Industry**Products**



Solartron Inc.

US OEM Agreement Adds Key Technology to Solartron's High Integrity Level Monitoring and Measurement Portfolio

Solartron, Inc., and Klinger Fluid Instrumentation have signed an agreement enabling Solartron to offer Klinger's well-known magnetic level gages in the USA. Integrating the proven Klinger products into its existing portfolio enables Solartron to extend its coverage of high integrity safety monitoring and measuring systems for steam plant into level management of all kinds of liquids, including hazardous and toxic fluids.

The Klinger magnetic gage is designed so that the liquid to be measured is enclosed within a sealed chamber in which is a free-moving AISI 321 stainless steel, titanium or plastic float fitted with an omni-directional magnet. As the float rises or falls inside the chamber, patented ferrite molded edge-magnetized wafers rotate 180° to present a contrasting color: white above the float level and red below, providing a clear, accurate indication of the level of the liquid.

"Not all magnetic gages are the same," comments Mike Abbott, Klinger's marketing manager. "Many competitive systems sacrifice performance to achieve low specific gravity and higher pressures, or use guided or vented floats that stick or collapse. Our sealed, guide-free floats provide ultimate performance even under the most arduous conditions." The advanced magnetic level gage is suitable for all kinds of liquids, including dangerous and toxic, at temperatures up to 750°F, and from vacuum to 2900psi.

The gage can be of almost any length and offers very fast response particularly during surge conditions where other wafer-style systems often fail. The chamber is available in AISI 316L austenitic stainless steel as standard or optionally in Alloy 825, Titanium, Hasteloy, Sanicro 28/Duplex or Monel. Importantly, the wafers resist accidental disturbance by, for example vibration, due to their edge magnetization and mutual attraction.

Alarm functions are achieved simply by attaching the EExd IIc T6-approved explosion-proof magnetic level gage switches to the side of the chamber. By fitting a level transmitter, approved to EExia IIc T4 with Zener barriers and ExN IIc T4 without float position can be sensed and level information transmitted as a 4-20mA signal, facilitating integration into SCADA and DCS systems. Four fully adjustable safety trips for alarm functions are standard within the level transmitter, ensuring plant safety is not compromised by DCS, transmitter or cabling failure.

Solartron Inc., Allentown, PA

Reader Service No. 235

Millions of Certificates of Analysis Go Online at Sigma-Aldrich Supersite

More than two million certificates of analysis characterizing chemicals, biochemicals, immunochemicals and a wide variety of other products provided by the Sigma-Aldrich brands are now available through their new SuperSite www.sigma-aldrich.com. This comprehensive array of analytical data includes products from the Sigma, Aldrich, Fluka, and Superco brands.

This "web-based" certificate of analysis service permits instant access to valuable product information 24 hours a day, seven days a week, from anywhere in the world. Certificates of analysis often play a key role in product evaluation. In addition to assisting with purchasing, certificates of analysis are crucial to demonstrating compliance with cGMP manufacturing requirements. The certificates, which can be easily printed from the Web site, provide analytic data

including formula weight, relevant physical properties, unit definition, impurities, and suitability for certain purposes as well as a wealth of other information. The information is always fresh, with new data being added on a regular basis as new lots of material are released to inventory.

Sigma-Aldrich, St. Louis, MO

Reader Service No. 236

Oakite Products Introduces Environmentally Safe Sanitizer

Imagine a tough product that destroys microorganisms and breaks down into harmless oxygen, acetic acid and water. Oakite Products, Inc.'s FiSan OxySanitizer, a special formula containing peroxyacetic acid and hydrogen peroxide, is ideal for circulation sanitizing of previously cleaned nonporous food contact surface and equipment.

FiSan OxySanitizer's high success rate of eliminating a variety of microorganisms is accomplished with no foam, when used at low concentrations and diluted with water. It is also phosphate free, an environmental bonus. Furthermore, it's ideal for mixing tanks, pipelines, evaporators, fillers, pasteurizers, and asceptic equipment in dairies, wineries, breweries, beverage and other food processing plants.

Oakite Products, Inc., with headquarters based in Berkeley Heights, NJ, has been developing, manufacturing, and supplying state-of-the art specialty chemical products since 1909. The QS9000/ ISO 9001 certified company offers a wide spectrum of products ranging from cleaners, sanitizers, chain lubes, additives, and defoamants to complete available water and waste treatment programs. Oakite's integrated products, chemical management systems, process equipment, and service programs facilitate the achievement of many industries' processing needs.

Oakite Products, Inc., Berkeley Heights, NJ

Reader Service No. 237

Eriez Introduces MPCTerm with Real-Time Diagnostic Functions

Eriez Magnetics introduces a new and unique software program that adds remote access and real-time diagnostic functions to their extensive line of E-Z Tec® Metal Detectors. The software, MPCTerm, revolutionizes metal detection and can be applied in any processing application that utilizes E-Z Tec Microprocessor Controlled (MPC) metal detectors such as food, chemicals, pharmaceuticals, plastic wood and pulp and paper among others.

The remote access feature enables one or more Master computers monitor an unlimited number of metal detectors. The Master computers work through a network of modem-connected remote Slave computers, each of which may directly control up to 99 metal detectors. Also, there is no limit on the distance separating the Master from the Slaves. For example, a quality manager in Chicago can monitor and impose real-time control on metal detectors in Milwaukee, Mexico or London. Security restrictions on each Slave computer prevent any inadvertent action that could affect product quality.

MPCTerm's real-time diagnostic functions in conjunction with unique diagnostic features in the MPC "chip," enable users to view an oscilloscopic trace of the signal being processed by any networked E-Z Tec Model MPC detector right on the computer screen. When combined with the new, enhanced remote operation capability, this oscilloscopic capability means that metal detector operational problems can be debugged from anywhere in the world.

New features include: Simple modem and phone line connection means no limit on distance between Master and Slave computers; Master has access to all functions of all metal detectors connected to Slave, including diagnostics, subject to security restrictions that can be imposed by Slave; all PC's in system can function in Master, Slave or stand alone mode; changing the mode is achieved through a software setting and is instantaneous; remote connection can be initiated by Master or Slave; user can feed worldwide reject data into single central database for use with a spreadsheet or similar software; oscilloscopic trace of metal detector signal can be viewed directly on computer screen; diagnostic trace is viewable in real time on locally connected computer or on remotely connected Master; monitor as little as one second of operation or as much as one hour; store unlimited number of oscilloscopic traces and recall for diagnostic review either within MPCTerm or in external applications such as a spreadsheet; zoom to allow signal resolution down to .1 mv or less, and up to 5 volts; software is compatible with Windows and can also be used on most DOS-based PC's.

Eriez Magnetics, Erie, PA

Reader Service No. 238

New COD Heater Block for Micro-COD Tests

A new heater block for micro-COD test vials has been introduced by Bioscience, Inc. in 15 and 30-tube sizes. The new heater, which includes a temperature monitor and safety shield, is designed to take up less bench space than former models.

The heater blocks are used to digest samples in the Bioscience accu-TEST™ systems for determining chemical oxygen demand

(COD) in wastewater. The EPA-approved method employs optical glass containers with pre-mixed reagents. A waste sample is added to the container, which is then resealed and digested a 150°C for two hours. The vial is then placed in a spectrophotometer and COD results read directly.

While EPA reporting methods require 2 hours of sample digestion, the results for non-reporting purposes can be obtained in as little as 15 minutes for readily oxidized wastes. Rapid tests are often used in connection with BOD to determine the biodegradability of influents to industrial waste treatment plans.

Five reagent types are now available for ranges from 5 to 4500 mg/l COD. They include tests for high, low and standard COD levels, plus mercury-free reagents for low and standard ranges.

Bioscience, Inc., Bethlehem, PA

Reader Service No. 239

An FDA Bacteriological Analytical Manual (BAM) Method and a Health Canada HPB Lab Procedure

Dynabeads® anti-E. coli O157 is designed for rapid, immunomagnetic selective enrichment of *E. coli* O157 directly from pre-enrichment broths. The rapid and simple protocol (less than 60 minutes) results in the isolation of *E. coli* O157 colonies in 24 hours. Thus, saving at least 24 hours of valuable confirmation testing time required in presumptive tests (e.g., ELISA methods) and reducing false positive results.

Dynabeads® anti-E. coli O157 are uniform, superparamagnetic microspheres (2.8 microns in diameter) with affinity purified antibodies on their surface. When incubated with a sample, Dynabeads® will bind their target bacterium forming a bacterium: magnetic bead complex. This complex is separated from the heterogeneous sample by performing the test in a magnetic test tube rack (Dynal MPC®-M). The isolated and concentrated bacterium:bead complex can then be cultured on any selective culture medium (e.g., SMAC, CT-SMAC).

This highly sensitive system will detect as few as 100 organisms/ml of pre-enriched sample. With isolated colonies at 24 hours, false positive results are eliminated and confirmation can be completed sooner. Other features include simple protocols, shelf stable reagents, no requirement for shakers during pre-incubation or a 42°C incubator, and a significantly lower cost per test. The versatility provided by this methodology will allow testing of many different sample types while achieving excellent recovery of this important pathogen.

Dynal, Inc., Lake Success, NY

Reader Service No. 240

Rugged, Quantitative Measurement of Flavor and Aroma Volatiles

Quantitative measurement of low threshold flavor and aroma compounds requires sample concentration techniques testing sample pathways of complete inertness. Unlike other techniques, the 3100 is a dynamic headspace concentrator which provides true quantitative measurements. The 3100 Sample Concentrator from Tekmar-Dohrmann uses fused silica lined sample pathways minimizing analyte activity, adsorption and carryover. Sample pathway temperatures are uniform and precisely controlled. This ensures that the analysis of a flavor system of competitive product is of the highest quality. Other features of the 3100 Sample Concentrator

Tekmar-Dohrmann

include an enhanced bake cycle and an improved sample drain system. These features in the 3100 along with the appropriate Tekmar autosampler provide the highest level of data quality, ease of use and sample throughput.

Tekmar-Dohrmann, Cincinnati, OH

Reader Service No. 241

New, Light Gray PROTECTA and PROTECTA LP Bait Stations Offer Discreet Bait Placement

Bell Laboratories is ringing in the new year with new, light gray PROTECTA and PROTECTA LP Bait Stations, which blend discreetly with many light colored surfaces.

Made of heavy-duty injection-molded plastic, the new gray PROTECTA Bait Stations can be placed on decorative stone, asphalt, concrete, and other light colored materials, drawing little attention to their purpose.

Bell introduced the light gray bait stations at the request of PCOs and distributors who wanted a bait station to blend with the light surfaces inside and outside buildings, noted Bell's marketing manager, John Schwerin.

Outdoors, the light gray PROTECTAs are a near match to gray corrugated metal buildings and the concrete aprons, skirting many pole barns. For companies that set up a ring of bait stations around the perimeter of the building, the light gray PROTECTAs blend in better than the traditional black bait stations.

Indoors, gray PROTECTA and PROTECTA LP work well in hospitals, pharmaceutical plants, food operations and other locations where the emphasis is on a sanitary appearance.

Except for color, the gray PROTECTAs are identical in quality and construction to Bell's black, tamper-resistant PROTECTA Bait Stations, and are equipped with the same accessories: securing devices to lock or unlock the bait station, bait tray liners, and horizontal and vertical bait securing rods that add to the weatherability and palatability of Bell's Blox baits.

Bell Laboratories Inc., Madison, WI

Reader Service No. 242

Neogen Releases Rapid Test to Detect Eggs

Neogen Corporation announced the release of the only commercial test available to protect consumers from the presence of minute quantities of unlabeled eggs in food products.

The technology is of critical importance to the millions worldwide who face severe consequences, up to and including death, if they accidentally ingest eggs. An allergy to eggs is most prevalent among infants and children, and is one of the more common food allergies, according to researchers.

The egg test is seen as most critical to processors of pasta, ice cream, baby food and salad dressing, for the most part, foods that make up a large percentage of the diet of infants and children.

The test for eggs was developed by Neogen in cooperation with the University of Nebraska's Food Allergy Research and Resource Program. The university's Dr. Sue Hefle is Co-Director of the team that developed the test. Dr. Hefle said egg contamination occurs when egg residues get into another food that is processed on shared equipment. Processing foods on the same equipment is common and economically necessary, she said.

Neogen's ELISA (Enzyme-Linked Immunosorbent Assay)-based egg test kit takes only 30 minutes to complete and requires only a minimal amount of training to use. Previously, processors had to rely on a test method that took days to complete in a laboratory setting. Neogen recently introduced its rapid test for peanuts. Rapid tests for other common food allergens, including casein, are being actively pursued by Neogen in cooperation with University of Nebraska researchers.

Neogen Corporation, Lansing, MI

Reader Service No. 243

Osmonics and Cargill Pursue Joint Efforts to Explore Industrial Applications of Solvent Resistant Membranes

Membrane systems are already widely proven in water-based processes. Can they be as successful in harsh, solvent-based environments? This is the question Osmonics and Cargill, Inc. of Minnetonka, MN, will investigate under a five-year, $3.75 million grant from the National Institute of Standards and Technology (NIST) Advanced Technology Program. And the food, pharmaceutical and petrochemical processing industries are among those awaiting the answer.

"This joint venture creates tremendous opportunities for our companies today and will benefit entire industries in the future," said David Paulsor, Osmonics' Director of Corporate Research and Development. "Cargill offers extensive expertise in commercial food and fertilizer processing, while Osmonics brings high-tech separations product design and engineering skills. Together, we will develop innovative and cost-effective membrane solutions for widespread industrial solvent applications."

Once commercialized, the new polymeric membranes and systems should help U.S. companies save tens of millions of dollars in energy costs annually, because membranes typically require less than 10 percent of the energy used in distillation. They will also reduce costs associated with controlling airborne and wastewater emissions.

Cargill will provide a full-time Program Manager and will act as Administrator of the grant. Osmonics will focus on membrane products and systems technology and collaborate with Cargill on applying membrane to processing applications. A research group at the University of Kentucky will assist with transport and separation modeling, and the University of Minnesota Center for Interfacial Engineering will provide analytical expertise. Experienced industrial and academic consultants will work jointly on the project.

"NIST funding requires the technology to have broad commercial applicability," Paulson said. "Since we began working with Cargill on the grant proposal, we have identified many food processing applications and have targeted applications in the pharmaceutical and petrochemical industries as well."

"We're also confident this research will increase our understanding of current water-based, or aqueous membrane technology, which means we'll be able to improve the economics in a majority of established membrane applications."

Osmonics, Minnetonka, MN

Reader Service No. 244

BusinessExchange

Services/Products

BusinessExchange

Employment Opportunities

Sanitation Supervisor

Case Swayne, a growing food products manufacturer has an opening for a Sanitation Supervisor. This position is responsible for implementing and documenting sanitation, pest control, and janitorial procedures and standards. Supervises all employees in the Sanitation Department. Position requires AA degree or two years technical training either in a trade school or on the job. Five to seven years' supervisory experience is required. Mail or fax resume w/salary history to: Human Resources, 1930 California Ave., Corona, CA 91719 or Fax (909) 737-1119.

EOE

Section Chief
Food Technical Services

Madison, Wisconsin

The Wisconsin Department of Agriculture, Trade & Consumer Protection (DATCP), Division of Food Safety is recruiting for Chief of the Food Technical Services Section. Headquartered in Madison, the state capital, DATCP helps to assure Wisconsin's food supply is safe.

This position provides advice on technical food and dairy program matters; develops and delivers technical assistance; interprets and advises industry and the public on food and dairy problems; develops and delivers training to staff and industry; coordinates activities with the FDA, USDA, city and county health departments and other state agencies; and supervises Food Scientists and Food Safety Consultants.

The starting salary is $44,549-$58,088 annually, depending on qualifications, with excellent benefits. For more information about qualifications, and to request an application, please call Linda Rogers at (608) 224-4764 or rogerll@wheel.datcp.state.wi.us.

An Affirmative Action/
Equal Opportunity Employer

Field Services Director
Food Safety and Inspection

Madison, Wisconsin

The Wisconsin Department of Agriculture, Trade & Consumer Protection (DATCP), Division of Food Safety is recruiting for Field Services Director, Bureau of Food Safety and Inspection. Headquartered in Madison, the state capital, DATCP helps to assure Wisconsin's food supply is safe.

This position serves as the principal resource to direct and administer field activities; evaluate program service delivery; participate in policy development; plan, organize and direct field activities; work with compliance staff to coordinate the enforcement of food and dairy inspection rules and regulations; plan and coordinate education programs for industry and consumers; and supervise Food Safety Supervisors statewide.

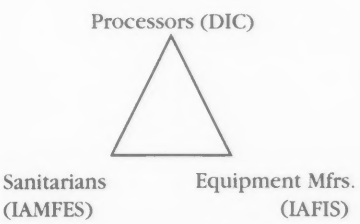
The starting salary is $44,549-$58,088 annually, depending on qualifications, with excellent benefits. For more information about qualifications, and to request an application, please call Linda Rogers at (608) 224-4764 or rogerll@wheel.datcp.state.wi.us.

An Affirmative Action/
Equal Opportunity Employer

MARK OF COMPLIANCE

The 3-A Symbol Story

The 3-A Sanitary Standards Symbol Administrative Council, known throughout the industry as the "**3-A Symbol Council**," was organized in 1956. Its purpose is to grant authorization to use the **3-A Symbol** on equipment that meets 3-A Sanitary Standards for design and fabrication.



A Modern Concept

The modern concept of the 3-A program was established in 1944 when the Dairy Industry Committee (DIC) was formed. DIC is one of the three industry segments involved in the preparation of 3-A Sanitary Standards. These industry segments are:

- **Processors,** represented by DIC
- **Equipment Manufacturers**, represented by IAFIS
- **Sanitarians**, represented by IAMFES

Use of the Symbol

Voluntary use of the **3-A Symbol** on dairy equipment:

- assures processors that equipment meets sanitary standards
- provides accepted criteria to equipment manufacturers for sanitary design & fabrication
- establishes guidelines for uniform evaluation and compliance by sanitarians.

3-A Sanitary Standards Symbol Administrative Council

3020 Bluff Road

Columbia, SC 29209-3502

803-783-9258 phone **803-783-9265 fax**

Reader Service No. 225

Dairy, Food and Environmental Sanitation, Vol. 19, No. 2, Pages 126-147

Holders of 3-A Symbol Council Authorization as of February 1999

Questions or statements concerning any of the holders' authorizations listed below, model numbers or the equipment fabricated should be addressed to: Administrative Officer, 3-A Symbol Council, 1500 Second Avenue, SE, Suite 209, Cedar Rapids, IA 52403; Phone 319.286.9221; Fax 319.286.9290

01-07 Storage Tanks for Milk and Milk Products

2 APV Americas - Lake Mills (5/1/56)
100 South CP Avenue
Lake Mills, Wisconsin 53551

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

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

440 Scherping Systems (2/28/85)
801 Kingsley Street
Winsted, Minnesota 55395

31 Walker Stainless Equipment Co., Inc. (10/4/56)
902 - 2nd Main Street
Elroy, Wisconsin 53929-0126

02-09 Pumps for Milk and Milk Products

975 Alfa Laval Pumps Ltd. (8/25/98)
Birch Road
Eastbourne, East Sussex
BN23 6PQ, England
(Not Available in the USA)

976 Alfa Laval Pumps Ltd. (8/25/98)
Birch Road
Eastbourne, East Sussex
BN23 6PQ, England
(Not Available in the USA)

63R APV Americas - Lake Mills (4/29/57)
100 South CP Avenue
Lake Mills, Wisconsin 53551

946 APV Americas - Lake Mills (11/25/97)
100 South CP Avenue
Lake Mills, Wisconsin 53551-1799
(Mfg. by: APV Fluid Handling
Howard Pumps Ltd.
Eastbourne, East Sussex
U.K.)

568 Allweiler AG, Werk Bottrop (5/15/89)
Kirchhellener Ring 77-79
D-46244 Bottrop
Germany
(US Rep.: Shanley Pump and Equipment, Inc.
2525 South Clearbrook Drive
Arlington Heights, IL 60005)

793 Ampco Pumps Co. (9/14/94)
4000 W. Burnham Street
Milwaukee, Wisconsin 53215

212R Babson Brothers Company (2/20/70)
Dairy Systems Division
20903 West Gale Avenue
Galesville, Wisconsin 54630-0659

923 Bombas Bornemann S.R.L. (5/16/97)
Armenia 2898 (1605)
Munro, Argentina
(US Rep.: Bornemann Pumps, Inc.
P.O. Box 1769
Matthews, North Carolina 28105)

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

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

709 Conexiones Inoxidables (1/18/93)
de Puebla S.A. de C.V.
Vicente Guerrero No. 211
Xicotepec de Juarez
Edo, Puebla, Mexico
(US Rep.: Ben Dolphin Consulting
4735 Lansing Drive
North Olmsted, Ohio 44070)

820 Drum Industries, Inc. (3/17/95)
2501 Constant Comment Place
Louisville, Kentucky 40299
(Mfg. by: Alfa Laval Pumps, LTD
Easbourne East Sussex
England BN 23 6PQ)

671 Flowtech Inc., - Teknoflow, Inc. (4/1/92)
1701 Spinks Drive
Marietta, Georgia 30067

466 Fluid Metering, Inc. (1/10/86)
5 Aerial Way, Suite 500
Syosset, New York 11791

828 Flux Pumps Corp. (4/13/95)
4430 Commerce Circle
Atlanta, Georgia 30336
(Mfg. by: Flux Geraete GmbH
Talweg 12
D75433 Maulbronn
Germany)

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

65R Alfa Laval/G & H Products Corp. (5/22/57)
P.O. Box 909
Pleasant Prairie, WI 53158-0909

325 Johnson Pumps (U.K.) Ltd. (12/19/79)
Highfield Industrial Estate
Edison Road, Eastbourne
East Sussex, England BN23 6PT
(US Rep.: Viking Pump, Inc.
406 State Street, P.O. Box 8
Cedar Falls, Iowa 50613)

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

502 Inoxpa, s.a. (4/28/87)
Carrer Dels Telers, 54
17820 Banyoles
Spain
(US Rep.: Jensen Fittings Corp.
107-111 Goundry Street
North Tonawanda, NY 14120)

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

603 Johnson Pumps (U.K.) Ltd. (8/16/90)
Highfield Industrial Estate
Edison Road, Eastbourne
East Sussex, England BN23 6PT
(US Rep.: Viking Pump, Inc.
406 State Street, P.O. Box 8
Cedar Falls, Iowa 50613)

604 Johnson Pumps (U.K.), Ltd. (8/16/90)
Highfield Industrial Estate
Edison Road, Eastbourne
East Sussex, England BN23 6PT
(US Rep.: Viking Pump, Inc.
406 State Street, P.O. Box 8
Cedar Falls, Iowa 50613)

841 Johnson Pumps (U.K.), Ltd. (8/18/95)
Highfield Industrial Estate
Edison Road, Eastbourne
East Sussex, England BN23 6PT
(US Rep.: Viking Pump, Inc.
406 State Street, P.O. Box 8
Cedar Falls, Iowa 50613)

673 Alfa Laval Flow, Inc. (4/16/92)
Industrial Pumps Division
8201 104th Street, P.O. Box 581909
Pleasant Prairie, Wisconsin 53158-0909

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

400 Netzsch Incorporated (8/15/84)
119 Pickering Way
Exton, Pennsylvania 19341-1393

827 PACKO Diksmuide NV (4/14/95)
Cardijnlaan 10
B8600 Diksmuide, Belgium
(Not available in the USA)

701 Pierre Guerin SA (10/27/92)
BP. 12 - 79210
Mauze-Sur-Le-Mignon
France
(Not Available in the USA)

241 Puriti, S.A. de C.V. (9/12/72)
Alfredo Nobel 39
Industrial Puente de Vigas
Tlalnepantla, Mexico
(US Rep.: Waukesha Cherry-Burrell
611 Sugar Creek Road
Delavan, WI 53115)

148R Moyno Industrial Products (4/22/64)
A Division of Robbins & Myers, Inc.
P.O. Box 960
Springfield, Ohio 45501-0960

810 O.M.A.C. SRL Pompe (1/2/95)
Via G. Falcone 8, I-42948
Rubiera (RE) Italy
(US Rep.: Sanchelima International, Inc.
1781-83 N.W. 93rd Avenue
Miami, Florida 33172)

684 PCM Pompes (7/9/92)
17, rue Ernest Laval
92170 Vanves
France
(US Rep.: Alfa Laval Flow, Inc..
P.O. Box 581909
Pleasant Prairie, WI 53158-0909)

934 Platdot Ein Harold (8/6/97)
Kibbutz Ein Harod Meuhad
18965
Israel
(US Rep.: Norix-International L.T.D.
35 Monhegan Street
Clifton, New Jersey 07013)

595 seepex, Inc. (3/16/91)
511 Speedway Drive
Enon, Ohio 45323
(Mfg. by: Seeberger GmbH + Co.
Scharnholzstrasse 344
D-46240 Bottrop
Germany)

678 Shanley Pump & Equipment, Inc. (5/11/92)
2525 S. Clearbrook Drive
Arlington Heights, Illinois 60005
(Mfg. by: Phillip Hilge GmbH, Germany)

911 Sigma Equipment Corp. (3/20/97)
39 Westmoreland Avenue
White Plains, New York 10606

507 Sine Pump (7/21/87)
c/o Sundstrand Fluid Handling
14845 West 64th Street
Arvada, Colorado 80007

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

860 Sudmo North America, Inc. (11/28/95)
4786 Colt Road
Rockford, Illinois 61109
(Mfg. by: Sudmo Schleicher AG
Industiestr. 7
D-73469, Reisburg
Germany)

72R L.C. Thomsen Inc. (8/14/57)
1303-43rd Street
Kenosha, Wisconsin 53140

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

899 Und Maschinenfabrik (12/31/96)
Lederle GmbH Pumpen
GewerbestraBe 53 D-79194
Gundelfingen, Germany
(US Rep.: Alto Systems Inc.
P.O. Box 60667
Houston, Texas 77205)

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

29R Waukesha Cherry-Burrell (10/3/56)
611 Sugar Creek Road
Delavan, Wisconsin 53115

04-04 Homogenizers and Reciprocating Pumps

75 APV Gaulin (9/26/57)
500 Research Drive
Wilmington, Massachusetts 01887

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

657 Microfluidics International, 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 US by:
Niro Hudson, Inc.
1600 Country Road F
Hudson, Wisconsin 54016)

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

87 Waukesha Cherry-Burrell (12/29/57)
(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 Brenner Tank Mauston, Inc. (3/15/83)
N. 3760 Hwy. 12 & 16
Mauston, Wisconsin 53948

756 Beall Trailers of California (2/21/94)
1301 South Avenue
Turlock, California 95380-5108

70R Brenner Tank, Inc. (8/5/57)
450 Arlington Avenue, 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

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

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

653 Tremcar (10/10/91)
1, Tougas Street
Iberville, Quebec, Canada J2X 2P7
(US Rep.: Bay State Tr. & Tr.
527 Winthrop
Rehobeth, Massachusetts 02769)

25 Walker Stainless Equip. Co., Inc. (9/28/56)
625 State Street
New Lisbon, Wisconsin 53950

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

437 West-Mark (11/30/84)
2704 Railroad Avenue, P.O. Box 100
Ceres, California 95307

943 LBT Stainless, Inc. (11/11/97)
Route 5, Box 480
Manning, SC 29102

10-03 Milk and Milk Products Filters Using Disposable Filter Media

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

435 Sermia International (11/27/84)
771 Boul. Industriel
Blainville, Quebec
Canada J7C 3V3
(US Rep.: Edward W. Fox, Jr.
1200 Rolling Ridge Way, #403
Bloomington, Indiana 47403)

296 L. C. Thomsen, Inc. (8/25/77)
1303 43rd Street
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

880 AGC Engineering (6/7/96)
8869 SE 58th St. Avenue
Portland, Oregon 97206

365 APV Heat Exchanger AS (9/8/82)
Platinvej, 8
P.O. Box 329
DK-6000 Kolding
Denmark
(Not available in the USA)

20 APV Americas (9/4/56)
395 Fillmore Avenue
Tonawonda, New York 14150

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

17 Tetra Pak Engineering (8/30/56)
8400 Lake View Parkway
Pleasant Prairie, Wisconsin 53158
(Mfg. by: Alfa Laval Thermal
Lund, Sweden)

718 Babson Bros. Co. (3/8/93)
Dairy Systems Div.
1400 West Gale Avenue
Galesville, Wisconsin 54630

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

14 Chester-Jensen Co., Inc. (8/15/52)
5th & Tilghman Sts., P.O. Box 908
Chester, Pennsylvania 19016

791 The Coburn Co., Inc. (9/14/94)
834 E. Milwaukee Street, Box 147
Whitewater, Wisconsin 53190
(Mfg. by: Elmega S./L.
Apartado De Cerros, 1
Camino Vrejo De Mourelle, S/N
15840 [Santa Comba] La Coruna
Spain)

468 GEA Ecoflex North America, Inc. (2/2/86)
7150 Distribution Drive
Louisville, Kentucky 40258-2528
(Mfg. by: GEA Ahlborn GmbH Co.
P.O. Box 1180
Voss-Strasse 11/13
D-3203 Sarsted
Germany)

622 ITT Standard (2/25/91)
175 Standard Parkway
Cheektowaga, New York 14227

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

912 Pladot Ein Harod (4/3/97)
Kibbutz Ein Harod Meuhad
18965 Israel
(Mfg. by: A.P.V. Company, Ltd.
P.O. Box 4
Crawley-West Sussex RH 102QB
England)
(US Rep.: Norix-International L.T.D.
35 Monhegan Street
Clifton, New Jersey 07013)

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 API Schmidt-Bretten, Inc. (10/3/91)
2777 Walden Avenue
Buffalo, New York 14225

670 Flomax International, Ltd. (4/1/92)
2 Robert Street
P.O. Box 14537
Panmurie, Auckland
New Zealand
(US Rep.: Masport, Inc.
6140 McCormick Drive
Lincoln, Nebraska 68507)

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

885 Tranter, Inc. Texas Division (7/11/96)
1900 Old Burk Highway
Wichita Falls, Texas 76304

610 Universal Dairy Equipment (12/13/90)
11100 N. Congress Avenue
Kansas City, Missouri 64153
(Mfg. by: Alfa Laval Agri, Inc.
Kansas City, Missouri 64153-1296)

12-05 Tubular Heat Exchangers for Milk and Milk Products

886 API Ketema Heat Transfer Technology (7/16/96)
2300 W. Marshall Drive
Grand Prairie, Texas 75051

438 APV Americas Heat Transfer (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
20903 West Gale Avenue
Galesville, Wisconsin 54630-0659

605 Waukesha 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

824 DASI Industries, Inc. (3/17/95)
214 Sherlake Lane
Knoxville, Tennessee 37922
(Mfg. by: Sacome Incapsa
30001 Murcia Spain)

712 Enerquip, Inc. (2/24/93)
611 North Road
P.O. Box 467
Medford, Wisconsin 54451

889 FMC Corporation-FranRica Systems (9/5/96)
P.O. Box 30127
Stockton, California 95213-0127

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

217 Girton Manufacturing Co. (1/31/71)
P.O. Box 900
Millville, Pennsylvania 17846

616 ITT Standard (1/4/91)
175 Standard Parkway
Cheektowaga, New York 14227

711 Kusel Equipment Co. (2/24/93)
820 West Street
Watertown, Wisconsin 53094

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

96 C. E. Rogers Co. (3/31/64)
1895 Frontage Road, P.O. Box 118
Mora, Minnesota 55051

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

971 Hydro-Thermal Corporation (7/2/98)
400 Pilot Court
Wauseka, Illinois 53188

614 Tetra Pak Processing Systems (5/2/91)
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)

951 Thermaline, Inc. (1/30/98)
180 - 37th Street N.W.
Auburn, Washington 98001

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

13-09 Farm Milk Cooling and Holding Tanks

802 Refinox S.A. DE C.V. (11/10/94)
Ind. Torreon, Coah, Mexico
(US Rep.: James Read
M. E. Stainless
601 High Plain Drive
Bel Air, Maryland 21014)

49R Alfa Laval Agri, Inc. (12/5/56)
11100 North Congress Avenue
Kansas City, Missouri 64153

240 Babson Brothers Company (9/6/72)
Dairy Systems Division
P.O. Box 659
Galesville, Wisconsin 54630
(Mfg. by: Paul Mueller Co.
1600 West Phelps Street
Springfield, Missouri 65801)

4R Dairy Equipment Co. (6/15/56)
1919 S. Stoughton Road
Madison, Wisconsin 53708-8050

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
(Mfg. by: Alfa Laval Agri Inc.
Kansas City, Missouri 64153-1296)

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

132 APV Americas (10/26/60)
182 Wales Avenue
Tonawanda, New York 14150

277 Contherm, Inc. (8/19/76)
P.O. Box 352, 111 Parker Street
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 Road
Birmingham, Michigan 48011

273 Niro, Inc. (5/20/76)
Evaporator Division
9165 Rumsey Road
Columbia, Maryland 21045

107R C.E. Rogers Co. (7/31/58)
P.O. Box 118
1895 Frontage Road
Mora, Minnesota 55051

17-09 Formers, Fillers and Sealers of Single Service Containers for Fluid Milk and Fluid Milk Products

939 BWI KP Aerofill (10/16/97)
807 West Kimberly Road
Davenport, Iowa 52808-3848

382 SIG Combibloc, Inc. (4/15/83)
4800 Roberts Road
Columbus, Ohio 43228
(Mfg. by: PKL Verpackungsystems, Germany)

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

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

619 Hassia Verpackungsmaschinen GmbH (2/22/91)
Heerweg 19
D-63691 Ranstadt
Germany
(US Rep.: Hassia USA, Inc.
1210 Campus Drive West
Morganville, New Jersey 07751)

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

330 Milliken Packaging (8/26/80)
P.O. Box 736
White Stone, South Carolina 29353
(Mfg. by: Chubukkikai, Japan)

442 Milliken Packaging (3/21/85)
P.O. Box 736
White Stone, South Carolina 29386

137 Elopak, Inc. (10/17/62)
30000 South Hill Road
New Hudson, Michigan 48165

941 Oden Corporation (10/28/97)
255 Great Arrow Avenue
Buffalo, New York 14207-3024

989 PACK LINE, Ltd. (11/24/98)
4, Hapatish Street
Holon 58815
Israel
(US Rep.: Rabbeco, Inc.
2601 Miles Road
Warrensville Heights, Ohio 44128)

281 Purity Packaging Corp. (11/8/77)
800 Kaderly Road
Columbus, Ohio 43228
(Mfg. by: Purity Packaging Corp.
25 Aylmer Street
Peterborough, Ontario, Canada K9J 6Y8)

967 RAPAK (6/18/98)
20939 Cabot Boulevard
Hayward, California 94545

924 Robert Bosch GmbH (6/4/97)
P.O. Box 1127
D-71301
Waiblingen, Germany
(US Rep.: Robert Bosch Corporation
9890 Red Arrow Highway
Bridgman, Michigan 49106)

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
(US Rep.: Elopak, Inc.
30000 South Hill Road
New Hudson, Michigan 48165)

220 Tetra Rex, Inc. (4/24/71)
451 East Industrial Boulevard
Minneapolis, Minnesota 55413

351 Tetra Pak, Inc. (1/6/83)
1287 Barclay Blvd.
Buffalo Grove, IL 60089
(Mfg. by: A.B. Tetra
Italy)

694 IPFO International, Inc. (9/23/92)
275 Fountainebleau Boulevard, Suite 247
Miami, Florida 33172
(Mfg. by: Time Pack
GmbH, Weissensburg, Germany)

19-04 A1 Batch and Continuous Freezers for Ice Cream, Ices, and Similarly Frozen Dairy Foods, as Amended

141 Waukesha Cherry-Burrell (4/15/63)
P.O. Box 35600
Louisville, Kentucky 40232-5600

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

286 Tetra Pak Hoyer, Inc. (12/8/76)
P.O. Box 280
Lake Geneva, Wisconsin 53147
(Mfg. by: Tetra Pak Hoyer APS
Denmark)

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

22-07 Silo-type Storage Tanks for Milk and Milk Products

154 APV Americas – Lake Mills (2/10/65)
100 South CP Avenue
Lake Mills, Wisconsin 53551

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

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)
390 S. Redwood Street
Canby, Oregon 97013

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, Suite 41
Summerland, British Columbia V0H 1Z0
(Not available in the USA)

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

675 Stainless Fabrication, Inc. (4/22/92)
4455 W. Kearney
Springfield, Missouri 65803

165 Walker Stainless Equipment Co., Inc. (4/26/65)
625 State Street
New Lisbon, Wisconsin 53950

23-02 Equipment for Packaging Viscous Dairy Products

174 APV Crepaco (9/28/65)
A Division of APV North America, Inc.
100 South CP Avenue
Lake Mills, Wisconsin 53551-1799

902 A.T.S. Engineering, Inc. (1/10/97)
7270 Torbram Road, Unit 23
Mississauga, Ontario
Canada L4T 3Y7
(US Rep.: L and A Package Sales
356 Millstone Road
Clarksburg, New Jersey 08510
and Packaging Specialist
4500 Greenville Avenue
Dallas, Texas 75206)

366 AUTOPPROD, Inc. (9/15/83)
5355 - 115th Avenue N
Clearwater, Florida 33760

965 BENHIL-GASTI Verpack (5/27/98)
ungsmaschinen GmbH
JagenbergstraBe 1
D-41468 Neuss
Germany
(US Rep.: Autoprod, Inc.
5355 - 155th Avenue N
Clearwater, Florida 34620)

868 Cryovac Division (3/5/97)
W.R. Grace & Co-Conn
P.O. Box 464
Duncan, South Carolina 29223-0464

853 Elmar Industries (10/11/95)
200 Gould Avenue, P.O. Box 245
Buffalo, New York 14043-0245

674 Hayssen Manufacturing (4/20/92)
225 Spartangreen Boulevard
Duncan, South Carolina 29334

447 GEI International, Inc. (7/22/85)
700 Pennsylvania Drive
Exton, Pennsylvania 19341-0439

942 Oden Corporation (10/28/97)
255 Great Arrow Avenue
Buffalo, New York 14207-3024

870 Phoenix Engineering & Design Co. (3/22/96)
4634 Case Drive, P.O. Box 1467
Janesville, Wisconsin 53546

343 Tetra Pak Hoyer, Inc. (7/6/81)
P. O. Box 280
Lake Geneva, Wisconsin 53147
(Mfg. by: Alfa Hoyer, Denmark)

679 Consolidated Biscuit Co. (6/1/92)
312 Rader Road
McComb, Ohio 45858

635 Interbake Dairy Ingredients Div. (7/10/91)
2821 Emerywood Parkway, Suite 210
Richmond, Virginia 23294

760 Jordan Manufacturing, Inc. (2/23/94)
1688 County Road 192
Crossville, Alabama 35962

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

990 PACK LINE, Ltd. (11/24/98)
4, Hapatish Street
Holon 58815
Israel
(US Rep.: Rabbeco, Inc.
2601 Miles Road
Warrensville Heights, Ohio 44128)

666 RapidPak (3/5/92)
2530 West Everett Street
Appleton, Wisconsin 54914-4958

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

222 Sweetheart Packaging (11/15/71)
10100 Reistertown Road
Owing Mills, Maryland 21117

891 World Cup Packaging Corporation (9/20/96)
777 Progressive Lane
South Beloit, Illinois 61080

24-02 Non-coil Type Batch Pasteurizers

158 APV Americas - Lake Mills (3/24/65)
100 South CP Avenue
Lake Mills, Wisconsin 53551-1799

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

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

878 Walker Stainless Equipment (5/14/96)
625 State Street
New Lisbon, Wisconsin 53950

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

159 APV Americas - Lake Mills (3/24/65)
100 South CP Avenue
Lake Mills, Wisconsin 53551-1799

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

725 Inox-Tech, Inc. (4/14/93)
6705 Route 132
Ville Ste-Catherine
Quebec, Canada J0L 1E0
(US Rep.: Michael Ripka, Pres.
Bionex
12615 E. Meridian Avenue
Payallup, Washington 98373)

710 Lee Industries, Inc. (2/10/93)
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 65803

837 Viatec Process Incorporated (7/10/95)
500 Reed Street
Belding Michigan 48809

202 Walker Stainless Equip. Co., Inc. (9/24/68)
625 State Street, 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)
35 Sherman Street
Muncy, Pennsylvania 17756

363 Kason Corp. (7/28/82)
67-71 East Willow Street
Millburn, New Jersey 07041

430 Midwestern Industries, Inc. (10/11/84)
915 Oberlin Road, P.O. Box 810
Massillon, Ohio 44648-0810

185 Rotex, Inc. (8/10/66)
1230 Knowlton Street
Cincinnati, Ohio 45223

656 Separator Engineering, Ltd. (11/4/91)
810 Ellingham Street
Pointe Clair, Quebec, Canada H9R 3S4
(US Rep.: Kason Corp.
1301 E. Linden Avenue
Linden, New Jersey 07036)

172 Sweco, Inc. (9/1/65)
(Division of Emerson Electric Company)
7120 Buffington Road
Florence, Kentucky 41042

27-03 Equipment for Packaging Dry Milk and Dry Milk Products

353 All-Fill, Inc. (3/2/82)
418 Creamery Way
Exton, Pennsylvania 19341

935 Bossar S.A. (8/8/97)
Poligono Industrial Roca
C/. San Marti s/n.
08100 Martorelles
(Barcelona)
Spain
(US Rep.: Hayssen Manufacturing Co.
225 Spartangreen Blvd.
Duncan, South Carolina 29334)

831 Custom Equipment Design (5/9/95)
1057 Highway 80 East, P.O. Box 4807
Monroe, Louisiana 71203

618 Hayssen Manufacturing Company (2/18/91)
225 Spartangreen Boulevard
Duncan, South Carolina 29334
(Mfg. by: Yamato Scale Co.
Akasi, 673, Japan)

625 Ishida Company, Ltd. (4/2/91)
44, Sanno-Cho, Shogoin
Sakyo-Ku, Kyoto, Japan
(US Rep.: Heat & Control
21121 Cabot Blvd.
Hayward, California 94545-1132)

922 Ishida Co., Ltd. (5/9/97)
44 Sanno-Cho, Shogoin
Sakyo-Ku
Kyoto, Japan
(US Rep.: Heat & Control, Inc.
21121 Cabot Boulevard
Hayward, California 94545-1132)

409 GEI International, Inc. (10/31/83)
700 Pennsylvania Drive
Exton, Pennsylvania 19341-0439

905 Pacmac, Inc. (2/13/97)
1161 Armstrong Avenue
P.O. Box 360
Fayetteville, Arkansas 72702-0360

895 Spiroflow-Orthos Systems, Inc. (11/27/96)
2806 Gray Fox Road
Monroe, North Carolina 28110

497 Triangle Package Machinery Co. (2/26/87)
6655 West Diversey Avenue
Chicago, Illinois 60635

28-03 Flow Meters for Milk and Milk Products

270 ABB Instrumentation, Inc. (2/9/76)
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

884 Bailey-Fischer & Porter GmbH (7/12/96)
Dransfeld Strasse, Gottingen 37079
Germany
(US Rep.: Bailey-Fischer & Porter
125 E. County Line Road
Warminster, Pennsylvania 18974)

956 Blancett Fluid Flow Meters (3/19/98)
100 E. Felix Street South, Suite 190
Fort Worth, Texas 76115-3548

979 Bopp & Reuther Messtechnik GmbH (9/9/98)
Carl-Reuther Strasse 1
D-68305 Mannheim
Germany
(US Rep.: Metron Technology
2005 - 10th Street
Boulder, Colorado 80302)

359 Brooks Instrument Division (6/11/82)
407 West Vine Street
Hatfield, Pennsylvania 19440
(Mfg. by: Fisher-Rosemount Technologies de Flujo S.A. de C.V.
Avenida Miguel de Cervantes 111
Complejo Industrial Chikuahua
Chihuahua, Chihuahua
31109 Mexico)

660 Danfoss A/S (11/20/91)
DK-6430
Nordborg, Denmark
(US Rep.: Danfoss Electronics
2995 Eastrock Drive
Rockford, Illinois 61109)

950 Delta M Corp. (1/19/98)
1003 Larsen Drive
Oak Ridge, Tennessee 37830

692 Endress & Hauser Flowtec AG (9/14/92)
Kägenstrasse 7
CH - 4153 Reinach, Switzerland
(US Rep.: Endress & Hauser, Inc.
2350 Endress Place
Greenwood, Indiana 46143)

226 Bailey Fischer & Porter Co. (12/9/71)
125 E. County Line Road
Warminster, Pennsylvania 18974

477 Flowdata, Inc. (7/31/86)
1817 Firman Drive
Richardson, Texas 75081-1826

506 FTI (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. (3/4/93)
3800 Camp Creek Parkway
Ste. 102, Bldg. 2400
Atlanta, Georgia 30331

649 Geo Technology Corporation (10/2/91)
12312 E. 60th Street
Tulsa, Oklahoma 74146

661 Alfa Laval Flow, Inc. (11/21/91)
G & H Division
8201 - 104th Street, P.O. Box 581909
Pleasant Prairie, Wisconsin 53158-0909

630 Halliburton Services (5/28/91)
Drawer 1431
Duncan, Oklahoma 73536-0346

574 Aaliant (10/12/89)
150 Venture Boulevard
P.O. Box 4585
Spartanburg, South Carolina 29305

512 Hoffer Flow Controls, Inc. (8/17/87)
107 Kitty Hawk Lane
Elizabeth City, North Carolina 27909-4585

744 Honeywell IAC (11/16/93)
1100 Virgina Drive
Fort Washington, Pennsylvania 19034
(Mfg. by: Yamatake Corporation
Shonan Factory, 500 Ohmagari
Shamukawa-Cho Koya-gun
Kanagawa 253-01 Japan)

733 Honeywell, Inc. (5/18/93)
16404 Black Canyon Highway
Phoenix, Arizona 85023-3095
(Mfg. by: Endress & Hauser Flowtec AG
CH-4153 Reinach
Switzerland)

265 Flow Automation (3/10/75)
9303 Sam Houston Parkway South
Houston, Texas 77099-5298

535 FMC Invalco, Inc. (7/12/88)
(An FMC Corporation Subsidiary)
P.O. Box 1183
Hutchinson, Kansas 67504

764 Yokogawa Industrial Automation America Inc. (4/22/94)
4 Dart Road
Newnan, Georgia 30265-1040
(Mfg. by: Yokogawa Electric Corp.
2-9-32 Nakacho
Musashino-shi, Tokyo, 180 Japan)

840 KOBOLD Instr. Inc. (7/17/95)
1801 Parkway View Drive
Pittsburgh, Pennsylvania 15205
(Mfg. by: KOBOLD Messring GmbH
Frankfort HRB 29376
Germany)

871 KOBOLD Instr. Inc. (3/28/96)
1801 Parkway View Drive
Pittsburgh, Pennsylvania 15205
(Mfg. by: Flowdata, Inc.
1817 Firman Drive
Richardson, Texas 75081-1826)

529 KROHNE, Inc. (5/18/88)
7 Dearborn Road
Peabody, Massachusetts 01960
(Mfg. by: Altometer, Holland)

755 Liquid Controls LLC (2/21/94)
105 Albrecht Drive
Lake Bluff, Illinois 60044
(Mfg. by: Processautomatic
Box 117
61070 Vagnharad, Sweden)

972 Liquid Controls, LLC (7/21/98)
105 Albrecht Drive
Lake Bluff, Illinois 60044-2242
(Mfg. by: Rheonik Messgerate GmbH
Rudolph-Diesel-Str. 5
D-85235 Odelzhausen, Germany)

778 Magnetrol Intl., Inc. (7/27/94)
5300 Belmont Road
Downers Grove, Illinois 60515

378 Micro Motion, Inc. (2/16/83)
7070 Winchester Circle
Boulder, Colorado 80301

932 Nitto Seiko Co., Ltd. (7/31/97)
623 Japan, 30
Nobu-Cho
Ayabe Kyoto
(Mfg. by: Endress & Hauser Flowtec AG
CH-4153 Reinach
Kagenstrasse 7
Switzerland)
(US Rep.: Endress & Hauser Flowtec AG
Division USA
2350 Endress Place
P.O. Box 246-1
Greenwood, Indiana 46142)

938 norax, L.L.C. (10/16/97)
8809 Industrial Drive
Franksville, Wisconsin 53126

729 Peek Measurement, Ltd. (4/14/93)
Kings Worthy, Winchester
Hampshire, England S023 7QA
(US Rep.: Peek Measurement
10335 Landsbury, Ste. 300
Houston, Texas 77099-3407)

490 Rosemount, Inc. (1/8/87)
12001 Technology Drive
Eden Prairie, Minnesota 55344
(Mfg. by: Fisher-Rosemount
Technological de Flujo
S. A. de C. V.
Chihua, Chihuahua
31109 Mexico

585 Solartron (12/7/89)
11321 Richmond Avenue
Houston, Texas 77082-2615
(Mfg. by: Solartron, England)

587 Schlumberger Ind., Measurement Div. (12/18/89)
1310 Emerald Road
Greenwood, South Carolina 29646
(Mfg. by: Schlumberger, France)

550 Sparling Instruments Co., Inc. (10/26/88)
4097 N. Temple City Boulevard
P.O. Box 5988
El Monte, California 91731

715 Thermal Instrument Co. (2/25/93)
217 Sterner Mill Road
Trevose, Pennsylvania 19053

803 Turck, Inc. (11/18/94)
3000 Campus Drive
Plymouth, Minnesota 55441-2656
(Mfg. by: EGE - Eletronik
Ravensberg 34
D-24214 Gehorf
Germany)

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 Alfa Laval FLow, Inc. (11/21/91)
G & H Division
8201 - 104th Street, P.O. Box 581909
Pleasant Prairie, Wisconsin 53158-0909

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 Americas – Lake Mills (6/15/77)
100 South CP Avenue
Lake Mills, Wisconsin 53551

323 Waukesha Cherry-Burrell (7/26/79)
Process Equipment Division
P.O. Box 35600
Louisville, Kentucky 40232-5600

274 Contherm, Inc. (6/25/76)
111 Parker Street
Newburyport, Massachusetts 01950

496 FMC Corp.
Fran Rica Systems (2/23/87)
P.O. Box 30127
Stockton, California 95213-0127

361 N.V. Terlet (7/12/82)
P.O. Box 62
7200 AB Zutphen
Netherlands
(US Agent Manning & Lewis-NJ)

964 Schroder GmbH & Co. KG (5/27/98)
Falkenstr. 51-57
D-23564, Lubeck
Germany
(US Rep.: Schroder N.A. Corp.
12780 Westlinks Drive
Fort Myers, Florida 33913)

32-02 Uninsulated Tanks for Milk and Milk Products

397 APV Americas – Lake Mills (6/21/83)
100 South CP Avenue
Lake Mills, Wisconsin 53551

268 DCI, Inc. (11/21/75)
600 No. 54th Avenue, P.O. Box 1227
St. Cloud, Minnesota 56301

708 Lee Industries, Inc. (1/12/93)
P.O. Box 688
Phillipsburg, Pennsylvania 16866

844 Paul Mueller Co. (8/24/95)
1600 West Phelps Street
Springfield, Missouri 65801

354 C.E. Rogers Co. (3/3/82)
1895 Frontage Road, P.O. Box 118
Mora, Minnesota 55051

683 SANIFAB (7/9/92)
A Division of A&B Process Systems Corp.
P.O. Box 86
Stratford, Wisconsin 54484

441 Scherping Systems (3/1/85)
801 Kingsley Street
Winsted, Minnesota 55395

852 Viatec, Inc. (10/18/95)
1220 State Street
Hastings, Michigan 49058

339 Walker Stainless Equip. Co., Inc. (6/2/81)
625 State Street
New Lisbon, Wisconsin 53950

33-01 Polished Metal Tubing for Dairy Products

310 Allegheny Bradford Corp. (7/19/78)
P.O. Box 200 Route 219 South
Bradford, Pennsylvania 16701

812 A.T.I. s.r.l. (1/26/95)
Viale Resegone 7
22036 Erba (Como)
Italy
(US Rep.: Norca Corporation
185 Great Neck Road
Great Neck, New York 11022)

413 Azco, Inc. (12/8/83)
P.O. Box 567
Appleton, Wisconsin 54912

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

308 Rath Manufacturing Co., Inc. (6/20/78)
2505 Foster Avenue
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 the USA)

776 TGPRO (7/18/94)
Bangkok, Thailand
(US Rep.: Kurt Orban Partners
Kurt Orban
450 Kings Road
Brisbane, California 94005)

775 Trent Tube (7/18/94)
P.O. Box 77
East Troy, Wisconsin 53120

289 Tri-Clover, Inc. (1/21/77)
9201 Wilmot Road
Kenosha, Wisconsin 53141

331 United Industries, Inc. (10/23/80)
1546 Henry Avenue
Beloit, Wisconsin 53511

34-02 Portable Bins

916 Custom Metalcraft, Inc. (4/17/97)
2332 East Division
P.O. Box 10587 GS
Springfield, Missouri 65808

647 Thomas Conveyor Company (9/18/91)
Tote System Division
P.O. Box 2916
Fort Worth, Texas 76113-2916

35-00 Continuous Blenders

869 ADMIX, Inc. (3/14/96)
234 Abby Road
Manchester, New Hampshire 03103-3332

527 Arde Barinco, Inc. (3/15/88)
500 Walnut Street
Norwood, New Jersey 07648

590 Chemineer, Inc. (1/23/90)
125 Flagship Drive
North Andover, Massachusetts 01845

417 Waukesha Cherry-Burrell (2/7/84)
Process Equipment Division
P.O. Box 35600
Louisville, Kentucky 40232-5600

825 GEI International, Inc. (3/30/95)
700 Pennsylvania Drive
Exton, Pennsylvania 19341
(Mfg. by: Machines Collette N.V.
Keerbaan 70
B-2160 Wommelgem
Belgium)

914 International Mixing Tech. s.a.r.l. (4/9/97)
469 Avenue Louis Herbeaux
F-59240 Dunkerque
France
(US Rep.: I.M.T. USA
6946 Paseo Laredo
San Diego, California 92037)

642 Mondomix B.V. (8/7/91)
Reeweg 13
P.O. Box 98
1394 ZH Nederhorst den Berg
The Netherlands
(US Rep.: Mondomix
1 West Illinois Street, Suite 300
St. Charles, Illinois 60174)

680 Quadro Engineering, Inc. (6/3/92)
613 Colby Drive
Waterloo, Ontario
Canada N2V 1A1
(US Rep.: Quadro, Inc.
55 Bleeker Street
Milburn, New Jersey 07041-1414)

766 Semi-Bulk Systems (4/28/94)
159 Cassens Court
Fenton, Missouri 63026-2543

724 Silverson Machines, Inc. (4/14/93)
P.O. Box 589
355 Chestnut Street
East Longmeadow, Massachusetts 01028
(Mfg. by: Silverson Machines
Chesham, England)

36-00 Colloid Mills

808 Boston Shearpump, Inc. (12/16/94)
170 Linden Street
Wellesley, Massachusetts 02181-7919

846 IKA Works, Inc. (9/7/95)
2635 North Chase Parkway, S.E.
Wilmington, North Carolina 28405-7499

915 IKA Works, Inc. (4/17/97)
2635 North Chase Parkway, S.E.
Wilmington, North Carolina 28405-7499

608 Kinematica, Inc. (10/17/90)
19 Normandy Road
Newton, Massachusetts 02166
(Mfg. by: Kinematica AG
CH-6014 Littau/Lucerne, Switzerland)

293 Waukesha Cherry-Burrell (8/25/77)
611 Sugar Creek Road
Delavan, Wisconsin 53115

38-00 Cottage Cheese Vats

541 Kusel Equipment Company (9/16/88)
820 West Street
Watertown, Wisconsin 53094

385 Stoelting, Inc. (5/5/83)
502 Highway 67
Kiel, Wisconsin 53042-1600

40-01 Bag Collectors for Dry Milk and Dry Milk Products

381 Marriott Walker Corp. (4/12/83)
925 E. Maple Road
Birmingham, Michigan 48809

456 C. E. Rogers Company (9/25/85)
P.O. Box 118
Mora, Minnesota 55051

41-01 Mechanical Conveyors

631 Flexicon Corporation (5/28/91)
1375 Stryker's Road
Phillipsburg, New Jersey 08865

894 Spiroflow-Orthos Systems, Inc. (11/5/96)
2806 Gray Fox Road
Monroe, North Carolina 28110

42-01 In-Line Strainers

855 Flowtech Inc. (10/30/95)
1701 Spinks Drive S.E.
Marietta, Georgia 30067-8925

655 Tri-Clover, Inc. (10/23/91)
9201 Wilmot Road
Kenosha, Wisconsin 53141

606 Waukesha Cherry-Burrell (9/18/90)
611 Sugar Creek Road
Delavan, Wisconsin 53115

44-02 Air Hydraulically or Mechanically Driven Diaphragm Pumps

958 American LEWA, Inc. (4/15/98)
132 Hopping Brook Road
Holliston, Massachusetts 01746-1499
(Mfg. by: LEWA-Herbert Ott GmbH & Co.
P.O. Box 1563
Ulmer Strasse 10
D-71229, Leonburg
Germany)

959 American LEWA, Inc. (4/15/98)
132 Hopping Brook Road
Holliston, Massachusetts 01746-1499
(Mfg. by: LEWA-Herbert Ott GmbH & Co.
P.O. Box 1563
Ulmer Strasse 10
D-71229, Leonburg
Germany)

937 Versa-Matic Pump Company (9/18/97)
6017 Enterprise Drive
Export, Pennsylvania 15632-8969

713 Warren Rupp, Inc., A Unit of IDEXX Corp. (2/5/93)
800 North Main Street
P.O. Box 1568
Mansfield, Ohio 44905

833 Wilden Pump & Engr. Co. (6/22/95)
22069 Van Buren Street
Grand Terrace, California 92313-5651

805 Tri-Clover (11/18/94)
9201 Wilmont Road
Kenosha, Wisconsin 53141
(Mfg. by: KWW
Dusseldorf, Germany)

45-00 Cross Flow Membrane Modules

807 CeraMem Separations (11/30/94)
20 Clematis Avenue
Waltham, Massachusetts 02154

786 North Carolina SRT, Inc. (9/24/94)
221 James Jackson Avenue
Cary, North Carolina 27513
(Mfg. by: Tohshin Seiko Co., Ltd.
42-2 Aza Shinmei Tazawa Ohkuma
Watari-Cho, Watari-Gun
Miyagi 889-23 Japan)

46-01 Refractometers and Optical Sensors

981 AW Company (9/16/98)
8809 Industrial Drive
Franksville, Wisconsin 53126-9337

785 Bran & Lubbe, Inc. (9/2/94)
1025 Busch Parkway
Buffalo Grove, Illinois 60089
(Mfg. by: Bran & Lubbe
Norderstdt
GMbH [Germany])

955 Brimrose Corp. of America (3/17/98)
5020 Campbell Boulevard
Baltimore, Maryland 21236-4968

859 The Electron Machine Corp. (11/4/95)
15820 CR 450 West
P.O. Box 2345
Umatilla, Florida 32784

800 Epsilon Industrial Inc. (10/24/94)
2215 Grand Avenue Parkway
Austin, Texas 78728

783 James C. Camp (9/2/94)
dba Advantec Process Systems
95 Wyngate Drive
Newnan, Georgia 30265
(Mfg. by: BTG Inc.
2364 Park Central Boulevard
Decatur, Georgia 30035-3987)

940 K-Patents OY (10/23/97)
P.O. Box 77
Fin-01511
Vantaa, Finland
(US Rep.: K-Patents, Inc.
1804 Centre Pointe Circle, Suite 106
Naperville, Illinois 60563)

697 Liquid Solids Control, Inc. (10/21/92)
P.O. Box 259
Farm Street
Upton, Massachusetts 01568

751 Maselli Misure S.p.A. (1/20/94)
Via Baganza, 4/3
43100 Parma, Italy
(US Rep.: Maselli Measurements, Inc.
P.O. Box 7571
7746 Lorraine Avenue
Stockton, California 95267)

921 optek-Danulat Inc. (4/30/97)
279 South 17th Avenue, Suite 10
West Bend, Wisconsin 53095
(Mfg. by: optek-Danulat, Inc.
HaedenkampstraBe 18
D-45143 Essen
Germany)

767 Foss NIR Systems, Inc. (6/6/94)
12101 Tech Road
Silver Spring, Maryland 20904

750 PT Papertech, Inc. (1/20/94)
#301 - 2609 Westview Drive
North Vancouver
B. C. Canada V7N 4M2
(US Rep.: BD Services Corporation
300 North Commercial Street
Bellingham, Washington 98227)

919 Foss NIR Systems, Inc. (4/24/97)
12101 Tech Road
Silver Spring, Maryland 20904

742 Reflectronics, Inc. (9/15/93)
3009 Montavesta Road
Lexington, Kentucky 40502

47-00 Pumps for Cleaning & Sanitizing Solutions

897 Ampco Pumps Company (12/10/96)
4000 West Burnham Street
Milwaukee, Wisconsin 53215

50-00 Level Sensing Devices

705 Bindicator Company (12/29/92)
1915 Dove Street
Port Huron, Michigan 48060

51-00 (Formerly 08-17R) Plug-Type Valves

787 Cipriani, Inc. (8/27/91)
Tassalini S.P.A.
23195 LaCadena Drive, Suite 103
Laguna Hills, California 92653

772 Alfa Laval Flow, Inc. (6/10/57)
G & H Division
8201 - 104th Street, P.O. Box 581909
Pleasant Prairie, Wisconsin 53158-0909

780 L. C. Thomsen, Inc. (8/31/57)
1303 - 43rd Street
Kenosha, Wisconsin 53140

239 LUMACO (6/3/72)
9-11 East Broadway
Hackensack, New Jersey 07601

788 Puriti, S.A. De C. V. (9/12/72)
Alfredo Nobel No. 39
Fracc. Ind. Pte. de Vigas
Tlalnepantha, Mexico
(US Rep.: Waukesha Cherry-Burrell
611 Sugar Creek Road
Delavan, Wisconsin 53115)

781 Robert James Sales, Inc. (8/31/94)
699 Hertel Avenue, Suite 260
Buffalo, New York 14207

357 Tanaco Products (4/15/82)
3860 Loomis Trail Road
Blaine, Washington 98230

777 Tech Control Ent. (8/2/85)
3725 N. Murray Road
Otis Orchard, Washington 99027
(Mfg. by: Tech Control, Taipei, Taiwan)

790 Tri-Clover, Inc. (10/15/56)
9201 Wilmont Road
Kenosha, Wisconsin 53141-1413

759 VNE Corporation (3/16/78)
1149 Barberry Drive
Janesville, Wisconsin 53545

761 Waukesha Cherry-Burrell (12/17/57)
611 Sugar Creek Road
Delavan, Wisconsin 53115

52-01 (Formerly 08-17H) Thermoplastic Plug Type Valves

907 L"A"UFER International AG (2/25/97)
Finkenweg 2
D-88709
Meersburg, Germany
(US Rep.: M. G. Newell Corporation
115 N. 20th Street
Tampa, Florida 33605)

577 Ralet-Defay (11/2/89)
66, Boulevard Poincare
1070 Brussels, Belgium
(US Agent GENICANAM, Chazy, New York)

53-00 (Formerly 08-17A) Compression Type Valves

484 APV Americas - Lake Mills (10/22/86)
100 South CP Avenue
Lake Mills, Wisconsin 53551-1799

952 APV Fluid Handling-America (1/30/98)
100 South CP Avenue
Lake Mills, Wisconsin 53551-1799
(Mfg. by: APV Fluid Handling Horsens A/S
Temevej 61-63
DK-8700 Horsens
Denmark)

730 APV Americas - Lake Mills (4/21/93)
100 South CP Avenue
Lake Mills, Wisconsin 53551-1799

552 APV Americas - Lake Mills (11/23/57)
100 South CP Avenue
Lake Mills, Wisconsin 53551-1799

245 Babson Brothers Company (2/12/73)
Dairy System Division
P.O. Box 659
20903 West Gale Avenue
Galesville, Wisconsin 54630
(Mfg. by: Superior Stainless, Inc.
611 Sugar Creek Road
Delavan, Wisconsin 53115)

443 Badger Meter, Inc. (4/30/85)
6116 East 15th Street
Tulsa, Oklahoma 74112

686 Bardiani Valvole S.R.L. (8/3/92)
Via G. Vittorio, 30/B
43045 Fornovo (PR) Italy
(US Rep.: Sanchelima Int.
1763 Northwest 93rd Avenue
Miami, Florida 33172)

538 Cipriani, Inc.-Tassalina S.P.A. (7/31/88)
23195 La Cadena Drive, Suite 103
Laguna Hills, California 92653
(Mfg. by: Fratelli Tassalini, Italy)

716 Conexiones Inoxidables (3/4/93)
de Puebla S.A. de C.V.
Vicente Guerrero No. 211
Xicotepec de Juarez
Edo, Puebla Mexico
(US Rep: Ben Dolphin Consulting
4735 Lansing Drive
North Olmsted, Ohio 44070)

376 Defontaine of America, Inc. (1/25/83)
16720 W. Victor Road
New Berlin, Wisconsin 53151
(Mfg. by: Defontaine S.A. - Dept. Definox
3, rue Louis Renault - BP 329
44803 Saint-Herblain Cedex
France)

530 Alfa Laval Flow, Inc. (5/31/88)
G & H Division
8201 - 104th Street, P.O. Box 581909
Pleasant Prairie, Wisconsin 53158-0909
(Mfg. by: Alfa Laval LKM ApS
Albuen 31, Box 802
DK-6000 Kolding, Denmark)

607 FLOWSERVE Corporation (9/25/90)
510 Parkway View Drive
Pittsburgh, Pennsylvania 15205-1410
(Mfg. by: FLOWSERVE Corporation
Manderscheidtstr. 19
45141 Essen 1, Germany)

570 LUMACO (8/9/89)
9-11 East Broadway
Hackensack, New Jersey 07601

881 MTS Milchtechnik AG (6/14/96)
Saint Galler Strasse 19
CH-9042
Speicher AR
Switzerland
(US Rep.: Mr. James Lucas
Lucas & Associates
642 Alvarado St., #306
San Francisco, California 94114)

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
(Not Available in the USA)

551 Puriti, S.A. de C.V. (9/12/72)
Alfredo Nobel 39
Fracc. Ind. Puente de Vigas
Tlalnepantla, Mexico
(US Rep.: Waukesha Cherry-Burrell
611 Sugar Creek Road
Delavan, Wisconsin 53115)

149R Q-Controls (5/18/64)
Subsidiary of Cesco Magnetics
93 Utility Court
Rohnert Park, California 94928

978 Relco Unisystems Corporation (8/31/98)
2281 - 3rd Avenue SW, P.O. Box 1689
Willmar, Minnesota 56201

748 Richards Industries Valve Group (1/11/94)
3170 Wasson Road
Cincinnati, Ohio 45209-2381

762 Stainless Products, Inc. (12/18/80)
1649 - 72nd Avenue
Somers, Wisconsin 53171-0169

806 Steri Technologies, Inc. (11/23/94)
857 Lincoln Avenue
Bohemia, New York 11716
(Mfg. by: Aseptomag AG
Bachweg 3, Postfach 415
CH-3401 Burgdorf
Switzerland)

804 Sudmo North America, Inc. (11/18/94)
4786 Colt Road
Rockford, Illinois 61109
(Mfg. by: Sudmo Schleicher AG
Industriester 7 D-73469
Reisburg, Germany)

823 Sudmo North America, Inc. (3/17/95)
4786 Colt Road
Rockford, Illinois 61109
(Mfg. by: Sudmo Schleicher AG
Industiester 7 D-73469
Riesburg, Germany)

954 Taylor Valve Technology (2/25/98)
8300 S.W. 8th Street
Oklahoma City, Oklahoma 73128

542 L.C. Thomsen, Inc. (8/31/88)
1303-43rd Street
Kenosha, Wisconsin 53140

34A Tri-Clover, Inc. (10/15/56)
9201 Wilmot Road
Kenosha, Wisconsin 53141

467 Tuchenhagen North America, Inc. (1/13/86)
9165 Rumsey Road
Columbia, Maryland 21045
(Mfg. by: Otto Tuchenhagen, West Germany)

561 VACU-PURG, Inc. (1/26/89)
214 West Main Street
P.O. Box 159
Fredericksburg, Iowa 50630

584 Valvinox, Inc.-SGRM Division (11/27/89)
650 1ere Rue.
Iberville-QUE-Canada J2X 3B8
(Not Available in the USA)

796 VNE Corp. (10/11/94)
1149 Barberry Drive
Janesville, Wisconsin 53547
(Mfg. by: EGMO LTD.
1 Hayotsrim, P.O. 266
Nahariya, Israel)

555 Waukesha Cherry-Burrell (12/11/57)
611 Sugar Creek Road
Delavan, Wisconsin 53115

54-02 (Formerly 08-17B) Diaphragm-Type Valves

565 APV Americas - Lake Mills (10/22/86)
100 South CP Avenue
Lake Mills, Wisconsin 53551-1799
(Mfg. by: APV Rosista, Inc., W. Germany & Denmark)

877 APV Americas – Lake Mills (5/14/96)
100 South CP Avenue
Lake Mills, Wisconsin 53551-1799

980 APV Fluid Handling America (9/15/98)
100 South CP Avenue
Lake Mills, Wisconsin 53551-1799
(Mfg. by: APV
Una, Germany
and Horsens, Denmark)

615 AsepCo (1/4/91)
1101 San Antonio Road, #301
Mountain View, California 94043

814 Burkert Contromatic Corporation (2/2/95)
2602 McGaw Avenue
Irvine, California 92714
(Mfg. by: Buerkert Steuer-Und Regeltechnik
Christian-Buerkert-Str 13-17
D-74653 Ingelfinger
Germany)

953 Burkert Contromatic Corporation (2/2/98)
2602 McGaw Avenue
Irvine, California 92614
(Mfg. by: Bukert & Cie
B.P. 21
Triembach au Val
F67220 Ville
France)

745 Cashco, Inc. (12/9/93)
P.O. Box 6, Hwy. 140 West
Ellsworth, Kansas 67439-0006

617 Defontaine of America, Inc. (2/1/91)
16720 W. Victor Road
New Berlin, Wisconsin 53151
(Mfg. by: Defontaine S.A. - Dept. Definox
3, rue Louis Renault - BP 329
44803 Saint-Herblain Cedex
France)

856 Flowtech, Inc. (10/30/95)
1900 Lake Park Drive, No. 345
Smyrna, Georgia 30080

637 Gemu Valves, Inc. (7/10/91)
3800 Camp Creek Parkway
Bldg. 2600, Suite 110
Atlanta, Georgia 30331

514 H. D. Bauman Inc. (8/24/87)
35 Mirona Road
Portsmouth, New Hampshire 03801-5317

203R ITT Engineered Valves (11/27/68)
33 Centerville Road
Lancaster, Pennsylvania 17603-2064

55-01 Boot Seal Valves for Milk & Milk Products

821 Keofitt A/S (3/17/95)
Snaremosvej 27
DK-7000 Fredericia
Denmark
(US Rep.: Keofitt, Inc.
c/o Leman
2920-3000 Wolff Street
Racine, Wisconsin 53404

56-00 (Formerly 08-17E) Inlet and Outlet Leak-Protector Plug Valve

34E Tri-Clover, Inc. (10/15/56)
9201 Wilmot Road
Kenosha, Wisconsin 53141

57-01 (Formerly 08-17F) Tank Outlet Valve

531 Alfa Laval Flow, Inc. (5/31/88)
G & H Division
8201 - 104th Street, P.O. Box 581909
Pleasant Prairie, Wisconsin 53158-0909

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

843 APV Americas-Lake Mills (8/24/95)
100 South CP Avenue
Lake Mills, Wisconsin 53551

986 CME (10/26/98)
No. 21, Alley 6, Lane 71
Lin-Sen Road
Taoyuan, Taiwan
(US Rep.: Bradford Cast Metals
P.O. Box 33
Elm Grove, Wisconsin 53122)

691 Defontaine of America, Inc. (9/19/92)
16720 W. Victor Road
New Berlin, Wisconsin 53151
(Mfg. by: Defontaine S.A. - Dept. Definox
3, rue Louis Renault - BP 329
44803 Saint-Herblain Cedex
France)

835 Alfa Laval Flow, Inc. (6/22/95)
G & H Division
8201 - 104th Street, P.O. Box 581909
Pleasant Prairie, Wisconsin 53158-0909
(Mfg. by: Alfa Laval LKM ApS
Albuen 31, Box 802
DK-6000 Kolding, Denmark)

968 SINMAG FITTING CORPORATION (7/2/98)
6F, No. 23, Wu-Chuang 6th Road
Wu-Ku Hsiang
Taipei Hsien, Taiwan
(US Rep.: MarketNet
2241 Quebec Avenue South
St. Louis Park, Minnesota 55426)

834 Stanfos, Inc. (6/22/95)
3908 - 69th Avenue
Edmonton, Alberta
Canada T6B 2V2
(US Rep.: Andron Stainless Corporation
8901 Farrow Road, Suite 101
Columbia, South Carolina 29203)

857 Steel & O'Brien, Mfg. Co. (10/30/95)
12850 Route 39
Sardinia, New York 14134

689 VNE Corporation (8/17/92)
1149 Barberry Drive
Janesville, Wisconsin 53547

908 Waukesha Cherry-Burell (4/25/97)
611 Sugar Creek Road
Delavan, Wisconsin 53115

59-00 (Formerly 08-17D) Automatic Positive Displacement Sampler

291 Accurate Metering Systems Inc. (6/22/77)
(Mfg. by: Diessel, Germany)
1650 Wilkening Court
Schaumburg, Illinois 60173

284 Bristol Equipment Co. (11/18/76)
210 Beaver Street
P.O. Box 696
Yorkville, Illinois 60560-0696

60-00 (Formerly 08-17G) Rupture Discs

407 Continental Disc Corp. (10/14/83)
3160 W. Heartland Drive
Liberty, Missouri 64068

854 Fike Metal Prod. (10/17/95)
Div. Fike Corp.
704 South 10th Street
Blue Springs, Missouri 64015

892 Oklahoma Safety Equipment Company (10/11/96)
(OSECO)
1701 West Tacoma
Broken Arrow, Oklahoma 74012

61-00 (Formerly 08-17I) Steam Injected Heaters

728 APV Americas (4/14/93)
Heat Transfer Division
395 Fillmore Avenue
Tonawanda, New York 14150

811 Hydro-Thermal Corporation (1/1/95)
400 Pilot Court
Waukesha, Wisconsin 53188

991 Komax Systems, Inc. (11/30/98)
508 East E Street
Wilmington, California 90744

560 Pick Heaters, Inc. (1/19/89)
P.O. Box 516
West Bend, Wisconsin 53095

874 Q-Jet DSI, Inc. (4/2/96)
704 Powell Lane, P.O. Box 350
Lewiston, New York 14092-0350

62-01 (Formerly 08-17L) Hose Assemblies

795 Able Hose & Rubber, Inc. (9/14/94)
2307 E. Hennepin Avenue
Minneapolis, Minnesota 55413

774 The Briggs Co. (7/18/94)
3 Bellecor Drive
New Castle, Delaware 19720

758 Crouch Supply Co. (2/22/94)
P.O. Box 163829
902 S. Jennings
Ft. Worth, Texas 76161

721 Dixon Valve & Coupling Co. (3/23/93)
800 High Street
Chestertown, Maryland 21620-1196

913 JGB Enterprises, Inc. (4/9/97)
115 Metropolitan Drive
Liverpool, New York 13088

757 Nelson-Jameson, Inc. (2/21/94)
P.O. Box 647
2400 East 5th Street
Marshfield, Wisconsin 54449

727 Nalge Process Technologies Group (4/14/93)
924 Marcon Boulevard
Allentown, Pennsylvania 18103

799 R/W Connection (10/21/94)
936 Links Avenue
Landisville, Pennsylvania 17538

698 Sanitary Couplers, Inc. (10/23/92)
275 South Pioneer Boulevard
Springsboro, Ohio 45066

700 Titan Industries, Inc. (10/23/92)
P.O. Box 1007
11121 Garfield Avenue
South Gate, California 90280-7590

63-01 (Formerly 08-17R) Sanitary Fittings

380 Allegheny Bradford Corp. (3/21/83)
P.O. Box 200 Route 219 South
Bradford, Pennsylvania 16701

79R APV Americas – Lake Mills (11/23/57)
100 South CP Avenue
Lake Mills, Wisconsin 53551-1799

682 Andron Stainless, Ltd. (6/30/92)
6170 Tomken Road
Mississauga, Ontario
Canada L5T 1X7
(US Rep.: Andron Stainless Corp.
8901 Farrow Road, #101
Columbia, South Carolina 29223)

349 APN, Inc. (12/15/81)
921 Industry Road
Caledonia, Minnesota 55921

900 APV Americas – Lake Mills (12/31/96)
100 South CP Avenue
Lake Mills, Wisconsin 53551-1799

948 ARMATURENWERK (1/2/98)
HOTENSLEBEN GmbH
SchulstraBe 5-6
39393 Holenslebon
Germany
(US Rep.: VNE Corporation
1149 Barberry Drive
Janesville, Wisconsin 53547)

621 Bradford Castmetals (2/25/91)
P.O. Box 33
Elm Grove, Wisconsin 53122

688 Swagelok (8/4/92)
9760 Shepard Road
Macedonia, Ohio 44056-1199

985 CME (10/26/98)
No. 21, Alley 6, Lane 71
Lin-Sen Road
Taoyuan, Taiwan
(US Rep.: Bradford Cast Metals
P.O. Box 33
Elm Grove, Wisconsin 53122)

960 C S E Chiang Sung (4/24/98)
Enterprise Co., Ltd.
No. 6-19 To Lun Road
Ta Tsun Hsiang Chang
Hua Shien, Taiwan
Republic of China
(US Rep.: Kurt Orban Partners
450 Kings Road
Brisbane, California 94005)

949 CANDIGRA y CIA, S.A. (1/2/98)
C/. Telers, 54-Aptdo. 174
17820 Banyoles
Spain
(Not Available in the USA)

645 Cipriani, Inc. - Tassalini S.P.A. (8/27/91)
23195 LaCadena Drive, Suite #103
Laguna Hills, California 92653

962 CIVACON (4/30/98)
416 E. Alondra Boulevard
Gardena, California 90248

696 Conexiones Inoxidables (10/1/92)
de Puebla S. A. de C. V.
Vicente Guerrero No. 112
Xicotepec de Juarez
Edo. Puebla, Mexico
(US Rep.: Ben Dolphin Consulting
4735 Lansing Drive
North Olmsted, Ohio 44070)

528 Mark IV Industrial
Dayco Industrial Division (3/16/88)
P.O. Box 1004
1 Prestige Place
Dayton, Ohio 45401-1004

677 EXCEL-A-TEC, Inc. (5/8/92)
N93 W14635 Whittaker Way
Menomonee Falls, Wisconsin 53051

973 Fastest, Inc. (7/21/98)
2315 Hampden Avenue
St. Paul, Minnesota 55114

947 FLOWMECA (12/22/97)
47 rue du Bois Chaland
LISSES
91029 Evry Cedex
France
(US Rep.: FLOWMECA, Inc.
19400 Stevens Creek Boulevard, Suite 200
Cuppertino, California 95014)

838 Food & Dairy Quality Mgmt. Inc. (QMI) (7/10/95)
245 E. 6th Street, Suite 416
St. Paul, Minnesota 55101

67R Alfa Laval Flow, Inc. (6/10/57)
G & H Division
8201 - 104th Street, P.O. Box 581909
Pleasant Prairie, Wisconsin 53158-0909

925 Hassia Verpackungsmachinen (6/5/97)
GmbH
Heerweg 19
D-63691
Ranstadt, Germany
(US Rep.: Hassia USA, Inc.
1210 Campus Drive West
Morganville, New Jersey 07751)

773 Herrli AG (7/15/94)
3210 Kerzers
Switzerland
(US Rep.: VNE Corp.
P.O. Box 1698
Janesville, Wisconsin 53547)

917 Irving Polishing & Mfg., Co., Inc. (4/17/97)
5704 46th Street
Kenosha, Wisconsin 53144-1899

454 Jensen Fittings Corp. (9/11/85)
107-111 Goundry Street
North Tonawanda, New York 14120-5998

933 King Lai International Co., Ltd. (7/31/97)
No. 10, The 6th Street
Youth Industrial Zone
Tachia, Taichung
Taiwan ROC
(Not available in the USA)

389 Lee Industries, Inc. (5/31/83)
P.O. Box 688
Philipsburg, Pennsylvania 16866

703 Parker Hannifin Corp. (11/6/92)
UHP Products Division
1005 A Cleaner Way
Huntsville, Alabama 35805

200R Paul Mueller Co. (3/5/68)
1600 W. Phelps Street, Box 828
Springfield, Missouri 65801

726 Nalge Process Technologies Group (4/14/93)
924 Marcon Boulevard
Allentown, Pennsylvania 18103

242 Puriti, S.A. de C.V. (9/12/72)
Alfredo Nobel 39
Industrial Puente de Vigas
Tlalnepantla, Mexico
(US Rep.: Waukesha Cherry-Burrell
611 Sugar Creek Road
Delavan, Wisconsin 53115)

424 Robert-James Sales, Inc. (8/31/84)
699 Hertel Avenue, 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)

969 SINMAG FITTING CORPORATION (7/2/98)
6F, No. 23, Wu-Chuang 6th Road
Wu-Ku Hsiang
Taipei Hsien, Taiwan
(US Rep.: MarketNet
2241 Quebec Avenue South
St. Louis Park, Minnesota 55426)

334 Stainless Products, Inc. (12/18/80)
1649-72nd Avenue, Box 169
Somers, Wisconsin 53171

741 Steel & O'Brien Mfg., Inc. (8/26/93)
12850 Route 39
Sardinia, New York 14134

449 Tech Controls Enterprise Co., Ltd. (8/2/85)
3725 N. Murray Road
Otis Orchard, Washington 99027
(Mfg. by: Tech. Control, Taipei, Taiwan)

73R L.C. Thomsen, Inc. (8/31/57)
1303-43rd Street
Kenosha, Wisconsin 53140

34R Tri-Clover, Inc. (10/15/56)
9201 Wilmot Road
Kenosha, Wisconsin 53141

987 Trident Stainless Manufacturing Ltd. (10/26/98)
4635 Burgoyne Street, Units 17-18
Mississuaga, Ontario
L4W 1V9 Canada
(US Rep.: Steve Byskosh
500 Berwick Court
Schaumburg, Illinois 60193)

707 Valvinox, Inc., SG RM Div. (1/5/93)
650-1st Street
Iberville, Quebec, Canada J2X 3B8
(Mfg. by: SG RM, France
Not available in the USA)

304 VNE Corporation (3/16/78)
1149 Barberry Drive
Janesville, Wisconsin 53547

82R Waukesha Cherry-Burrell (12/17/57)
611 Sugar Creek Road
Delavan, Wisconsin 53115

64-00 (Formerly 08-17N) Pressure Reducing and Back Pressure Regulating Valve

782 CASHCO, Inc. (8/31/94)
P.O. Box 6
Ellsworth, Kansas 67439-0006

753 Alfa Laval Flow, Inc. (2/1/94)
G & H Division
8201 - 104th Street, P.O. Box 581909
Pleasant Prairie, Wisconsin 53158-0909

769 Richards Industries Valve Group (6/6/94)
3170 Wasson Road
Cincinnati, Ohio 45209-2381

65-00 Sight &/or Light Windows & Sight Indications & Contact with Milk & Milk Products

849 Jacoby TarBox Division of (9/25/95)
Clark Reliance Corp.
16633 Foltz Industrial Parkway
Strongsville, Ohio 44136

867 J. M. Canty, Inc. (2/19/96)
6100 Donner Road
Lockport, New York 14096

929 Darrell A. Beer (7/18/97)
d.b.a. SHAE Industries
P.O. Box 1268
121 W. North Street
Healdsburg, California 95448

845 L. J. Star Inc. (9/7/95)
P.O. Box 1116
2201 Pinnacle Parkway
Twinsburg, Ohio 44807
(Mfg. by: Herberts Industrieglas
GmbH & Co.
KG, Wuppertal
Germany)

890 Moisture Systems (9/14/96)
117 South Street
Hopkinton, Massachusetts 01748

970 SINMAG FITTING CORPORATION (7/2/98)
6F, No. 23, Wu-Chuang 6th Road
Wu-Ku Hsiang
Taipei Hsien, Taiwan
(US Rep.: MarketNet
2241 Quebec Avenue South
St. Louis Park, Minnesota 55426)

974 Steel and O'Brien Mfg., Inc. (8/7/98)
12850 Route 39
Sardinia, New York 14134

818 Tri-Clover, Inc. (3/10/95)
9201 Wilmot Road
Kenosha, Wisconsin 53141-1413

68-00 Ball-Type Valves

898 Fluid Transfer (12/12/96)
Division of Lee Ind., Inc.
514 W. Pine Street
Philipsburg, Pennsylvania 16866

931 LUMACO (7/18/97)
9-11 East Broadway
Hackensack, New Jersey
(Mfg. by: Dairy Pipe Lines, Ltd.
Shirehill Industrial Estate
Saffron Walden, Essex
England)

73-00 Shear Mixers, Mixers and Agitators

901 Admix, Inc. (1/2/97)
234 Abby Road
Manchester, New Hampshire 03103-3332

957 Admix, Inc. (3/24/98)
234 Abby Road
Manchester, New Hampshire 03103-3332

74-00 Sensors and Sensor Fittings and Connections

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

738 ABB Instrumentation, Inc. (6/25/93)
1175 John Street
Rochester, New York 14602-0550

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

576 Ametek Test and Calibration (10/13/89)
Instruments Division
8600 Somerset Drive
Largo, Florida 34643

822 Ametek/US Gauge Division (3/17/95)
PMT Products
820 Pennsylvania Boulevard
Feasterville, Pennsylvania 19053

318 Anderson Instrument Co., Inc. (4/9/79)
156 Auriesville Road
Fultonville, New York 12072

865 APV Heat Transfer Tec (1/25/96)
395 Fillmore Avenue
Tonawanda, New York 14150
(Mfg. by: Pasilac Electronics
Silkelorg, Denmark)

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

659 Bindicator Company (11/20/91)
1915 Dove Street
Port Huron, Michigan 48060

706 Bindicator Company (12/29/92)
1915 Dove Street
Port Huron, Michigan 48060

926 BOURDON - SEDEME S.A. (6/18/97)
125, rue de la Marre
B.P. 214 41103
Vendome Cedex
France
(US Rep.: Rawson & Co., Inc.
P.O. Box 924288
Houston, Texas 77292-4288)

872 Brookfield Eng. Lab, Inc. (3/28/96)
11 Commerce Boulevard
Middleboro, Massachusetts 02346

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

525 Caldwell Systems Corporation (3/4/88)
1200 Diamond Circle, Unit K
Lafayette, Colorado 80026

910 CEMCO Mfg., Inc. (3/7/97)
1120 North Peoria
Tulsa, Oklahoma 74106-4904

850 Chicago Stainless Equip. (9/28/95)
1280 S.W. 34th Street
Palm City, Florida 34990-3308

672 Computer Instruments Corp. (4/3/92)
1000 Shames Drive
Westbury, New York 11590

829 DCT Instruments/Sensotec, Inc. (4/13/95)
2080 Arlingate Lane
Columbus, Ohio 43228-4112
(Mfg. by: Sensotec Inc.
2080 Arlingate Lane
Columbus, Ohio 43228-4112)

862 Delta Controls Corporation (11/30/95)
585 Fortson Street
Shreveport, Louisiana 71107

586 Diversey Lever Equipment (12/14/89)
151 Harvey West Boulevard
Santa Cruz, California 95060

866 Dovex S.S., Inc. (1/29/96)
770 Tower Drive
Medina, Minnesota 55340

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 Road
Horsham, Pennsylvania 19044

861 Dwyer Instruments, Inc. (11/28/95)
P.O. Box 373
Michigan City, Indiana 46360
(Mfg. by: Ametek, US Gauge Div.
PMT Products
820 Pennsylvania Boulevard
Feasterville, Pennsylvania 19053)

977 Efector, Inc. (8/31/98)
A subsidiary of ifm electronic
805 Springdale Drive
Exton, Pennsylvania 19341

763 EG & G Berthold Laboritorium Prof. (4/21/94)
Berthold GmbH & Co. KGCalmbacher Str. 22
D-7547 Bad Wildbad 1, Germany
(US Rep.: E G & G Berthold USA
100 Midland Road
Oak Ridge, Tennessee 37830)

936 ENFM-USA, Inc. (8/28/97)
11339 East Distribution Avenue
Jacksonville, Florida 32256
(Mfg. by: Eerste Nederlandse Fabriek
Van Manometers B.V.
Scheidam, Holland)

524 Flow Technology, Inc. (1/14/88)
4250 E. Broadway Road
Phoenix, Arizona 85040

459 Endress + Hauser, Inc. (10/17/85)
2350 Endress Place
Greenwood, Indiana 46142
(Mfg. by: Endress + Hauser GmbH
Hauptstrasse 1
D-79689 Maulburg, Germany)

876 Fisher-Rosemount Singapore (5/14/96)
Private Limited
1 Pandan Cresent
Singapore 0512
Republic of Singapore
(US Rep.: Rosemount, Inc.
12001 Technology Drive
Eden Prairie, Minnesota 55344)

598 FMC Invalco, Inc., (3/22/90)
A FMC Corp. Subsidiary
P.O. Box 1183
Hutchinson, Kansas 67504-1183

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

963 GLI International, Inc. (5/4/98)
9020 West Dean Road
Milwaukee, Wisconsin 53224

984 Garner Industries (10/20/98)
4200 North 48th Street
Lincoln, Nebraska 68504

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

668 GP: 50 New York, Ltd. (3/30/92)
2770 Long Road
P.O. Box 1150
Grand Island, New York 14072

633 Griffith Industrial Products Company (6/21/91)
P.O. Box 111
Putnam, Connecticut 06260

749 Haenni Cie & AG (1/17/94)
CH-3303
Jegenstorf, Switzerland
(US Rep.: Haenni Instruments, inc.
1107 Wright Avenue
Gretna, Louisiana 70056)

651 HEINRICH KUBLER AG (10/3/91)
CH-6341 Baar
Switzerland
(US Rep.: Granzow, Inc.
2300 Crown Point Executive Drive
Charlotte, North Carolina 28227)

794 Honeywell, Inc. (9/14/94)
1100 Virginia Drive
Fort Washington, Pennsylvania 19034

557 Honeywell, Inc. (12/21/88)
Industrial Controls Div.
1100 Virginia Drive
Fort Washington, Pennsylvania 19034

832 H.O. Trerice Co. (5/12/95)
12950 W. Eight Mile Road
Oak Park, Michigan 48237-3288
(Mfg. by: Bourdon-Sedene
125 Rue De La Marre
41 100 Vendome
France)

629 ISE-Magtech (5/20/91)
907 Bay Star
Webster, Texas 77598-1531

572 ITT Conoflow (9/25/89)
P.O. Box 768, Rt. 78
St. George, South Carolina 29477

961 KDG Instruments (4/24/98)
Crompton Way
Crawley, W. Sussex
RH102YZ, England
(Not available in the USA)

798 Kay-Ray/Sensall, Inc. (10/14/94)
1400 Business Center Drive
Mount Prospect, Illinois 60056

930 Kamstrup A/S (7/18/97)
Process Division
Jacob Knudsens Vej 12
DK-8230 Abyhoj
Denmark
(Not available in the USA)

945 Kemotron, Inc. (11/25/97)
1090 Northchase Parkway, Suite 200 South
Marietta, Georgia 30067
(Mfg. by: Kemotron a/s
Chr. X Alle' 89
DK-2800 Lyngby
Denmark)

842 Klay Instruments B.V. (8/18/95)
Nijverheidsweg 5
NL 7991 CZ Dwingeloo
The Netherlands
(Not available in the USA)

396 King Engineering Corp. (6/13/83)
P.O. Box 1228
Ann Arbor, Michigan 48106

893 Kistler-Morse Corporation (10/31/96)
19021-120th Avenue N.E.
Bothell, Washington 98011-9511

285 K Systems Corp. (Tank Mate Division) (12/7/76)
4391 Butterfield Road
Hillside, Illinois 60162

620 Larad Equipment (2/25/91)
213 Airport Drive Extension
Hopedale, Massachusetts 01747

501 Lumenite Control Technology Inc. (4/27/87)
2331 N. 17th Avenue
Franklin Park, Illinois 60131

596 Magnetrol International (3/20/90)
5300 Belmont Road
Downers Grove, Illinois 60515

768 MTS Systems Corporation (6/6/94)
Sensors Division
3001 Sheldon Drive
Cary, North Carolina 27513

906 Mettler-Toledo Process (2/14/97)
Analytical, Inc.
261 Ballardvale Street
Washington, Massachusetts 01887
(Mfg. by: Mettler-Toledo Process AG
ImHackacker 15
8902 URDORF Switzerland)

627 Milltronics, Inc. (4/12/91)
P.O. Box 4225
Peterborough, Ontario
Canada K9J 7B1
(US Rep.: Milltronics, Inc.
709 E. Stadium Drive
Arlington, Texas 76011)

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

863 Nelson-Jameson (1/11/96)
2400 East 5th Street, P.O. Box 647
Marshfield, Wisconsin 54449
(Mfg. by: Chicago Stainless Equipment
511 Weston Ridge Drive
Naperville, Illinois 60563)

597 NUOVA FIMA S.p.A. (3/20/90)
Via C. Battisti 59
28045 - INVORIO (N0) Italy
(Not available in the USA)

966 ODEN Corporation (5/27/98)
255 Great Arrow Avenue
Buffalo, New York 14207

909 OHMART/VEGA Corporation (3/4/97)
4241 Allendorf Drive
Cincinnati, Ohio 45209-9961
(Mfg. by: VEGA Grieshaber KG
AM Honenstein 113
D-77761 Schiltach
Germany)

983 OHMART/VEGA Corporation (10/10/98)
4241 Allendorf Drive
Cincinnati, Ohio 45209
(Mfg. by: AM Hohenstein 113
D-77761 Schiltach
Germany)

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)
1951 Highway 290W
Brenham, Texas 77833

644 Princo Instruments, Inc. (8/22/91)
1020 Industrial Highway
Southampton, Pennsylvania 18966-4095

815 ProMag PM LTD (2/24/95)
11552 Merchant Drive
Baton Rouge, Louisiana 70809

487 Pyromation, Incorporated (12/16/86)
5211 Industrial Road
Fort Wayne, Indiana 46825-5152

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

982 Reotemp Instrument Corporation (10/08/98)
11568 Sorrento Valley Road, Suite 10
San Diego, California 92121-1313

495 Rosemount Analytical, Inc. (2/13/87)
Uniloc Division
2400 Barranca Parkway
Irvine, California 92606

328 Rosemount, Inc. (5/22/80)
12001 Technology Drive
Eden Prairie, Minnesota 55344

732 SensorTec, Inc. (5/18/93)
16335-7 Lima Road
Huntertown, Indiana 46748

784 Sensotec, Inc. (9/2/94)
2080 Arlington Lane
Columbus, Ohio 43228-4112

515 Setra Systems, Inc. (9/14/87)
159 Swanson Road
Boxborough, Massachusetts 01719

583 S. J. Controls, Inc. (11/11/89)
2248 Obispo Avenue #203
Long Beach, California 90806

873 Smar Equipamentos (4/2/96)
Industriasis Ltda.
7240 Brittmoore, Suite 118
Houston, Texas 77041
(Mfg. by: Smar Equipamentos Industriasis Ltda.
Av. Dr. Antonio Furian Jr.
Serlhozlnko - SP - 14160.000
Brazil)

875 SOR (4/15/96)
14685 W. 105th Street
Lenexa, Kansas 66215-5964

896 TBI-Bailey Controls Company (12/3/96)
2175 Lockheed Way
Carson City, Nevada 89706

641 Tempress A/S (7/16/91)
Nordlandsvej 64-66
DK-8240 Risskor, Denmark
(Not available in the USA)

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

765 Tri-Clover, Inc. (4/27/94)
9201 Wilmot Road
Kenosha, Wisconsin 53141

444 Tuchenhagen North America, Inc. (6/17/85)
9160 Red Branch Road
Columbia, Maryland 21045
196 Western Avenue
Fond du Lac, Wisconsin 54936-1458

754 Valmet Automation (7/2/95)
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

779 Wahl Instruments, Inc. (8/10/94)
234 Weaverville Highway
Asherville, North Carolina 28804

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

569 WEISS Instruments, Inc. (5/24/89)
85 Bell Street
West Babylon, New York 11704
(Mfg. by: Nuova-Fima, Italy)

600 Weksler Instruments Corporation (4/27/90)
250 E. Main Street
Stratford, Connecticut 06497

646 WIKA Instrument Corp. (9/10/91)
1000 Wiegand Boulevard
Lawrenceville, Georgia 30243
(Mfg. by: WIKA Ind. Corp.
63911 Klingenberg
Germany)

685 Winter's Thermogauges, Ltd. (8/3/92)
121 Railside Road
Toronto, Ontario
Canada M3A 1B2
(US Rep.: Winter's Thermogauges, Inc.
6020/3 N. Bailey Avenue
Buffalo, New York 14226)

879 Zurich Industria E (6/3/96)
Comercio LTDA
R. Serra da Piedade, 183
Sao Paulo - SP - Brazil 03131-080
(Not available in the USA)

The Following Firms Have Not Renewed Their 3-A Symbol Authorization and Effective This Date No Longer are Authorized to Display the 3-A Symbol

02-09 Pumps for Milk and Milk Products

636 Abel Pumps Corporation
888 Seeberger GmbH
609 Tuthill Corporation

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

360 Laffranchi Wholesale Co.

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

639 Niro Sterner, Inc.

17-09 Formers, Fillers and Sealers of Single Service Containers for Fluid Milk and Fluid Milk Products

473 International Paper, Co.

22-07 Silo-type Storage Tanks for Milk and Milk Products

168 Waukesha Cherry-Burrell
920 Technova, Inc.

24-02 Non-coil Type Batch Processors

161 Waukesha Cherry-Burrell

25-02 Non-coil Type Batch Processors

162 Waukesha Cherry-Burrell

44-02 Air, Hydraulically or Mechanically Driven Diaphragm Pumps

927 Yamada America, Inc.

46-01 Refractometers and Optical Sensors

737 MSC Moisture Systems

53-00 Compression-Type Valves

883 Keystone Hygienic Valve Division

63-01 Sanitary Fittings

391 Stork Food Machinery, Inc.

74-00 Sensors and Sensor Fittings and Connections

638 Millipore Corporation

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In Memory of...

Judith True
Frankfort, Kentucky

IAMFES would like to extend our deepest sympathy to the family and friends of Judith True who recently passed away.

Judy served as Treasurer and IAMFES Delegate for the Kentucky Association of Dairy, Food and Environmental Specialists.

IAMFES ANNUAL MEETING

86th Dearborn • Michigan

August 1-4, 1999
Dearborn, Michigan

SYMPOSIA TOPICS*

- USDA HACCP Implementation — Where Have We Been; Where are We Going?
- HACCP in Retail Operations
- Fresh Fruits and Vegetables: Are They Safe Enough?
- Overview of Dairy Plant Regulations
- Dairy Plant HACCP Program
- Dairy Plant Basics
- Globalization of Foodborne Disease
- The Impact of the Presidential Food Safety Initiative (FSI) on Seafood Safety
- Methods for the Detection of Infectious Viruses in Foods
- USDA Risk Assessment of *E. coli* O157:H7 in Ground Beef
- Pathogen Resistance to Traditional Processing
- Manure and Water: Produce Safety Implications
- Animal Waste Management and Its Relationship to Food Safety
- Science-Based Criteria for Harmonizing Food Safety Regulations
- New Emerging Pathogens —*Mycobacterium* spp.

*Subject to change.

IAMFES ANNUAL MEETING

86th Dearborn • Michigan

EVENT INFORMATION

EVENING EVENTS

Cheese and Wine Reception
Sunday, August 1, 1999, *(8:00 p.m. – 10:00 p.m.)*

An IAMFES tradition continues for attendees and guests. The reception begins immediately following the Ivan Parkin Lecture on Sunday evening in the exhibit hall.

Exhibit Hall Reception
Monday, August 2, 1999, *(5:00 p.m. – 6:30 p.m.)*

Relax with colleagues and friends in the exhibit hall at the end of the day. Exhibitors showcase the latest developments in the industry at an informal reception.

Historical Adventures
Monday, August 2, 1999, *(6:00 p.m. – 9:30 p.m.)*

Ride a carriage back into history at the Greenfield Village Living Museum. Discover what inspired inventors Henry Ford, Thomas Edison, and Orville and Wilbur Wright. Gather around the antique carousel. Enjoy dinner and spend the evening with friends.

An Evening in Wine Country
Tuesday, August 3, 1999, *(5:30 p.m. – 10:30 p.m.)*

A quiet country evening begins in surroundings reminiscent of an "Old World" wine cellar at Pelee Island Winery, located near Kingsville, Ontario. Then tempt your taste buds in the tropical gardens of Colasanti while exotic birds call to you from the wild.

(When traveling to Canada, proof of citizenship such as voter's registration, passport, or birth certificate is required.)

Take Me Out to the Ballgame
Tuesday, August 3, 1999, *(6:00 p.m. – 10:30 p.m.)*

Cheer yourself silly as the Detroit Tigers take on the Chicago White Sox in one of the oldest baseball stadiums in the US. When the game is over, you can claim to be one of the last fans to visit the original Tiger Stadium before it closes. Tickets and round trip bus transportation included.

IAMFES Awards Banquet
Wednesday, August 4, 1999, *(6:00 p.m. – 10:00 p.m.)*

A special occasion to formally recognize the accomplishments of deserving food safety professionals. An elegant reception and dinner are followed by the awards ceremony. Business attire requested.

TOURS

Great Lakes and "Motor City" Culture
Sunday, August 1, 1999, *(9:30 a.m. – 3:00 p.m.)*

Belle Isle, a 1000 acre island park, beckons you to visit the Dossin Great Lakes Museum and other cultural attractions. Tour the Coast Guard Station on the Detroit River. Then it's smooth sailing to lunch on the waterfront at Sinbad's restaurant. Start your engines at the interactive "Motor City Exhibition" in the Detroit Historical Museum. Race to explore your favorite destinations including the Detroit Institute of Art, the Museum of African American History and the Detroit Science Center.

At Home with the Auto Barons
Monday, August 2, 1999, *(9:30 a.m. – 3:30 p.m.)*

Just for a day, imagine you are a guest in Fair Lane, the 15th and final home of Henry Ford. Stroll through the same rooms as some of the world's most influential people.

Don't forget your invitation for lunch at the Eleanor and Edsel Ford Estate, located on the shores of Lake St. Claire. Architect Albert Kahn created a sense of the English countryside in the home at Grosse Point. Inside, original masterpieces line the walls. Your tour includes the home, the scenic gardens, the pool-house, the garage with Mrs. Ford's custom-built 1952 Lincoln Town Car, and the children's playhouse.

All Things Canadian
Tuesday, August 3, 1999, *(9:30 a.m. – 3:30 p.m.)*

Watch as world famous Canadian Club Whiskey is produced at the Hiram Walker & Sons Distillery. Then stroll through the classical Jackson Park gardens featuring over 12,000 rose bushes in bloom. Soak up the local flavor during lunch at a restaurant in downtown Windsor, Canada. Step inside the log cabin used as terminal of the Underground Railway built by fugitive slave John Freeman Walls.

(When traveling to Canada, proof of citizenship such as voter's registration, passport, or birth certificate is required.)

GOLF TOURNAMENT

FORE! Best-Ball Golf Tournament
Sunday, August 1, 1999, *(6:00 a.m. – 2:00 p.m.)*

A swinging good time at the newest golf course in the area — the Inkster Golf Course. You don't even need to know how to play to win a prize. Golf, transportation, breakfast, lunch and prizes all included in your registration fee.

GENERAL INFORMATION

IAMFES 86th ANNUAL MEETING
AUGUST 1-4, 1999
DEARBORN, MICHIGAN

IMPORTANT! Please read this information before completing your registration form.

■ Meeting Information

Register to attend the world's leading food safety conference.

Registration includes:

- Technical Sessions
- Symposia
- Poster Presentations
- Ivan Parkin Lecture
- Exhibit Hall Admittance
- Cheese and Wine Reception
- Exhibit Hall Reception
- Awards Banquet
- Program and Abstract Book

■ Registration Information

Please mail the registration form with payment today. Registrations post-marked after July 1, 1999 must pay the late registration fee. Checks should be made payable to: IAMFES, 6200 Aurora Avenue, Suite 200W, Des Moines, Iowa 50322-2863, USA. For faster service, use your credit card and call 800.369.6337, or fax the completed registration form with credit card information to 515.276.8655.

■ Refund/Cancellation Policy

Registration fees, minus a $50 processing charge and any applicable bank charges, will be refunded for written cancellations received by July 15, 1999. **No refunds will be made after July 15;** however, the registration may be transferred to a colleague with written notification. Refunds will be processed after August 6, 1999.

■ Hotel Information

For reservations, contact the hotel directly and identify yourself as an IAMFES Annual Meeting attendee to receive a special rate of $102 per night, single or double. Make your reservations as soon as possible, this special rate is available only until July 2, 1999.

Hyatt Regency Dearborn
Fairlane Town Center
Dearborn, Michigan 48126
Phone: 313.593.1234; Fax: 313.593.3366

■ EVENTS

(See the preceeding page for detailed descriptions)

■ Evening Events

Sunday, August 1, 1999
Cheese and Wine Reception *(8:00 p.m. – 10:00 p.m.)*

Monday, August 2, 1999
Exhibit Hall Reception *(5:00 p.m. – 6:30 p.m.)*
Historical Adventures *(6:00 p.m. – 9:30 p.m.)*

Tuesday, August 3, 1999
An Evening in Wine Country *(5:30 p.m. – 10:30 p.m.)*
Take Me Out to the Ballgame *(6:00 p.m. – 10:30 p.m.)*

Wednesday, August 4, 1999
IAMFES Awards Banquet *(6:00 p.m. – 10:00 p.m.)*

■ Tours

Sunday, August 1, 1999
Great Lakes and "Motor City" Culture
(9:30 a.m. – 3:00 p.m.) (Lunch included)

Monday, August 2, 1999
At Home with the Auto Barons
(9:30 a.m. – 3:30 p.m.) (Lunch included)

Tuesday, August 3, 1999
All Things Canadian
(9:30 a.m. – 3:30 p.m.) (Lunch included)

■ Golf Tournament

Sunday, August 1, 1999
FORE! Best-Ball Golf Tournament *(6:00 a.m. – 2:00 p.m.)*

MEMBERSHIP RATES

	UNITED STATES	CANADA/ MEXICO	INTERNATIONAL
Membership with *Journal of Food Protection* and *Dairy, Food and Environmental Sanitation*	**$140.00**	**165.00**	**$210.00**
(Student Membership)*	($70.00)	($95.00)	($140.00)
Membership with *Dairy, Food and Environmental Sanitation*	**$85.00**	**$95.00**	**$110.00**
(Student Membership)*	($42.50)	($52.50)	($67.50)
(Student Membership* with *Journal of Food Protection*)	($42.50)	($57.50)	($87.50)

**Full-time student verification required*

All prices include Shipping & Handling

Prices effective through August 31, 1999

FOR OFFICE USE
First initial Last name DFES
Registration #

REGISTRATION FORM

IAMFES 86th Annual Meeting August 1-4, 1999 Dearborn, Michigan

Name (Print or type your name as you wish it to appear on name badge)

Title Employer

Mailing Address (Please specify: ❒ Home ❒ Work)

City State/Province Country Postal/Zip Code

Telephone Fax E-mail

IAMFES Member since: 19____

Regarding the *Americans with Disabilities Act*, please indicate special requirements you may have. _____

REGISTER BY JULY 1, 1999 TO AVOID LATE REGISTRATION FEES

REGISTRATION FEES:	MEMBERS	NONMEMBERS	AMOUNT
Registration (Awards Banquet included)	$ 245 ($295 late)	$365 ($415 late)	
IAMFES Student Member*	$ 40 ($ 50 late)	Not Available	
Retired IAMFES Member*	$ 40 ($ 50 late)	Not Available	
One Day Registration: ❒ Mon. ❒ Tues. ❒ Wed.	$ 125 ($150 late)	$180 ($205 late)	
Spouse/Companion (Name): _____	$ 35 ($ 35 late)	$ 35 ($ 35 late)	
Children 15 & Over (Names): _____	$ 25 ($ 25 late)	$ 25 ($ 25 late)	
Children 14 & Under (Names): _____	FREE	FREE	

*Awards Banquet not included

EVENTS:		# OF TICKETS	
FORE! Best-Ball Golf Tournament (Sunday, 8/1)	$ 80 ($ 95 late)		
Historical Adventures (Monday, 8/2)	$ 39 ($ 44 late)		
Children 14 and under	$ 29 ($ 34 late)		
An Evening in Wine Country (Tuesday, 8/3)	$ 49 ($ 54 late)		
Take Me Out to the Ballgame (Tuesday, 8/3)	$ 22 ($ 27 late)		
IAMFES Awards Banquet (Wednesday, 8/4)	$ 40 ($ 45 late)		

TOURS:			
Great Lakes and "Motor City" Culture (Sunday, 8/1)	$ 45 ($ 51 late)		
At Home with the Auto Barons (Monday, 8/2)	$ 42 ($ 47 late)		
All Things Canadian (Tuesday, 8/3)	$ 43 ($ 48 late)		

JOIN IAMFES TODAY AND SAVE!!! (Attach a completed Membership application) _____

TOTAL AMOUNT ENCLOSED _____

(CHECK PAYABLE TO IAMFES — US FUNDS ON US BANK)

International Association of Milk, Food and Environmental Sanitarians
6200 Aurora Avenue, Suite 200W
Des Moines, Iowa 50322-2863, USA
Phone: 800.369.6337; 515.276.3344
Fax: 515.276.8655; E-mail: iamfes@iamfes.org

Credit Card Payments:

❒ VISA ❒ MasterCard ❒

Card # | | | | | | | | | | | | | | | | |

Exp. Date _____

Name on Card _____

Signature _____

EXHIBITORS DO NOT USE THIS FORM

ComingEvents

MARCH

· **10, Dairy HACCP Workshop,** Madison, WI. This one-day workshop will cover design and implementation of HACCP plans in dairy plants. For additional information, contact the Program Coordinators or Dept. of Food Science, University of Wisconsin-Madison, Madison, WI 53706-1565; Phone: 608.262.3046; Fax: 608.262.6872.

· **10-12, Michigan Environmental Health Association 54th Annual Educational Conference**. For further information, contact Chuck Lichon at 517.832.6656.

· **10-12, Practical HACCP for Food Processors,** Sponsored by Silliker Laboratories Group, Inc. Waterfront Hilton, Huntington Beach, CA. For additional information, contact Silliker Laboratories, Education Services Dept., 900 Maple Road, Homewood, IL 60430; Phone: 800.829.7879; 708.957.7878; Fax: 708.957.8405.

· **16-17, Basic Food Microbiology Seminar,** Holiday Inn, Portland Airport, Portland, OR. This course will introduce the participant to the fundamental characteristics of microorganisms and relate the application of microbiology to foods, food safety, and sanitation. For additional information, contact Jack Brook, Mt. Hood Community College, 26000 SE Stark St., Gresham, OR 97030; Phone: 503.491.7473; Fax: 503.491.7389; E-mail: brookj@mhcc.cc.or.us.

· **16-18, Foodborne Illness Investigations – Train the Facilitators/Downlink Coordinators Satellite Course.** Air time each day 11:30 a.m. to 4:00 p.m. ET. For additional information, contact U.S. Food and Drug Administration, ORA/ORM/DHRD, HFC-60, 5600 Fishers Lane, Rockville, MD 20857; For questions prior to broadcast fax questions to: Attention Satellite Course (s): 301.594.1966; Voice Mail: 301.594.2263.

· **22-24, Principles of Quality Assurance Seminar,** Manhattan, KS. This seminar provides basic instruction and examples for developing a quality assurance program. For more information or to enroll, contact AIB, 1213 Bakers Way, P.O. Box 3999, Manhattan, KS 66505-3999; Phone: 785.537.4750; Fax: 785.537.1493; Web site: aibonline.org.

· **22-26, Laboratory Methods in Food Microbiology,** held at Silliker Laboratories' Corporate Research Center, Teaching Laboratory, South Holland, IL. For additional information, contact Silliker Laboratories, Education Services Dept., 900 Maple Road, Homewood, IL 60430; Phone: 800.829.7879; 708.957.7878; Fax: 708.957.8405.

· **29-1 April, IAFIS Annual Conference,** Westin Rio Mar Beach Resort and Country Club, Rio Grande, Puerto Rico. For additional information, contact IAFIS, 1451 Dolley Madison Blvd., McLean, VA 22101-3850; 703.761.2600; Fax: 703.761.4334.

· **31-April 1, The Pennsylvania Food Industry: Strengthening Partnership for Growth,** Harrisburg/Hershey Holiday Inn, Grantville, PA. The conference is sponsored by The Pennsylvania State University College of Agricultural Sciences and sponsored by Penn State Dept. of Food Science, Penn State Food Industry Group, and the Ben Franklin Partnership. For more information on the program, contact the Conference Program Coordinator, Claudine Nuernberger, Dept. of Food Science, Penn State University at 814.863.5846; E-mail: cxn8@psu.edu.

APRIL

· **7-8, Introduction to Microbiological Criteria and Sampling Plans,** Omni Netherland Plaza, Cincinnati, OH. Sponsored by Silliker Laboratories Group, Inc. For additional information, contact Silliker Laboratories, Education Services Dept., 900 Maple Road, Homewood, IL 60430; Phone: 800.829.7879; 708.957.7878; Fax: 708.957.8405.

· **7-9, Missouri Milk, Food and Environmental Health Association Annual Educational Conference,** Ramada Inn, Columbia, MO. For further information, contact Steve St. Clair, Phone: 573.221.1166 or 1167; Fax: 273.221.1214.

· **8-12, Canadian Institute of Public Health Inspectors Educational Conference**, Vancouver, B.C. For additional information, contact Richard Taki, Promotions Chair at 604.736.2866; Fax: 604.736.8651; E-mail: bcciphi@cnx.net.

· **8-10, Introduction to Statistical Methods for Sensory Evaluation of Foods,** University of California-Davis, Davis, CA. This course introduces statistical analysis to the beginning sensory scientist as well as being an excellent update on applying statistical procedures for the experienced professional. For additional information, contact Michael O'Mahoney at 530.752.6389; E-mail: maomhony@ucdavis.edu.

· **12-13, "An Insider's Look at Microbial Risk Assessment,"** DoubleTree Hotel, National Airport, Arlington, VA. The workshop, presented by IAMFES, will compare and contrast two risk assessments conducted to address the risk of *Salmonella* Enteritidis in shell eggs to illustrate how different data and assumptions can impact the resulting risk estimates. For further information, contact IAMFES at 515.276. 3344; Fax: 515.276. 8655; E-mail: iamfes@iamfes.org.

· **12-14, Learning the 7 HACCP Principles and Developing a HACCP Plan,** Rutgers University, New Brunswick, NJ. For additional information, contact Keith Wilson, Phone: 732.932.9271; Fax: 732.932.1187; E-mail: ocpe@aesop.rutgers.edu; Web site: www.cook.rutgers.edu/~ocpe.

·**12-14, Sensory Evaluation: Overview and Update,** University of California-Davis, Davis, CA. Designed for both the beginner and experienced professional, this course will give an overview on why tests can be set up in some ways and not in others, enabling the professional to modify and custom-design techniques specific to the product being tested. For additional information, contact Michael O'Mahony at 530.752.6389; E-mail: maomhony@ucdavis.edu.

·**13-14, Microbiological Concerns in Food Plant Sanitation & Hygiene,** San Antonio, TX. Sponsored by Silliker Laboratories Group, Inc. For additional information, contact Silliker Laboratories, Education Services Dept., 900 Maple Road, Homewood, IL 60430; Phone: 800.829.7879; 708.957.7878; Fax: 708.957.8405.

·**15-16, Carolinas Association of Milk, Food and Environmental Sanitarians Affiliate Meeting.** For further information, contact Joe Neely at 803.935.7890.

·**15-17, IFPA Hosts 12th Annual Conference,** Tampa, FL. The International Fresh-cut Produce Association's (IFPA) will host its 1999 Conference and Exhibition, "Tampa '99: Bridge to the New Millennium," at the Tampa Convention Center. This is the only produce industry event specifically geared toward the fresh-cut sector and this year's conference will feature an impressive lineup of speakers, seminars, exhibits and networking opportunities focused on the rapidly growing fresh-cut industry. For more information, contact Justina Brewer at 703.299.6282.

·**19, International Dairy Federation Symposium,** Convention Centre, Ottawa, Canada. The symposium will deal with the subject of Laboratory Accreditation and Proficiency Testing. For additional information contact, International Dairy Federation, Secretariat, 41 Sqaure Vergote, B-1030 Bruxelles, Belgium or Fax: 32 2 733 04 13; E-mail: Info@fil-idf.org; Web site: www.fil-idf.org.

·**21, Metropolitan Association of Dairy, Food and Environmental Specialists Affiliate Meeting,** Woodbridge, NJ. For further information, contact Fred Weber at 609.584.7677.

·**22, Nebraska Association of Milk and Food Sanitarians Affiliate Meeting.** For further information, contact Roger Biltoft, Phone: 402.225.2254.

·**22, Indiana Environmental Health Association, Inc. Spring Conference,** Valle Vista Country Club, Greenwood, IN. For further information, contact Helene Uhlmann at 219.853.6358.

·**27-29, High Temperature Short Time (HTST) Pasteurization Hands-On Workshop,** L.A. Fairplex, outside Los Angeles, CA. Sponsored by the International Association of Food Industry Suppliers (IAFIS). This program will be organized under the direction of John C. Bruhn, Director, Dairy Research and Information Center and Dairy Foods Processing Specialist at the University of California-Davis. For more information, contact Dorothy Brady at 703.761.2600; E-mail: dbrady@iafis.org.

MAY

·**1-7, The 27th National Conference on Interstate Milk Shipments,** will meet at the Spirit of Atlanta Hotel (formerly Radisson, in Atlanta, GA. For additional information, contact Leon Townsend, Executive Secretary, 110 Tecumseh Trail, Frankfort, KY 40601; Phone/Fax: 502.695.0253; E-mail: lcontown@dcr.net.

·**4-5, Wyoming Environmental Health Association Annual Educational Conference,** Casper, WY. For further information, contact Laurie Leis at 307.266.1203.

·**4-6, Principles of Food Microbiology,** Marriott Fisherman's Wharf, San Francisco, CA. For additional information, contact Silliker Laboratories, Education Services Dept., 900 Maple Rd., Homewood, IL 60430; Phone: 800.829.7879; 708.957.7878; Fax: 708.957.8405.

·**6-12, 15th International Trade Fair for Packaging Machinery, Packaging and Confectionery Machinery,** in Düsseldorf, Germany. For further information, contact Dusseldorf Trade Shows, Inc., 150 N. Michigan Ave., Suite 2920, Chicago, IL 60601 or Phone: 312.781.5180; Fax: 312.781.5188; Web site: www.dtsusa.com/dts/.

·**12-13, Traceback of Fresh Produce and Other Commodities Satellite Course.** (11:00 a.m. to 3:30 p.m. ET.) For additional information, contact U.S. Food and Drug Administration, ORA/ORM/DHRD, HFC-60, 5600 Fishers Lane, Rockville, MD 20857. For questions prior to broadcast fax questions to: Attention Satellite Courses(s): 301.594.1966; Voice Mail: 301.594.2263.

·**12-14, Food Irradiation 99 Conference—The Solution to the Food Safety Crisis,** Sheraton National Hotel, Arlington, VA. This international conference will present an examination of the business and technical outlook for food irradiation as a solution to the growing global problem of food safety. For further information, contact Deborah Crommett, Conference Coordinator, Intertech Conferences, 411 US Route One, Portland, ME 04105 or Phone: 207.781.9800; Fax: 207.781.2150; E-mail: info@intertechusa.com or www.intertechusa.com.

·**17-21, Laboratory Methods in Food Microbiology,** Silliker Laboratories' Corporate Research Center, South Holland, IL. For additional information, contact Silliker Laboratories, Education Services Dept., 900 Maple Rd., Homewood, IL 60430; Phone: 800.829.7879;708.957.7878; Fax: 708.957.8405.

·**18-19, Aseptic Processing and Packaging Introductory Workshop,** University of California-Davis, Davis, CA. This course focuses on the engineering, microbiological and chemical principles related to aseptic processing. Hands-on laboratories allow participants to learn methods of aseptic product quality evaluation, packaging and equipment particulars. For further information,

contact Diane Barrett at 530.752.4800; E-mail: dmbarrett@ucdavis.edu.

· **20, Advanced Aseptic Processing and Packaging,** University of California-Davis, Davis, CA. As a continuation of the 2-day introductory workshop, this course will focus on heat penetration and distribution, process deviation and recommendations, and a computerized program for calculating thermal processes is demonstrated. For further information, contact Diane Barrett at 530.752.4800; E-mail: dmbarrett@ucdavis.edu.

· **24-26, 3rd International Symposium on Recombined Milk and Milk Products,** Penang, Malaysia. The symposium will seek to discuss and review issues facing the milk recombination industry, the need for the industry to keep pace with the challenges of the future, and product development opportunities presented by the introduction of new technologies and emerging markets. For further information, contact Alison Johnson, The Secretariat, 3rd International Symposium on Recombined Milk and Milk Products, Private Bag 16, Werribee, Victoria Australia, 3030 or Phone: 61 3 97420117; Fax: 61 3 9742 0201; E-mail: alison.johnson@foodscience.afisc.csiro.au.

JUNE

· **3-4, International Prospects for Dairying in the Next WTO Negotiating Round,** Hotel Claridge, Buenos Aires, Argentina. Sponsored jointly by Food & Agriculture Organization of the UN, Pan American Dairy Federation, and International Dairy Federation. For additional information, contact Mr. Ricardo A. James, President Comité Nacional Argentino de la FIL, Medrano 281, 1178 Buenos Aires, Argentine; Phone: 54 1 983 6149; 54 1 983 0587, 54 1 983 1865; Fax: 54 1 958 4056; E-mail: cil@cil.org.ar.

· **7-10, New Applications of Membrane Technology in the Dairy Industry,** Palais du Grand Large, Saint-Malo, France. The seminar will attempt to assemble the most recent information on new applications of the membrane processes that would benefit the dairy processing industry worldwide. For further information, contact Prof. J. L. Maubois, Dairy Research Laboratory INRA, 65 Rue de Saint Brieuc, FR-35042 Rennes Cedex, France.

· **14-16, The Food Safety Summit and Expo,** Washington, D.C. The conference serves food processors and manufacturers, as well as the food service and grocery fields, and others who produce, sell, or serve food. For more information, Phone: 800.746.9646.

· **14-16, Food Engineering,** Rutgers University, New Brunswick, NJ. For additional information, contact Keith Wilson, Phone: 732.932.9271; Fax: 732.932.1187; E-mail: ocpe@aesop.rutgers.edu; Web site: www.cook.rutgers.edu/~ocpe.

JULY

· **9-16, Rapid Methods and Automation in Microbiology International Workshop XIX,** Manhattan, KS. For scientific content, contact Daniel Y. C. Fung, Director of the Workshop at 785.532.5654; Fax: 785.532.5681; E-mail: dfung@oz.oznet.ksu.edu. For registration information, please see www.dec.ksu.edu/dce/conf/microbiology.

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