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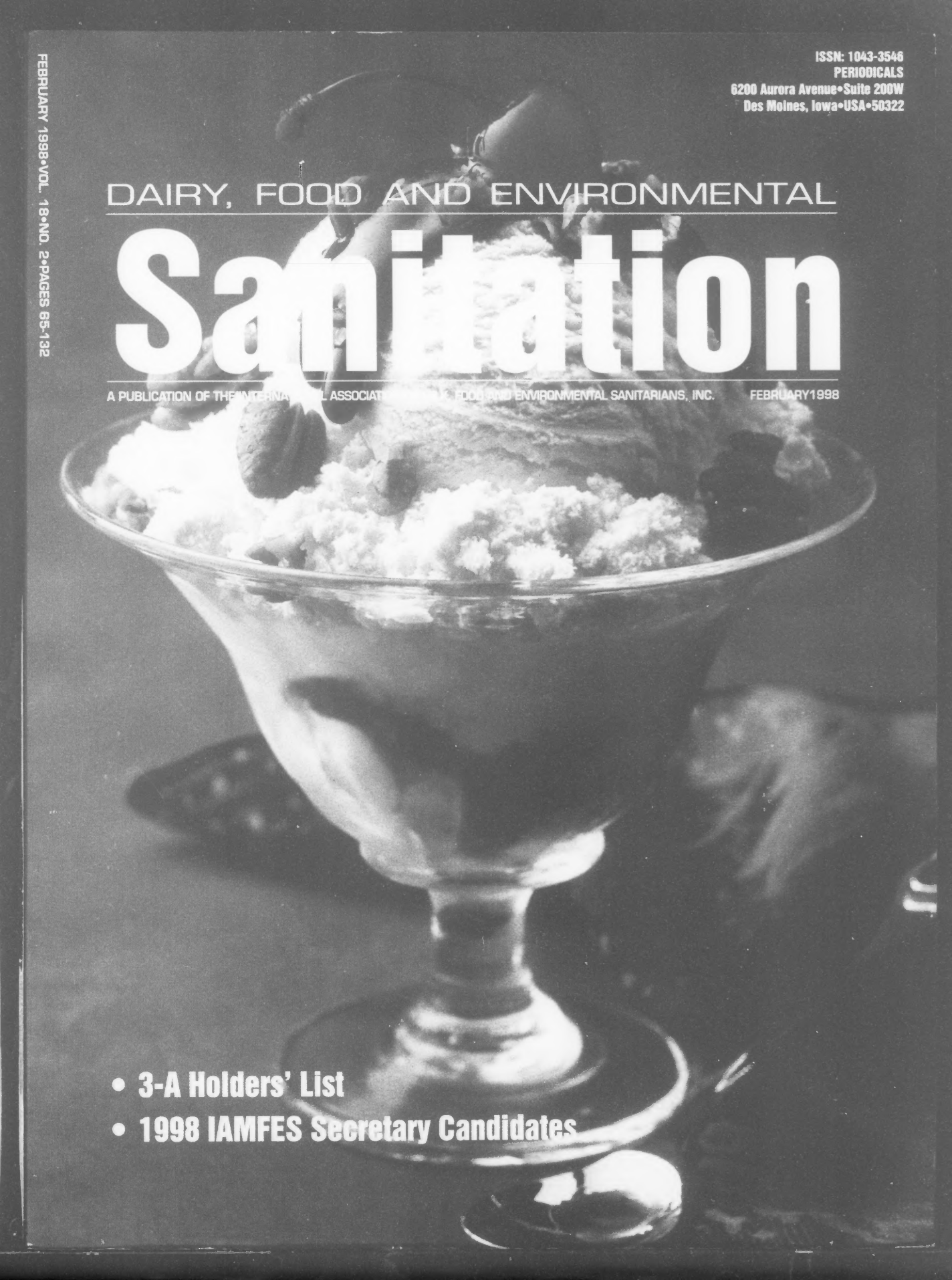

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A PUBLICATION OF THE INTERNATIONAL ASSOCIATION OF MILK, FOOD AND ENVIRONMENTAL SANITARIANS, INC.

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COMMENTS

FROM YOUR PRESIDENT

By GALE PRINCE
IAMFES President

"Take a moment to think about the name of our association"

Have you ever thought about your name? Your name is the shortest definition of you that anyone will ever have. If you think about it, though it is completely beyond your realm of control, you hope your name gives you a favorable review when you are introduced or someone mentions your name.

Take a moment to think about the name of our association; say the International Association of Milk, Food and Environmental Sanitarians out loud. How much of that phrase do you think you can say before the person hearing it loses interest? I personally can get about to "milk" before I speed up and trail off as I speak.

Our first impression with a prospective new member or other supporter will come from our name, just as we as people form opinions of others first from their name, then from the correspondence or communication we have with them. International Association of Milk? Is that what we are about? Milk is a big part of the picture we wish to paint, but is it the focus? After all, milk is a food; everything that provides nourishment can be considered a food.

Would calling ourselves the International Association for Food Protection be more representative of our mission? We would like to be perceived by those making initial contact with us as closely as possible to what we really are. This association needs to make its mission as an organization clear without having the luxury of time it takes to explain what we do. We are often referred to as simply IAMFES; those who know us know exactly what that means, everyone else has to ask. Even people who have had a good deal of exposure to IAMFES are not quite sure of what each letter of the acronym actually stands for. If we changed our name we might still use an acronym, but one that is much easier to remember and one that defines us, right from the start.

Changing our name is a step I believe IAMFES has to consider. Especially with all the food safety issues in today's news and since this is the key focus of our members.

I have welcomed comments from members since I first accepted a term on the IAMFES Executive Board, but those comments are more important to me now than ever. Please contact me at 513.762.4209; Fax: 513.762.4372; or E-mail: gprince@kroger.com with your ideas on this issue. We need your input to make decisions that reflect the thoughts and feelings of our membership.

Support Your IAMFES Foundation Fund

To support the IAMFES Foundation Fund, send donations (**marked Foundation**) to: IAMFES, 6200 Aurora Avenue, Suite 200W, Des Moines, IA 50322-2863

What is the IAMFES Foundation Fund?

The Foundation Fund is supported by membership of IAMFES sustaining members and from individual members. Sustaining members are corporations, companies and individuals whose business interests reflect the goals and mission of IAMFES. Funds in the Foundation are kept separate from the operating funds of IAMFES and are used for worthy causes which enrich the Association.

What does the Foundation Fund support?

Revenue from the Foundation Fund currently supports the IAMFES:

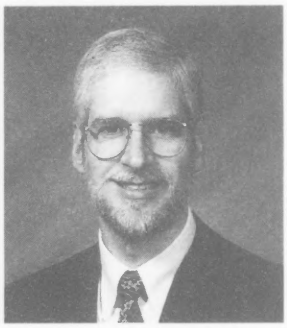
- Ivan Parkin Lecture
- Audio-Visual Lending Library
- Co-sponsorship of the Crumbine Award
- Developing Scientist Oral and Poster Competition
- Shipment of volumes of surplus JFP and DFES journals to developing countries through FAO in Rome
- Recruitment of exceptional speakers for IAMFES Annual Meetings

Why should I contribute to the IAMFES Foundation Fund?

Any contribution, no matter how large or small will help build a secure Foundation for the future of IAMFES. The future of IAMFES depends on how well we can meet the needs of our membership in providing educational programs, journals, products, and services, and on how well IAMFES fulfills its mission. The Foundation Fund was created to provide a long-lasting legacy of information and service for protecting the milk, food, water, and environment throughout the world.

COMMENTARY

FROM THE EXECUTIVE DIRECTOR



By DAVID W. THARP
IAMFES Executive Director

"You have an opportunity to build the stature of deserving colleagues"

Have you taken time recently to tell someone they have done a great job or that you appreciate their work? Everyone needs positive reinforcement to encourage them to continue exerting their highest effort. Today, you have an opportunity to build the stature of deserving colleagues through recognition from all IAMFES members by nominating individuals or companies for an IAMFES Award. You must act quickly though – the deadline for nominations is **February 20.**

Awards will be presented at the IAMFES Annual Meeting in Nashville, Tennessee this coming August. Our Awards Banquet is a fitting conclusion to the Meeting and provides an opportunity to recognize deserving individuals, companies, groups, and organizations. This recognition helps make their hard work and dedication worthwhile. Four individual awards are given: Sanitarian, Educator, Industry, and Citation. These awards recognize IAMFES members for their years of dedication to the ideals and objectives of IAMFES and to their profession. Affiliate Awards, Honorary Life Membership Awards, and the Black Pearl Award are also presented. The Black Pearl Award recognizes a company for its outstanding achievement of corporate excellence in food safety and quality. If you want to learn more about any of these awards, please call our office today!

We are fortunate to have other awards presented at our Awards Banquet, such as the Norbert F. Sherman Award, the Samuel J. Crumbine Award, and a new award this year, the NFPA Food Safety Award. These awards are administered by other groups and are also a great source for recognizing dedicated food safety professionals.

Do you have your plans in place to attend the 85th IAMFES Annual Meeting in Nashville? Congratulations if you do, and if you don't, may I suggest you begin planning now. Plans are underway for this year's Meeting, which includes over 250 presentations on the latest developments in food safety, over 80 educational exhibits, Committee and Professional Development Group meetings, and the opportunity to network with leading people in food safety from around the globe. We know you will not want to miss out on this year's Meeting.

Two groups help us present such an outstanding Annual Meeting – The Program Advisory Committee and the Local Arrangements Committee. Both groups are busy planning and developing this year's Meeting. The Program Advisory Committee, under the direction of Chairperson Susan Sumner, just completed their meeting in January. The Committee spent many exhausting hours pouring over submitted abstracts and symposia. They are responsible for analyzing and reviewing abstracts, accepting, categorizing, and then scheduling the program.

The Local Arrangements Committee met in December and will meet many times between now and August. This Committee consists of members from the Tennessee Association of Milk, Water and Food Protection and is co-chaired by Ann Draughon and Ruth Fuqua. Their responsibilities are to provide input on events held in conjunction with the Annual Meeting and to fill volunteer positions such as helpers at the registration desk and hospitality hosts during the Meeting.

Both the Local Arrangements and the Program Advisory Committees have done an excellent job of preparation and are to be commended. Without the help of these dedicated individuals, the Annual Meeting would not be what it is today! Our thanks goes out to everyone involved.

Dairy, Food and Environmental Sanitation, Vol. 18, No. 2, Pages 78-82

Quality and Stability of 2%-Fat Ultrapasteurized Fluid Milk Products

Kathryn J. Boor and Dorothy N. Nakimbugwe[1]

SUMMARY

Four batches each of raw and ultrapasteurized (UP) milk were sampled from each of two processing plants at approximately 3-month intervals. UP samples were stored at 7°(±1°)C and analyzed for microbiological, organoleptic, and chemical stability after 1, 4, 7, and 10 weeks of storage. The microbiological quality of the raw milk varied among batches and between processing plants. No viable bacteria were isolated from any processed milk sample during the 10-week storage period. The organoleptic quality of the milk samples was acceptable, as judged by a trained sensory panel throughout the test period. An increase was observed in the tyrosine values of the UP milk during the 10-week period, suggesting some post-processing protein degradation, but the maximum levels were below the threshold at which adverse flavor notes are normally detected. Acid Degree Values (ADV) were stable throughout the test period. The highest measured ADVs (0.5 to 0.7 meq FFA/liter) were below the threshold (1.0 to 1.5 meq/liter) at which rancidity is generally detected by sensory analysis. Vitamins A and D levels were stable during the 10-week test periods. Results indicate that ultra-pasteurization can produce organoleptically acceptable fluid milk products that are microbiologically and chemically stable for at least 10 weeks.

INTRODUCTION

Fluid milk products with extended shelf lives are value-added products with the potential to improve the economic competitiveness of dairy products in the beverage market. Efforts to extend the shelf lives of dairy products include the application of processing technologies such as ultra-high-temperature (UHT) thermal processing and ultra-pasteurization (UP). Product quality will ultimately determine consumer acceptance and demand for extended-shelf life dairy products in the United States. While many factors influencing the shelf life and quality of UHT fluid whole milk products have been described *(1, 2, 5, 6, 7, 9, 10, 13, 18, 19, 22, 23)*, UP product quality has not been extensively characterized.

In the United States, thermal processes for UHT milk must comply with Food and Drug Administration (FDA) requirements for sterilizing low-acid foods. Commercially sterile UHT milk is aseptically packaged, yielding a product that is shelf stable for several months. UP milk is heated to 280°F (138°C) for at least 2 s and generally has a shelf life of several

TABLE 1. Bacterial counts (CFU/ml × 10^3) for raw whole, skim, and 2%-fat milk

Test	Whole milk		Skim milk		2% milk	
	Plant 1	Plant 2	Plant 1	Plant 2	Plant 1	Plant 2
SPC	68 (37)*	43 (6)	35 (50)	7 (2)	78 (92)	50 (69)
GNC	37 (23)	10 (7)	7 (9)	0.08 (0.1)	93 (95)	42 (53)
PPC	37 (24)	17 (16)	25 (40)	0.07 (0.1)	23 (24)	25 (28)
LPC	4 (5)	0.7 (0.8)	4 (7)	0.03 (0.005)	6 (8)	0.04 (0.004)
CPC	2 (0.8)	0.08 (0.1)	0.4 (0.3)	0.001 (0.005)	0.3 (0.1)	0.08 (0.1)

SPC, Standard Plate Count; GNC, Gram Negative Count; PPC, Psychrotrophic Plate Count; LPC, Laboratory Pasteurized Count; CPC, Coliform Plate Count

*mean (S.D.)

weeks under refrigerated conditions *(3)*. In contrast, High Temperature Short Time (HTST) pasteurized milk, which must be heated to 161°F (72°C) for a minimum of 15 s or the equivalent, is usually coded for a last-day-of-sale between 10 and 21 days of refrigerated storage after the date of processing.

UP products may be susceptible to quality problems associated with UHT products, but they may in addition share some HTST product spoilage characteristics. To illustrate, some proteolytic and lipolytic enzymes survive UHT heat processing treatments *(1, 2, 6, 7, 21)*. These enzymes are endogenous to raw milk *(1, 18)* and also may be produced by psychrotrophic bacteria that are usually present in raw milk. Residual enzymatic activity can cause product degradation with extended storage, even at refrigeration temperatures *(21)*. In addition, because UP products are not aseptically packaged, they may be re-inoculated with spoilage organisms during filling. Such post-pasteurization contamination occurs frequently with HTST products *(11)*.

Vitamins A and D levels in fortified 2%-fat fluid milk products must meet the minimum legal standards of 2000 IU/qt and 400 IU/qt, respectively. In this study, vitamins A and D levels were monitored throughout post-processing storage to determine the stability of vitamins added to fortify UP milk products. In addition, the microbiological, organoleptic, and chemical stability of UP 2%-fat fluid milk products were assessed over 10 weeks of storage at 7°C.

MATERIALS AND METHODS

Sample collection

Four batches comprised of five sets of fifteen UP milk samples packaged in 3-layer (polyethylene/paperboard/polyethylene) half-pint (ca. 235 ml) gable-top cartons were obtained from each of two processing plants at approximately 3-month intervals. Raw milk samples (the whole and skim milk used in the formulation of the 2% UP milk and the raw 2% milk fortified with added vitamins A and D) were collected into sterile Whirlpak™ bags (Nasco, Ft. Atkinson, WI) according to Standard Methods for the Examination of Dairy Products *(20)*. All samples were transported at 4°C in insulated coolers. Upon arrival in the laboratory, UP samples were stored at 7° (±1°)C (45°F) throughout the 10-week test periods.

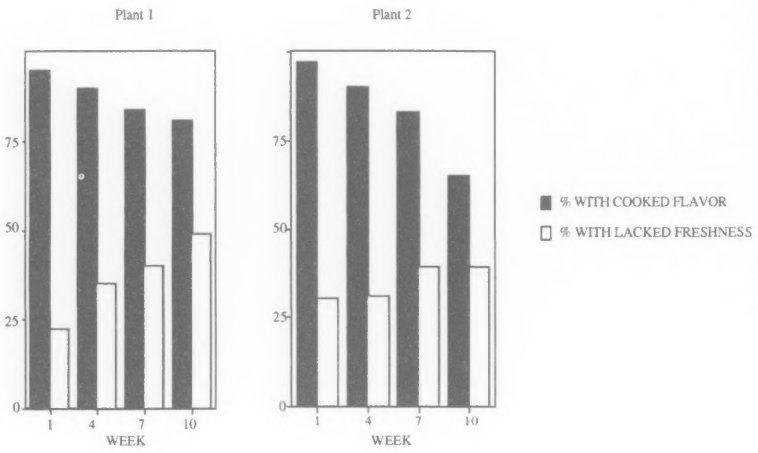
Microbiological analyses

Raw milk samples were analyzed upon arrival in the laboratory by standard methods for determining microbial numbers using the following procedures: Standard Plate Count (SPC), Psychrotrophic Plate Count (PPC), Laboratory Pasteurization Count (LPC), Coliform Plate Count (CPC), and Gram Negative Count (GNC) *(20)*. The processed milk samples were examined for SPC, PPC and aerobic sporeformers *(20)* upon arrival and after 4, 7, and 10 weeks of storage.

Sensory evaluation

Ten trained panelists from the Department of Food Science at Cornell University evaluated the sensory quality of the processed milk samples upon their arrival in the laboratory and after 4, 7, and 10 weeks *(4, 27)*. Panelists were provided with two ballots. On one ballot, each sample was scored for overall quality on a scale of 1 to 10 (10 = "no defects detected"). The second ballot was used for identification of specific quality defects. At each testing period, contents of cartons were mixed by inversion; then approximately 2 oz. (ca. 60 ml) of milk was poured into 5-oz. (ca. 150-ml) plastic cups labeled with three-digit codes. The cups were capped and presented to panel members. To enhance evaluation of defects, samples were allowed to warm to approximately 59°F (15°C) before evaluation.

Figure 1. Trends in "cooked" and "locked freshness" flavor defects observed in UP 2%-fat milk samples from Plants One and Two, stored at 7°C.



Chemical tests

Free fatty acids present in the milk samples, expressed as Acid Degree Value (ADV), were measured using variation II of the modified copper soap solvent extraction method *(26)*. Vitamin A levels were measured at week 1, 4, 7, and 10 by standard methods that use an HPLC system *(20)*. Vitamin D levels were quantitated by HPLC using a modification *(24)* of the method of Kobayashi et al. *(16)*. Proteolysis in the processed milk samples throughout the storage periods was estimated by determining tyrosine values *(14, 15)* at 1, 4, 7, and 10 weeks.

Statistical analyses

A two-way ANOVA was performed at a 0.05 with the Minitab Version 10 (Minitab Inc., State College, PA) to determine if results varied significantly between weeks within a sample batch. A repeated measures split plot ANOVA at a 0.1 with the JMP Statistical Analytical Systems (SAS Institute, Inc., Cary, NC) computer software was performed to determine if analytical results from samples varied significantly between batches within the same processing plant and also to determine if significant differences existed between milk processed by one plant and milk processed by the other.

RESULTS

Microbiology

Table 1 shows results of microbial analyses of raw milk (whole, skim, and 2%) used for production of the UP milk samples. Although counts varied greatly among batches for each plant, SPCs for all samples were below the bacterial limits of 300,000 CFU/ml for commingled grade A raw milk *(3)*. Except for the PPC for the blended 2% milk, counts for the raw milk samples from Plant Two were consistently lower than those from Plant One. In general, bacterial counts were lowest in the raw skim milk samples, specifically those from Plant Two. These reduced counts are attributed to a pre-pasteurization heat treatment applied during the skimming process.

Regardless of the counts in the raw milk samples, no viable bacteria were found by the given procedures in any UP 2%-fat milk samples plated after 1, 4, 7, or 10 weeks of storage at 7°C.

Sensory quality and flavor defects

Samples from both plants received an average score of approximately 7 on a scale of 1 to 10 throughout the 10-week period. Mean flavor scores for samples from all batches from both plants did not vary significantly from 7 ($P > 0.05$) throughout the 10-week period.

Although overall product quality did not vary between sampling intervals throughout the test period or between batches for each plant ($P>0.05$), descriptive analyses of defects revealed trends in detection of "cooked flavor" and "lacked freshness" flavor notes. The pronounced cooked flavor defect, noted in over 90% of the samples from both plants after one week, was noted in only 80% in Plant One samples and 70% in Plant Two samples after 10 weeks (see Fig. 1). Other flavor defects, collectively described as "lacked freshness," increased from 20 to 50% in Plant One and 30 to 40% in Plant Two during the 10-week trial.

Chemical analysis

In all samples analyzed, tyrosine values (TVs) increased significantly ($P<0.1$) during the test period, suggesting that some protein degradation had occurred. TVs for processed milk samples from Plant One were uniformly stable, at approximately 200 µg/ml for the first 7 weeks of storage, but had increased to an average of 330 µg/ml after 10 weeks. Although the mean TV was initially lower for Plant Two milk samples than Plant One samples, week 10 measurements were similar for the two plants. The mean TV for Plant Two milk samples was 175 µg/ml at week 1; 198 µg/ml at week 4; 250 µg/ml at week 7; and 320 µg/ml at week 10. In no instance did the TV of a milk sample reach the level (1,500 µg/ml) necessary for detection of off-flavors.

Free fatty acid levels (expressed as ADV) for the processed milk samples were consistent at approximately 0.7 meq/liter ($P > 0.05$) for all milk samples from both plants throughout the 10-week test period.

No rancid flavors were detected in the samples.

Mean vitamin A and vitamins D levels (in IU/qt) were 1,965 and 395, respectively, for Plant One samples, and 2,446 and 420, respectively, for Plant Two samples. In all cases, vitamin levels were stable in samples from both plants throughout the 10-week sample period.

DISCUSSION

U.S. consumers accustomed to conventionally pasteurized milk have been reported to detect a distinct cooked flavor in some UHT milk products *(8, 12, 13)*. Other reported UHT fluid milk defects include the possible development of oxidized and stale flavors *(13)*, creaming or fat separation *(25)*, gelation or sediment formation *(19)* and proteolytic or lipolytic deterioration *(1, 2, 5, 6, 7, 10, 18, 22, 23)*. In general, except for cooked flavor *(8)*, most UHT flavor and texture defects have been reported to increase in severity with increased storage time and temperatures *(7, 9, 10, 18, 19, 23)*.

In this study, over 90% of the UP milk samples from both plants were initially described as having a pronounced "cooked" flavor. Although all packaged samples from Plant One were processed at 145°C for 2 s, 80% retained "cooked" flavor notes, even 10 weeks after processing. The proportion of samples with "lacked freshness" defects rose from 20% to 50% during the test period. While all packaged samples from Plant Two were processed at 140°C for 4 s, 65% were described as tasting "cooked" after 10 weeks, with "lacked freshness" defects increasing from 30% after one week to 40% at 10 weeks. Prolonged product contact with paperboard containers might have contributed to development of the "lacked freshness" flavor notes *(17)*.

Microbiology results indicate that UP processing, i.e., 140°C (284°F) for 4 s or 145°C (293°F) for 2 s, destroys even the highly variable numbers of microorganisms found in the skim and whole milk used as raw material for UP 2%-fat milk. Products from both plants were adequately protected from post-processing contamination. Levels of Vitamins A and D were stable for up to 10 weeks in UP 2%-fat milk samples stored at 7°C in three-layer half-pint paperboard cartons. Our findings indicate that ultra-pasteurization can produce organoleptically acceptable fluid milk products that are microbiologically and chemically stable for at least 10 weeks.

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Occurrence of Clinical Mastitis and Antimicrobial Residues on Dairy Farms in Trinidad

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SUMMARY

The prevalence of clinical mastitis in lactating cows and antimicrobial residues in bulk milk from selected dairy farms in Trinidad was studied. The etiological agents of mastitis, frequency of use of veterinary services, and the practice of raw milk consumption were also investigated. Of 1,204 lactating cows studied, 29 had ongoing clinical mastitis, but 25 of 177 dairy farms investigated had cows with clinical mastitis. *Staphylococcus aureus* was the predominant pathogen recovered, with 9 of 14 mastitic milks testing positive for the pathogen, while *Streptococcus agalactiae* was isolated from 4 samples. Resistance to penicillin was most common among *S. aureus* strains with 5 of 9 exhibiting resistance. Among 177 dairy farmers, 105 rarely used veterinary services, compared with 27 who were frequent users, and the difference was statistically significant ($P \leq 0.001$; X^2). Of 173 dairy farmers, 140 claimed adherence to a required withdrawal period following antibiotic use, and only 5 of 176 bulk samples were positive for antimicrobial residues. Penicillin accounted for 80% of the identified residues. Overall, 55 of 177 dairy farmers consumed raw cows' milk.

It was concluded that clinical mastitis was low among dairy cows studied in Trinidad, but the low level of veterinary services usage coupled with the presence of antimicrobial residues in milk, often consumed raw, may pose a health hazard.

INTRODUCTION

Clinical mastitis, which may be caused by several pathogens, is an important source of economic loss in the dairy industry *(7, 13, 19)*. Subclinical mastitis, often unknown to the dairy farmer, has been reported to be prevalent on dairy farms *(4, 25, 27)* and has been associated with decreased milk production with obvious economic implications *(13, 15)*. Reports have suggested that misuse of antimicrobial agents has caused development of resistance in microorganisms responsible for mastitis *(30, 31)*. In developing countries, legislation to control the use of antimicrobial agents by farmers and enforcement of these laws are often lacking, with farmers frequently having ready access to these drugs *(2, 30)*.

The presence of antimicrobial agents in milk is a longstanding health concern *(8, 9)* because they can cause the development of resistance in enteropathogens *(16)*. Consumption of raw milk has also resulted in several milk-borne outbreaks worldwide *(17, 22, 26)*. Milk originating from dairy farms in Trinidad has been found to contain verocytotoxigenic *Escherichia coli* and enterotoxigenic *Staphylococcus aureus*, often in high

numbers *(1, 4)*. The risks associated with consumption of raw cows' milk therefore cannot be ignored.

This study was conducted to determine the prevalence of clinical mastitis and the associated etiologic agents on dairy farms in Trinidad; to investigate the frequency of use of veterinary services as well as the adherence to the withdrawal periods when antibiotics are used; and to determine the prevalence of antimicrobial residues in bulk milk and the practice of consumption of raw milk.

MATERIALS AND METHODS

Experimental design

Trinidad is a small island with approximately 700 dairy farms and 4,000 milking cows.

Clinical mastitis was studied on dairy farms that supplied milk to collection centers earlier investigated by Adesiyun et al. *(4)*. To select the farms to study, a computer printout of all dairy farms from each milking area was collected from the main milk processing plant in Trinidad. Every other dairy farm on the list was selected.

Questionnaire information

A comprehensive questionnaire was made available to each dairy farmer selected, and completed questionnaires were collected during or after the sampling visit. Information was obtained on the number of lactating cows on each farm; usage of veterinary services, classified as rare (hardly used or not used), moderate (once in 6 months), or frequent (1 to 3 times monthly); administration of therapy to dairy cows by farmers; knowledge of and adherence to requirements for withdrawal periods following use of antimicrobial agents; consumption of raw cows' milk and reason for consumption of raw milk.

Collection of milk samples

Milk samples were collected from cows that were clinically mastitic between October 1994 and February 1995. All lactating cows clinically diagnosed as mastitic but not receiving current therapy were sampled. Approximately 25 ml of milk was pooled from all quarters of each mastitic cow.

Bulk milk samples were collected from each dairy farm by trained veterinary public officers, pooled from all 48 kg stainless steel churns containing milk. Approximately 25 ml of sample was collected aseptically into sterile universal bottles. Each cow was sampled once during the study period.

All milk samples, bulk and mastitic, were transported to the laboratory ice-cooled within 2 h of collection.

California mastitis test

The California mastitis test (CMT), interpreted as described by Ullmann et al. *(28)*, was used to estimate the somatic cell count of all mastitic milk. Test results were classified as negative, 1+, 2+, 3+ and 4+. Clinical mastitis was determined by clinical examination of affected mammary glands combined with CMT reactions of 3+ or 4+ as criteria.

Total aerobic plate count of milk

To determine the total aerobic plate count decimal dilutions of milk were prepared in sterile saline and 0.1 ml was inoculated onto nutrient agar plates, after which sterile glass spreaders were applied. Inoculated plates were incubated at 37°C for 24 h and the colonies enumerated on a Quebec Darkfield colony counter (Cambridge Instruments Inc., United States). The counts were expressed as total aerobic plate count per ml of milk.

Isolation and identification of pathogens

Of each milk sample, 0.1 ml was inoculated into blood agar, MacConkey agar, and Baird-Parker agar plates and streaked for isolation. Inoculated plates were incubated aerobically at 37°C for 24 to 48 h. Pathogens were identified by standard methods *(21)*.

Determination of sensitivity of pathogens to antimicrobial agents

For all pathogens isolated, the following antimicrobial agents and concentrations were used: ampicillin (10 µg), chloramphenicol (30 µg), cephalothin (30 µg), gentamycin (10 µg), kanamycin (30 µg), methicillin (5 µg), neomycin (30 µg), penicillin (10 µg), streptomycin (10 µg) and sulphamethoxazole/trimethoprim, SXT (25 µg). The disk diffusion method was used *(5)*.

Detection of antimicrobial residues in milk

The Delvotest SP 5 Pack test kit (Canada Colours and Chemical Limited, Canada) was used to screen bulk milk for antimicrobial residues as recommended by the manufacturer. Penicillin was specifically detected by treating all samples that showed antimicrobial activity with penicillinase at concentration of 100,000 i.u./ml. To detect sulfas in milk, milk samples with inhibition were treated with para-amino benzoic acid (PABA) at 100 µg/ml. The sensitivity of the assay system for penicillin and sulfas was 0.003 to 0.004 i.u./ml and 0.1 to 0.25 µg/ml of milk, respectively. All samples with antimicrobial activity but not inhibited by either penicillinase or PABA were classified as positive for "antimicrobial residue, not penicillin or sulfa (NPS)."

Statistical analysis

The prevalence of events were compared using the chi-square test for independence, with one degree of freedom for cells with five or more observations.

RESULTS

The prevalence of clinical mastitis in lactating cows and dairy farms is shown in Table 1. Clinical mastitis was detected in 25 of 177 dairy farms (14.1%) studied. Only 29 of 1,204 lactating cows (2.4%) were positive for clinical mastitis.

TABLE 1. Prevalence of clinical mastitis in dairy cows and dairy farms in Trinidad between October 1994 and February 1995

Milking Center	Farm prevolence of clinicol mostitis: No. of forms sampled	Farm prevolence of clinicol mostitis: No. of forms with cows experiencing clinicol mastitis	Prevolence of bovine clinical mostitis: No. of milking cows[a]	Prevolence of bovine clinical mostitis: No. positive
1C	43	10 (23.3)	497	11 (2.2)
5C	35	4 (11.4)	173	4 (2.3)
5H	33	1 (3.0)	114	1 (0.9)
2G	16	2 (12.5)	84	2 (2.4)
2C	15	2 (13.3)	55	3 (5.5)
2B	14	5 (35.7)	181	7 (3.9)
6H	11	0 (0.0)	27	0 (0.0)
3G	10	1 (10.0)	73	1 (1.4)
Totol	177	25 (14.1)	1,204	29 (2.4)

( ) Percent

[a]Mean number of milking cows per form in each milking center is: IC (12 ± 3), 5C (5 ± 2), 5H (3 ± 2), 2G (5 ± 2), 2C (4 ± 2), 2B (13 ± 5), 6H (2 ± 1) ond 3G (7 ± 10)

TABLE 2. Use of veterinary services and frequency of treatment of dairy cows by farmers in Trinidad, October 1994 to February 1995

Milking Center	No. of farms	Use of veterinory services: Rare[a]	Use of veterinory services: Moderote[a]	Use of veterinory services: Frequent[a]	No. of herds with formers odministering treotment
IC	43	19	13	11	25
5C	35	19	10	6	20
5H	33	18	10	5	22
2G	16	9	3	4	12
2C	15	14	1	0	8
2B	14	11	3	0	10
6H	11	6	4	1	7
3G	10	9	1	0	3
Totol	177	105	45	27	107

[a]Rare defined os hordly used or not used, moderate as used once in 6 months ond frequently used 1 to 6 times monthly.

Of the 14 mastitic milk samples studied (not exposed to any therapy), the CMT result was 3+ for 11 samples and 4+ for 3 samples. The total aerobic plate count (*TAPC*) of over 10^4 CFU/ml was most prevalent (in 7 samples) but only 1 sample had a count as high as 4.1×10^6. *S. aureus* was the most frequently isolated pathogen, with 9 of 14 positive, compared with 4 and 1 positive results for *S. agalactiae* and *Klebsiella pneumoniae*, respectively. Among the nine *S. aureus* strains, resistance to penicillin (55.6%; 5 of 9) and kanamycin, (55.6%; 5 of 9) was relatively high, while 3 (33.3%) and 1 (11.1%) strains exhibited resistance to ampicillin and methicillin, respectively. Of the 4 strains of *S. agalactiae*, 4 (100.0%) and 3 (75.0%) were resistant to kanamcyin and methicillin, respec-

TABLE 3. Possession of knowledge and adherence to withdrawal period for antibiotics

	Knowledge of withdrowol period		Adherence to withdrowal period	
Milking Center	No. of responding formers[a]	No. with knowledge	No. of responding formers	No. complying
IC	42	40	41	39
5C	34	31	33	31
5H	31	31	26	23
2G	16	15	16	15
2C	15	13	11	8
2B	14	13	12	11
6H	11	6	7	6
3G	10	8	9	7
Totol	173	157	155	140

[a]Number of farmers thot responded to specific questions relevant to knowledge of ond odherence to withdrowal period.

TABLE 4. Prevalence of antimicrobial residue(s) in bulk milk samples

		Detection of antimicrobial residue	
Milking Center	No. of bulk milk somples tested	No. of bulk somples positive	Residue detected
IC	42	2	[1]P [2]
5C	35	1	PS [1]
5H	33	0	-
2G	16	1	P [1]
2C	15	0	-
2B	14	1	NPS [1]
6H	11	0	-
3G	10	0	-
Totol	176	5	P [3], PS [1], NPS [1]

[1]P, Penicillin; PS, Penicillin ond Sulfo; NPS, Not Penicillin or Sulfo

[ ] Number of somples

tively, of the 10 antimicrobial agents tested. Overall, all 4 types of pathogens tested exhibited resistance to one or more of the antimicrobial agents tested.

For 177 dairy farms sampled, 105 (59.3%), 45 (25.4%) and 27 (15.3%) used veterinary services rarely, moderately and frequently, respectively (Table 2). A total of 107 (60.5%) of the 177 dairy farmers administered treatment to their dairy cows.

Of 173 dairy farmers, 157 (90.8%) admitted knowledge of the withdrawal period for antimicrobial agents (Table 3). One hundred and forty of 155 (90.3%) dairy farmers claimed adherence to the withdrawal period following use of antimicrobial agents. For all farms studied, the mean number of days observed as withdrawal period was 3.8 ± 0.6.

Only 5 of 176 (2.8%) bulk milk samples contained antimicrobial agents (Table 4). Penicillin was detected in 4 of 5 samples (80.0%) positive for detectable antimicrobial residues.

A total of 55 of 177 (31.1%) dairy farmers and their families consumed raw cows' milk. The reasons for consuming raw milk among 177 farmers were taste (27.3%), nutritious nature (23.6%), lack of time to boil (10.9%), preference (2.8%) and habit or custom (2.3%). A total of 12 farmers (21.8%) gave no reasons for consuming raw milk.

DISCUSSION

The prevalence of clinical mastitis (2.4%) in lactating cows detected in the present study is low, although similarly low prevalences have been documented elsewhere *(6, 12, 14)*. A similar study in Jamaica, another Caribbean country, reported a prevalence of 0.8% for clinical mastitis in dairy herds *(31)*. Jung et al. *(18)*, however, reported a higher prevalence, 8.3% for clinical mastitis in South Korea. Several reasons, among which are weather, breed of dairy cow, and management practices, have been reported to affect the occurrence of clinical mastitis *(23)*. The relatively small sizes of dairy farms in Trinidad, coupled with a predominance of hand-milking practised by over 95% of the dairy farmers (Adesiyun and others, unpublished data) may in part, explain the low prevalence of clinical mastitis detected. Machine milking, if done improperly, has been found to result in mastitis *(23)*. It is also known that low incidence of clinical mastitis is often due to high incidence of subclinical mastitis, especially with contagious microorganisms such as *S. aureus* which usually causes subclinical mastitis *(25)*.

It was of interest to observe that *S. aureus*, the predominant etiological agent of clinical mastitis in lactating cows sampled, was responsible for mastitis in 64% of the cows and caused clinical mastitis in three of the five milking centres affected. This finding agrees with reports by others *(19, 20, 31)*. In Europe and the United States, however, it is known that most cases of clinical mastitis are caused by environmental pathogens such as streptococci and coliforms, because contagious pathogens such as *S. aureus* have been controlled *(25)*.

Although the somatic cell count was not determined in the present study, the CMT used in its estimation *(28)* detected reactions of 3+ and 4+, highly suggestive of high somatic cell counts in mastitic milk, coupled with the relatively high total aerobic plate count per ml. High somatic cell counts have been associated with clinical mastitis *(12, 14)*, although clinical mastitis has been known to occur in farms with low somatic cell counts *(6)*.

It was significant that resistance to penicillin was highly prevalent among *S. aureus* strains responsible for most clinical mastitis, as 56% of the isolates exhibited resistance. However, it did not come as a surprise, as milk originating from the milking centers but sampled at the collection centers using milk from non-clinical mastitis cows exhibited a high prevalence of resistance. High prevalence of resistance to penicillin has been reported by others *(16, 20)*, which reflects the fact that most *S. aureus* strains have the penicillinase enzyme, known to be common in animal and human strains. Adesiyun et al. *(4)* reported that 48 of 100 strains of *S. aureus* were resistant to penicillin. *S. aureus* is well known to be associated with subclinical mastitis, which has been documented to be highly prevalent in Trinidad *(1, 4)* and in dairy farms elsewhere *(20, 24, 27)*. Subclinical mastitis has also been reported to cause a 19% to 50% reduction in milk production, with associated economic losses *(11, 12)*.

The rather high prevalence of resistance to penicillin may be explained, in part, by the fact that approximately 60% of dairy farmers in the farms studied did not use veterinary services but treated animals themselves. A recent change from free veterinary practices provided by government veterinarians to fee-paying services is a relevant factor to consider. In developing countries such as Trinidad and Tobago, antimicrobial agents are readily available and the possibility of misuse or abuse cannot be ignored, as has been pointed out by others *(31)*. The economic impact of antibiotic resistance by etiological agents of mastitis is therefore important, as milk yield is consistently reduced and the potential for the spread of resistant pathogens to other cows also exists *(29, 31)*.

Another public health concern associated with unsupervised treatment of their dairy cows by dairy farmers is failure to observe stipulated withdrawal periods following therapy; the major processing plant in Trinidad does not test for antimicrobial residues in milk from these farms. The risk may, however, be extremely low, as 90% of the farmers questioned claimed that they possessed knowledge of the requirement of a withdrawal period and in fact observed it. The observance of stipulated withdrawal periods may therefore account for the relatively low prevalence (2.8%) of antimicrobial residues in milk. Higher prevalences of antimicrobial residues in milk have been reported by others *(8, 10)*.

Of food hygiene significance was the fact that close to a third of the dairy farmers and their families consumed raw cows' milk. Consumption of raw milk has been responsible for several epidemics *(17, 22, 26)*. A number of milk-borne pathogens have been detected in livestock in Trinidad *(3)*. The possibility of these pathogens gaining access to raw milk therefore exists. A second risk associated with consumption of raw milk is exposure to antibiotic residues. It was of interest to observe that approximately 20% of those consuming raw milk in the present study did so without specific reasons. It is therefore possible that the institution of an educational program to discourage raw milk consumption may be effective with these individuals. To date, information is not available on the percentage of the general population that also has access to raw milk from the dairy and that may consume raw milk.

In conclusion, although the prevalence of clinical mastitis in lactating cows studied is low, the

unsupervised use of antimicrobial agents by dairy farmers and the consumption of raw cows' milk are health concerns. It is therefore imperative that educational campaigns be instituted to address the problems.

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Reprinted from *Maryland Dairy Talk*, Fall Issue, Volume 1

Measure MUN and Evaluate Dairy Cow Nutrition

Jamie Jonker, Resident Graduate Assistant
and Rick Kohn, Assistant Professor, Department of Animal and Avian Sciences

Milk testing laboratories now report levels of milk urea nitrogen (MUN) when measuring milk composition. MUN is important because of its effect on reproduction and nutrition. High levels of MUN have been associated with reduced conception rates and longer calving intervals, which result in lost income to the dairy farmer.

High MUN levels are often attributed to specific causes, including too much rumen degraded protein, too little energy, an imbalance of carbohydrate and protein ratios, not enough un-degraded rumen protein. None of these reasons alone tells the complete story; high levels of MUN depend on a combination of factors.

In simplest terms, high MUN levels indicate a general excess of nitrogen in the cow based on the animal's level of production. Excess nitrogen might be the result of excess protein. The wasted protein, excreted in the cow's urine, results in loss of income to the dairy farmer. Two few calories in the diet result in lost production by the cow. Because of this loss, the protein cannot be used, and high MUN results.

The rule of thumb is that levels of MUN in an average herd should fall between 12 and 16 milligrams per deciliter. If the average MUN level is outside this range, it is a good idea to try to determine the cause. We recommend a minimum of 10 cows be sampled to determine an average MUN value for a herd. Dairy Herd Improvement Association (DHIA) testing laboratories now routinely analyze milk for MUN. Including this analysis with your monthly DHIA sampling is convenient and might be cost effective for all cows in the herd. Bulk tank samples might save money, but they will not show differences among different groups of cows.

We need to systematically isolate the true cause of high MUN levels. The following checklist should help determine the cause and lead to solutions for correcting the problem.

MUN Checklist

1. Milk Production—Are the cows producing as much milk as we expected?
2. Diet Formulation—Is the diet formulated to meet the cow's nutrient requirements?
3. Feed Analysis—Are all forages analyzed routinely?
4. Feed Digestibility—Do any of the feeds have heat damage?
5. Feeding Management—Are we feeding the cows the diets, as formulated, or is something lost in the translation from nutritionist→manager→feeder?
6. Animal Consumption—Are the cows eating what is offered or are they selecting part of the ration?

Why Have 3-A Standards for Rubber Materials?*

Kirk Snyder and Thomas M. Gilmore*

At first glance, the 3-A Sanitary Standards for Rubber and Rubber-Like Materials Used as Product Contact Surfaces in Dairy Equipment, Number 18-02, may seem unnecessary. After all, acceptable rubber materials intended for repeated use "in producing, manufacturing, packing, processing, preparing, treating, packaging, transporting, or holding food" are defined in the Code of Federal Regulations, Title 21, Part 177.2600 (21 CFR, Part 177.2600). So why would we need 3-A standards for materials that are already accepted by the FDA? The simple answer is that the CFR section on rubber materials and the 3-A standards for rubber materials address fundamentally different issues.

The Code of Federal Regulations, Title 21, which covers food and drugs, is further divided into parts (numbered 170 through 199), each of which covers specific aspects of food and drugs for human consumption. Part 177, titled "Indirect Food Additives: Polymers," covers materials (plastics and rubbers) that are used in food contact surfaces. Specifically, Part 177.2600 covers "rubber articles intended for repeated use." To comply with 21 CFR, Part 177.2600, articles must meet the following conditions:

- The articles must be made from acceptable substances. Acceptable substances include those that are generally recognized as safe (GRAS) for use in food or food packaging (these are listed in 21 CFR, Part 182); those listed in 21 CFR, Part 177.2600, paragraph (c)(4), which specifically names a number of acceptable rubber components, and those covered by other regulations.
- The total amount of material extracted during extraction with distilled water (for articles to be used with aqueous foods) or *n*-hexane (for articles to be used with high-fat foods) must be below certain limits.
- Substances intended to have an effect on the food may not be used.
- A substance may be used only in the necessary amount.
- Rubber articles to be used with dry foods must be made in accordance with good manufacturing practices that ensures that the articles are suitable for repeated use.
- The rubber articles must be thoroughly cleansed before they come in contact with food.

The scope of the 3-A Sanitary Standards for Multiple-Use Rubber and Rubber-Like Materials Used as Product Contact Surfaces in Dairy Equipment, Number 18-02, includes "the material and serviceability requirements of rubber and rubber-like materials intended for multiple-use as product contact surfaces or solution contact surfaces in the production, processing, and handling of milk or milk products." These requirements are found in Sections C (Materials) and D (Compatibility with Cleaning and Sanitizing Agents). To comply with Section C, the material must be nontoxic, must not adversely affect the product, and must comply with 21 CFR, Part 177.2600. In addition, it must:

- meet minimum tensile strength and elongation requirements;
- meet tolerance limits for changes in hardness, weight, and volume after immersion in a high-fat medium (butter oil or anhydrous milk fat) at specified time and temperature settings;
- meet tolerance limits for changes in hardness, weight, and volume after immersion in distilled water at specified time and temperature settings; and
- meet tolerance limits for changes in hardness after exposure to heated air for a specified length of time (the temperature varies according to material type).

To comply with 3-A 18-02, Section D, the material must meet tolerance limits for changes in hardness, weight, and volume after immersion in:

- an acid cleaning solution;
- an alkaline cleaning solution; and
- a chlorine sanitizing solution.

Each immersion test follows a separate testing procedure and is performed at appropriate time and temperature settings.

To summarize, the requirements of 21 CFR, Part 177.2600 ensure that components used in rubber product contact surfaces are nontoxic, have no effect on the product, and are present only in the necessary quantity. If any material is incidentally extracted into the product, these regulations ensure that the amount of material extracted will be inconsequentially small and will not present a threat to public health.

In addition to referencing these CFR requirements, the criteria specified in 3-A 18-02 address the physical properties of the rubber and rubber-like materials. These criteria ensure that materials used as product contact surfaces will maintain their original strength, elongation, hardness, weight, and volume characteristics throughout the processing, cleaning, and sanitizing phases. The testing procedures in Section C simulate the effects of processing conditions, while the tests specified in Section D simulate the effects of cleaning and sanitizing solutions over an extended period of regular use. Thus, they are accelerated use-simulating tests, not normal processing, cleaning, and sanitizing procedures.

Therefore, although 21 CFR, 177.2600 and 3-A 18-02 may initially appear to be redundant documents, they actually work in conjunction to guarantee that any rubber or rubber-like material used as product contact surfaces in dairy equipment is safe, is cleanable, and does not affect public health.

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UpDates

Dr. Robert Bosselman, FMP, Appointed Academic Ambassador

The Educational Foundation of the National Restaurant Association has appointed Dr. Robert Bosselman, FMP, as Academic Ambassador.

Bosselman will be the liaison between academic instructors at four-year universities and The Educational Foundation. He will also represent The Foundation at regional and national events and will serve on The Foundation's curriculum development advisory committee, which provides insight on development of programs for two- and four-year curriculum and continuing education.

Bosselman currently serves as Associate Director of Graduate Studies and Research for the William F. Harrah College of Hotel Administration, at the University of Nevada, Las Vegas. His specific responsibilities include managing the master's degree program, and supervising research activities of the college. He also holds the rank of Associate Professor in the Department of Food and Beverage Management, and carries a full teaching load each semester.

Bosselman has written more than 30 academic papers with research interests in food sanitation, foodservice operations, labor relations and hospitality education. He was the founding Editor of the *Hospitality and Tourism Educator*, and also served a term as Editor of the *Hospitality Research Journal*.

He received his doctorate in food systems administration from Oklahoma State University, a master's degree in hotel and restaurant administration from Florida International University and a bachelor's degree in biological sciences from SUNY, Buffalo. He is also a registered Dietitian.

Wirtz Promoted to Vice President at AIB

Ron Wirtz has been promoted to Vice President, Information Services and Distance Learning, to coordinate activities formerly carried out by three AIB departments: information services, communications, and distance learning.

Wirtz is a native Kansan who received his Ph.D. in Education from Kansas State University in 1994. He began at AIB as Director of the Ruth M. Emerson Library in 1987 and was named Director of Information Services and Distance Learning in 1995 and 1997, respectively. The combination of the three departments will allow Wirtz to continue his work in the Emerson Library while adding leadership to all of AIB's remote learning programs, including correspondence courses, CD-ROM programs, and AIB's Internet marketing efforts.

Prior to coming to AIB, Wirtz worked as a media specialist in public schools in Kansas and Nebraska and taught French at William Woods College and Emporia State University.

He has a language certificate from the Sorbonne in Paris, France, a bachelor's degree in French from Kansas State, a master's in French from Colorado State University, and an MLS in library science from Emporia State University. Wirtz is a member of the American Society of Bakery Engineers, the Society for Applied Learning Technology, the Library and Information Technology Association, and the Association for Supervision and Curriculum Development.

Sales Executives Join A & B Process Systems

A & B Process Systems Corp. announces the appointment of William R. Griffin as Vice President–Western Division, and Dan B. Look as Sales Coordinator.

Griffin will maintain A & B's Western Division office in Portland, OR. He comes to A & B with a strong background in processing environments. Previously employed by another international provider of process flow systems and related equipment, he has filled key technical and managerial roles in turnkey projects. Griffin holds a bachelor of technology degree in mechanical engineering from the Rochester Institute of Technology in Rochester, NY.

Dan Look comes to A & B from a nationwide welding distributorship and industrial sales group, where he served as an Account Manager since 1989. He has a broad range of sales experience with products that directly relate to the welding and safety industries, and has a good understanding of plant floor operations. He will coordinate internal aspects of the sales department as well as handling inside sales responsibilities and management of select outside sales accounts.

FDA Backgrounder: Food Irradiation

The Food and Drug Administration has approved irradiation to control microorganisms on fresh and frozen red meats including beef, lamb and pork. This FDA approval was based partly on research by Chemist Donald W. Thayer of USDA's Agricultural Research Service. The following is an overview of irradiation and some of Thayer's findings over the years.

Irradiation passes through food in the form of radiant energy, without leaving any residue. Ionizing radiation which produces enough energy to kill bacteria and other pathogens in food, involves the use of gamma rays produced by cobalt or cesium, or X-rays or electrons from machine sources. The FDA has declared that low-dose irradiation of food presents no health risk. In the 1920s, a French scientist discovered that irradiation could preserve food. During World War II, the U.S. Army tested irradiation on fruits, vegetables, dairy products and meat. Irradiated food has been routinely used for years by NASA.

Not only does irradiation extend the shelf life of fruits and vegetables, it also kills pests. Thayer likens irradiation to pasteurization; when used with the proper handling and processing techniques, irradiation greatly reduces the risk that contaminated meat, poultry, and other foods will reach consumers.

According to Thayer, during the irradiation process, food never comes in contact with any radioactive material. The gamma rays, X-rays, or electrons used in the process do not make food radioactive. Irradiation is similar to exposure to sunlight or being X-rayed for medical reasons. Specific doses of radiation can kill rapidly growing cells, such as those of insects or spoilage and pathogenic bacteria. But the process has little effect on the food itself because there is no cellular activity in the food. The changes that do occur

NEWS

are similar to the effects of canning, cooking or freezing food.

Thayer reports that irradiation can minimally affect some very sensitive vitamins like B_1 in pork. It has been estimated that if all the pork in the U.S. were to be irradiated, Americans would lose only 3.2 percent of the vitamin B_1 in their diets. "Irradiation converts small amounts of vitamin C in fruit to another equally usable form, so nothing is lost. In fact, multigenerational studies of animals fed irradiated foods show that not only is it safe, but the nutritive value remains virtually unchanged." Herbs, spices and seasonings can introduce bacteria that may cause spoilage or foodborne disease in food that must be stored or transported before reaching consumers. Some food processors treat spices with methyl bromide to kill insects or with ethylene oxide to control bacteria and mold. Both these chemicals are extremely toxic. But most spices, herbs, and dry vegetable seasonings in the U.S. are treated with ionizing radiation, which was sanctioned for this particular use by FDA in 1986.

In 1963, FDA authorized the first use of irradiation to treat food in the U.S. Wheat and wheat flour were irradiated to rid them of insects. An electron beam is used to kill insects on about 400,000 tons of wheat a year at the port of Odessa, Ukraine. This irradiation treatment is not used in the U.S. because we have other fumigants and methods of getting pests out of grain. In 1986, irradiation was approved to control insects and inhibit growth and ripening in fruits, vegetables, and grain. Irradiation increases the shelf life of very perishable sweet onions to three months and not only extends the shelf life of tomatoes, but also allows them to be picked when fully ripe. Zapped by irradiation, mushrooms can last for three weeks without browning or cap separation and strawberries can stay in the refrigerator for three weeks without decay or shrinkage. Even *Cyclospora* succumbs to irradiation. "We used a dose of irradiation that is recommended for fresh fruit on raspberries infected with *Cyclospora*. Not only does irradiation inactivate the parasite, but it also doubles the raspberries' shelf life," Thayer reports. "More research is planned on irradiating *Cyclospora*, but it reacts in much the same way as *Toxoplasma gondii*, a species of organism that continues to sporulate after irradiation but does not multiply in its host."

Thayer was the first to discover that *E. coli* O157:H7 could be controlled by radiation. He and colleagues have successfully used irradiation against other foodborne pathogens including *Bacillus cereus*, *Clostridium botulinum*, *Listeria monocytogenes*, *Salmonella*, *Staphylococcus aureus* and *Toxoplasma gondii* on meat and poultry.

Davis Calvin Wagner Sanitarian Award

The American Academy of Sanitarians announces the call for nominations for the Annual Davis Calvin Wagner award. The award will be presented by the Academy during the Annual Educational Conference of the National Environmental Health Association. The award consists of a plaque and a $500.00 honorarium.

Nominations for this award are open to all diplomates of the academy.

The deadline for receipt of nominations is April 15, 1998. Three copies of the nomination must be sent to John G. Todd, Dr. P.H., Chairman, A.A.S. Davis Calvin Wagner Award, 17309 Fletchall Drive, Poolesville, Maryland 20837.

Enhanced Diatomaceous Earth and Heat Treatment Being Tested as Possible Replacement for Methyl Bromide Fumigation

The combined use of enhanced diatomaceous earth (EDE) and superheated air is showing promise as one alternative to structural fumigations with methyl bromide of flour and feed mills. PCO Services, Inc., Toronto, used EDE and heat to treat a 260,000-cubic foot Rogers Foods, Ltd., grain mill in Armstrong, British Columbia. The commercial trial has been successful based on monitoring of results since the treatment in May 1997.

Bernie McCarthy, Chairman of the company's fumigation committee, says its commercial use of EDE and heat follows research done in March 1997 with Quaker Oats of Canada, and the Canadian and U.S. governments as part of an effort to identify alternatives to methyl bromide. The fumigant, widely-used in flour and feed mills to control grain-infesting insects, is being phased-out globally because it damages the Earth's ozone layer.

"Research is showing that enhanced diatomaceous earth and heat can provide commercial levels of insect control in flour and feed mills," McCarthy says. "In the Rogers Foods plant we gained 100 percent control of exposed test insects placed in the plant to monitor control. Following the treatment, a three-hour test run using industrial flour in treated sifter bins produced no live insects. We were very pleased with these results."

Portable heaters were used to generate temperatures of 110 degrees Fahrenheit (43.2 degrees Celsius). Protect-It™ from Hedley Technologies, Vancouver, an enhanced diatomaceous earth (EDE) product, was applied at a rate of 0.038 grams per cubic foot with an electric duster.

EDE and heat have been used to control insects in grain facilities, but the combination provides a synergistic effect to greatly improve efficacy, says Zia Siddiqi, Ph.D., B.C.E., Technical Director of PCO Services and Prism Integrated Sanitation Management, Miami.

"Diatomaceous earth kills insects through dehydration by damaging their waxy protective outer coating," Siddiqi says. "Heat creates a dryer environment that enhances the dehydration effect of diatomaceous earth. Together, diatomaceous earth and heat kill insects faster and at lower temperatures."

Diatomaceous earth is nontoxic to mammals, nonflammable and is allowed as a food additive to a level of 100 ppm. It can be added directly to grain.

McCarthy says PCO Services is working on ways to improve the EDE and heat technique.

Those interested in the treatment may contact McCarthy at 905.949.8778. A copy of a June 1997 research report, "Structural Pest Control: The Use of an Enhanced Diatomaceous Earth Product with Heat Treatment for the Control of Insect Pests in Food Processing Facilities," is also available. The report, published by Agriculture and AgriFood Canada and the U.S. Department of Agriculture, cites the use of EDE and heat in a Quaker Oats of Canada plant in Ontario in March 1997.

For its efforts in working to identify alternatives to methyl bromide, PCO Services was nominated for a CCME Pollution Prevention Recognition and Award by the Canadian government.

Discovery Links New Form of Inheritance in Yeast to "BSE" Type Diseases

Researchers from the Howard Hughes Institute at the University of Chicago have discovered a chaperone protein from yeast, which helps proteins to change their shapes, controls a new, protein-only form of inheritance, called a yeast prion. They have isolated the chaperone and prion proteins and shown that they can produce such shape changes in a test tube. The chaperone is very specific for certain target proteins and ignores most other proteins in the cell. Remarkably, the same yeast chaperone reacts with prion proteins from mammals. Prions are responsible for BSE in cattle, scrapie in sheep, Creutzfeld-Jakob, and other fatal ailments in humans. Prions have amazed scientists by their ability to cause disease by a new protein-only mechanism. When prion proteins fold into a different shape they produce indigestible tangles which can kill or damage nerve cells. This change in shape spreads to other proteins and other cells, killing the animal and producing new infectious material. The same yeast chaperone also interact with beta-amyloids, fibrous peptides that forms the destructive tangles which are believed to cause Alzheimer's disease.

These findings, reported in papers in the December 9 issue of the *Proceedings of the National Academy of Sciences*, add considerable weight to the prion hypothesis, linking the mechanism responsible for the new form of inheritance in yeast to neurodegenerative diseases of humans and animals. They provide a new target for potential therapies, and furnish a model system for more rapid and less expensive study of prion diseases and treatments. Perhaps more important, they indicate that prion-like variations in protein folding may be vastly more common than previously imagined.

The yeast protein, Hsp 104, is a chaperone, a member of a family of proteins that escort other proteins

to their destinations within the cell and help them fold correctly. Hsp 104, for example, is a heat-shock protein. It protects cells from environmental stresses such as high temperatures or toxins by promoting changes in shape in stress-damaged proteins, restoring them to their working forms. It was also found that a chaperone protein from bacteria (GroEL) can interact with prion proteins too.

Mounting evidence has linked Hsp 104 to a role in regulating whether the yeast prion folds into its normal working or abnormal non-functional conformation. Today's study provides the first direct evidence of the Hsp 104-prion interaction.

The real surprise was the powerful affinity between the yeast and bacterial chaperones and the mammalian prion. The primary structure of the mammalian prion protein is completely different from that of the yeast prion protein. But both have a very unusual ability to change shape and to spread this change in shape from cell to cell. Unlike BSE prions, the yeast prion doesn't kill cells, but it alters their appearance and activity.

FSIS Gives Notice of 'Zero Tolerance' in HACCP

FSIS announced in the *Federal Register* a notice to ensure that owners and operators of federally inspected slaughter establishments are aware that it views visible fecal material on live-stock carcasses at post-mortem inspection and poultry carcasses about to enter the chilling tank or thereafter as a food safety standard. It goes on to state that a HACCP for slaughter must be designed to ensure that by the time the livestock or poultry carcasses reach these points, no visible fecal material is present. The lengthy, and sometimes repetitive notice reaffirms that FSIS regards "zero tolerance for visible fecal material" as a food safety standard under both the FMIA and PPIA. Further, that fecal material is a vehicle for microbial pathogens, and microbiological contamination is a food safety hazard that is reasonably likely to occur in the slaughter production process. They go on to state that under the HACCP system regulations, critical control points to eliminate contamination with visible fecal material are both predictable and essential components of all slaughter establishments' HACCP plans. Thus, the agency will be looking in HACCP plans for how this will be controlled.

It further states that FSIS personnel will continue to verify compliance with the zero tolerance standard in slaughter establishments that are subject to part 417 requirements. It will use both visual observations and other ways to evaluate the effectiveness of both preventive controls and corrective actions for fecal material.

FDA Publishes Guidance on Industry-Supported Activities

In the *Federal Register*, FDA announced the publication of "Final Guidance on Industry-Supported Scientific and Educational Activities." This guidance document was prepared by FDA's Intra-Agency Working Group on Advertising and Promotion.

FDA is providing this guidance to describe the Agency's enforcement policy with regard to scientific and educational activities supported by industry. The guidance seeks to clarify the distinction the Agency draws between scientific and educational activities that FDA considers nonpromotional and those that the Agency considers promotional, and to provide guidance on how industry may support such activities without being subject to the labeling and advertising provisions of the Federal Food, Drug, and Cosmetic Act (the Act). This jurisdictional line is important because the constraints on advertising and labeling, when applied to scientific and educational activities, can restrict the freedom of participants to discuss their data or express their views. In particular, discussions of unapproved uses, which can be an important component of scientific and educational activities, are not permissible if programs that are or can be subject to substantive influence by companies that market products related to the discussion. The Agency recognizes that industry-supported activities can be both nonpromotional and educational.

FDA does not intend to regulate, under the labeling and advertising provisions of the Act, industry-supported scientific and educational activities that are independent of the influence of the supporting company. Companies and providers who wish to ensure that their activities will not be subject to regulation should design and carry out their activities free from the supporting company's influence and bias, based on factors FDA considers in evaluating activities and determining independence. These factors are listed in the guidance document.

Copies of "Final Guidance on Industry-Supported Scientific and Educational Activities" (CVM number 65) may be obtained from the on-line library at CVM's Internet Home Page (http://www.cvm.fda.gov/) or by calling CVM's communications staff at 301.594.1755.

Ryan Instruments, Inc.

Monitoring Supply Chain Made Easy with New Ryan Recorder

Ryan Instruments introduces its latest in humidity and temperature monitors, the HAT. This affordable, easy-to-use monitor provides the user with the critical information on environmental conditions needed to manage perishables throughout the supply chain.

The HAT can be programmed to monitor in one of three ways; humidity only, temperature only or both temperature and humidity. Whether the HAT is monitoring parameters in the field, in storage coolers, warehouses, at retail in display cases, or during the transportation of sensitive materials or perishable products, users are able to collect vital humidity and/or temperature information about the conditions in which their products were handled. The HAT will meet HACCP standards for humidity and temperature.

The HAT has many unique features such as a dual LCD readout with real time updates at the push of a button, and Ryan's out-of-bounds at a glance technology providing users with a visual alert to either humidity or temperature samples that are outside desired limits. This monitor has been designed with comfort and ease-of-use in mind. It offers user friendly WIN 3.1 or WIN95 HATWare software, and information provided in graphic and tabular reports. The user has the ability to replace the 9 volt battery in the field, which saves time and money.

The HAT temperature range is -4°F to 131°F (-20°C to 55°C) with an accuracy of ±0.9°F ≥32°F (± 0.5°C at ≥ 0°C) and ± 1.8°F at < 32°F (± 1.0°C at < 0°C). Humidity range is 10% to 100% with a standard accuracy of ±4% over the full range and upon request custom calibration is offered to ±3%. The HAT can record up to 16,000 samples, by using one of a list of selected intervals or in one minute increments from 1 through 250 minutes. All these features and more are found in the small, efficiently designed package (5 1/4" × 2 3/4" × 1 1/4" and weighs only 4.8 oz.).

Ryan Instruments, Redmond, WA

Reader Service No. 355

Validation Package for MicroLog™ System

The U.S. Food and Drug Administration has published its Guidelines on General Principles of Process Validation. Meeting these guidelines is required under the current good manufacturing practices (GMP) regulations for medical devices. In the Guidelines, the FDA defines process validation as "establishing documented evidence which provides a high degree of assurance that a specific process will consistently produce a product meeting its predetermined specifications and quality characteristics."

To assist customers in meeting these requirements, Biolog, Inc. has developed and made available for purchase a validation package for the MicroLog Microbial Identification System. The package includes documentation, two sets of 24 ATCC® organisms, and the associated ancillary products. The package, formatted in an easy to use step-by-step fashion, is designed to meet the requirements for process validation. Documentation to meet Instrumentation Qualification, Operator Qualification, and the MicroLog System component maintenance is included.

Biolog Inc., Hayward, CA

Reader Service No. 356

The Energizer Rod — New Manure Lagoon Technology

The Energizer Rod from Aqua Life Products Limited is changing the way we treat manure

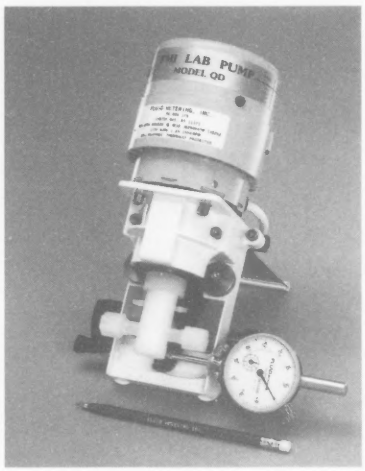
lagoons. The technology was developed in Austria and the rods are manufactured there. The Energizer Rod is a double configuration of two sturdy, eleven inch stainless steel rods connected by steel bars. The rods contain a fluid, which is charged with specifically designed frequencies, creating a permanent magnetic field around the rod. The resulting effect is the realignment of water molecules that accelerate the absorption of oxygen into the lagoon, increasing and activating the aerobic bacteria.

The water's reduced surface tension quickly saturates the crust of the lagoon, which gradually breaks up and dissolves. An odor-inhibiting foam forms on the surface as ammonia is effectively converted, reducing harmful nitrates to near zero levels. Activated by increased oxygen levels aerobic bacteria multiply rapidly, converting the raw manure into field-safe, nutrient-rich fertilizer. When the treated manure is sprayed on fields it does not stick to the plants, nor burn them, but quickly slides off soaking into the ground and releasing nutrients. The nitrogen and oxygen released into the soil starts greening up the plants within 24 to 48 hours.

The Energizer Rod is ideal for dairy operations and one rod will handle the manure from 500 to 700 cows, provided there is at least 50% water in the lagoon to keep it liquid. If solids are screened out the process is speeded up. The rods are easy to install and require no power source, no maintenance and will provide years of trouble-free use. Note: The rods must be protected from freezing. The Energizer Rod comes with a two-year factory warranty and 90 day money-back guarantee.

Aqua Life Products Limited, Bellingham, WA

Reader Service No. 357



Fluid Metering, Inc.

Ceramic No-Valve Metering Pump

Fluid Metering Inc.'s Model QD Pump is the solution for a wide variety of laboratory and industrial applications requiring accurate metering of liquids, gases, and slurries.

The QD Pump incorporates FMI's patented "No Valve" rotating & reciprocating piston design, virtually eliminating clogging and sticking typical of conventional valved pumps. Internal pump components are manufactured of sapphire hard ceramics for excellent chemical resistance, thermal stability, and mechanical durability.

Flow rate is infinitely adjustable, in either direction, from 0 to 100% of flow range, accurate to within 1%. It is adjustable and reversible while the pump is operating or at rest through a simple stroke rate adjusting knob. The convenient dial indicator accessory, Model Q485, provides a readable scale for precise adjustment of the pump head to within 1/1000 of flow range.

The Pump Head Module is directly coupled to a rugged high speed, thermally protected, ball bearing QD drive. Fan cooled and designed for long life, the QD Drive is available in 110 VAC, as well as 220 VAC CE Approved and Explosion-Proof (Model QDX).

Fluid Metering, Inc., Syosset, NY

Reader Service No. 358

New Tri-Clover Mainstream® Strainer/Filter Features Unique Basket

Quality filtering without the maintenance and mess of filter bags has been made possible through Tri-Clover's introduction of a new Mainstream® SEBW with Vee-Wire® strainer basket.

The new Mainstream SEBW strainer enables filtering to 150 micron. Short and long models are available with inlet/outlet diameters of 2, 3, and 4 inches.

The Mainstream filter's unique Vee-Wire basket meets 3A requirements for cleaning out-of-place and reuse, enhancing maintenance and reducing replacement expense. The VeeWire is constructed of v-shaped wire that is welded to perpendicular support rods. By providing just two points of contact at the screen surface – unlike the multiple contact points in perforated metal and wire mesh screens – the design minimizes clogging and enhances process efficiency at high capacities. Tri-Clover's filters and strainers can be used individually or in tandem to remove coarse, medium or fine particles from a process stream.

Tri-Clover, Kenosha, WI

Reader Service No. 359

Cold Weather Nitrification Improvement

A new product from Bioscience, Inc. improves oxidation of ammonia to nitrates in wastewater treatment plants when cold weather or adverse conditions inhibit the growth of natural nitrifying microorganisms.

Known as MICROCAT®-XNL, the biological formulation is a liquid suspension of adapted microorganisms selected for their ability to oxidize ammonium ions to nitrite and then to nitrate. It is used to start up, reseed or maintain nitrifying systems and to enhance treatment plant performance under toxic, inhibitory and/or cold weather conditions. When used for preventive maintenance, MICROCAT-XNL restores consistent nitrification and improves overall system performance. The product is also available as a refrigerated concentrate, MICROCAT-XNC.

In a 3 MGD municipal treatment plant, consisting of two 15 million gallon aerated lagoons in series, followed by settling basins, MICROCAT-XNL reduced effluent ammonia-nitrogen levels to below 3 mg/1 permit limits when temperatures were in the 10 to 14°C range and the plant was experiencing high BOD loading from industrial discharges. The liquid product was added to the second lagoon by a chemical pump system after the pH of the wastewater had been adjusted to optimum conditions for nitrification using soda ash. Ammonia-nitrogen removal rates with MICROCAT-XNL averaged 83 percent, compared to 43 and 52% respectively in two previous winters without bioaugmentation.

Bioscience, Inc., Bethlehem, PA

Reader Service No. 360

Share's PRO-FOAM Sanitizing System Designed for Food Facility Clean-up

Share Corporation introduces PRO-FOAM, a new sanitizing system specifically designed to provide easy cleaning and sanitizing of walls, floors and equipment at food processing facilities. PRO-FOAM combines washing, rinsing and sanitizing into one easy-to-use unit. The system uses a special trigger applicator which allows users to simply point at surfaces and spray them with a foaming cleaner, a clean water rinse and an air drying disinfectant. PRO-FOAM also eliminates the need for difficult hand scrubbing.

The PRO-FOAM system mounts to almost any wall to provide immediate cleaning where it's most needed within a facility. Using regular garden hose, the unit hooks up to a standard faucet as a source of fresh water for rinsing. Share also provides many cleaning and sanitizing solutions designed to kill germs, bacteria and dangerous viruses. PRO-FOAM meets USDA and EPA standards and is ideal for use at meat and seafood packing plants, produce processing facilities, grocery stores, delis and bakeries.

Share Corporation, Milwaukee, WI

Reader Service No. 361

Delco Offers Compact and Powerful Pressure Washer

Delco's versatile VERSA 2100 and VERSA 2100XL Hot High Pressure Washers cut clean-up time down to size. Blast away dirt, grease and grime from farm equipment, truck and car fleets, and a variety of other surfaces with a combination of hot water and high pressure.

Delco's VERSA 2100 and VERSA 2100XL pressure washers come equipped with duplex ceramic plunger pumps producing 2.1 gpm for the VERSA 2100 and 2.2 gpm for the VERSA 2100XL at 1000 psi. The 115 volt, 1.5 hp capacitor start, capacitor run motor delivers the power for these compact but powerful hot high pressure washers. Standard features include a high limit temperature switch, and a heavy duty 35 foot power cord with ground fault circuit interrupter (GFCI) for operator safety.

VERSA 2100 units are equipped with an open type gun with a 1/4", × 25' hose and 10 1/2" rubber tires. While VERSA 2100XL models have a trigger-type gun with a 3/8" × 40' hose and pneumatic tube tires. Both have fuel tanks with a 5.8 gallon capacity and accept #1 and #2 Diesel fuel.

Add versatility for customer use, Delco's VERSA 2100's are equipped with low amperage draw burner systems. When you need an efficient pressure washer for your business, you need the economically priced VERSA 2100.

Clarke/Delco Industries, Springdale, AK

Reader Service No. 362

Ecolab Introduces Convenient Liquid Membrane Cleaning System

Ecolab has introduced a convenient and effective way to clean Reverse Osmosis/Ultra Filtration (RO/UF) membrane systems. The company's new Ultrasil® Liquid cleaners and automated dispensing system are design to maximize RO/UF system performance and help extend membrane life.

Ultrasil Liquid products are specially designed to break down soils, helping to bring membranes' flux rates back to maximum levels. The liquid can be used in a variety of processing applications, including dairy, meat and poultry, produce, juices, sugar, and sweeteners, grain milling, agriculture, brine and plasma.

A pre-programmed controller accurately dispenses Ultrasil Liquid products. With the push of a button, a time-feed system dispenses the liquid for consistent and accurate allocation with no spills or waste. There is also less operator exposure to concentrated chemicals.

The preprogrammed controller also documents dispensing times, cycles and product amounts to help processors optimize the cleaning process.

Ecolab, St. Paul, MN

Reader Service No. 363

IAMFES SECRETARY CANDIDATES

John C. Bruhn

John C. Bruhn is Director of the Dairy Research and Information Center, a program that helps facilitate the conduct of dairy production and dairy foods research and education within the University of California. The program also allows those outside the university to seek research and educational resources from the university. Dr. Bruhn is a Dairy Foods Processing Specialist with Cooperative Extension in the Department of Food Science and Technology as well. As a Cooperative Extension Specialist, he has the responsibility of developing applied research and educational programs for the California dairy foods processing industry. Dr. Bruhn first joined the University of California in 1963 as a Research Assistant; prior to that he was a Research Specialist with Continental Can, Chicago, Illinois.

In 1962 he received his B.S. in food science from Michigan State University. He received his Ph.D. in 1968 from the University of California-Davis in dairy bacteriology. His research and educational programs for the dairy industry have emphasized factors relating to the quality and safety of raw milk, processed milk, and dairy foods.

Dr. Bruhn has been an active member of IAMFES since 1970. His involvement has included Chair of the *Dairy, Food and Environmental Sanitation* Management Committee; Chair of the Affiliate Council 1996-97; member of the Editorial Board for both IAMFES journals; member of the Program Advisory Committee; and organizer for Annual Meeting symposia. He has published many articles in both IAMFES journals. He is also active in his local affiliate the California Association of Dairy and Milk Sanitarians (CADMS). Other professional involvement for Dr. Bruhn includes: California Dairy Industries Association, California Creamery Operators Association, Institute of Food Technologists, and the American Dairy Science Association.

Honors Dr. Bruhn has received in recognition of his accomplishments include: the IAMFES Educator Award, CADMS Sanitarian Award, Outstanding Alumnus Award from MSU, and the Alfa-Laval, Inc. De Laval Agricultural Division Award from ADSA.

Jim Dickson

Jim Dickson is Interim Department Executive Officer and Associate Professor for the Department of Microbiology, Immunology and Preventative Medicine at Iowa State University, Ames, Iowa. Prior to his employment with Iowa State University, Dr. Dickson held positions as Research Food Technologist and Lead Scientist at USDA-ARS Meat Animal Research Center, Clay Center, Nebraska; Microbiologist, Tony's Pizza Service, Salina Kansas; and Manager, Food Irradiation Applications, Radiation Technology, Inc., Rockaway, New Jersey.

Dr. Dickson received his Ph.D. from the University of Nebraska-Lincoln in 1984. He began his academic career at Clemson University where he received his B.S. in 1977. He received his M.S. from the University of Georgia in 1980.

Research interest for Dr. Dickson includes the microbiological safety of foods of animal origins. Within this area, his interest is in the growth and physiological activity of bacteria of public health concern, especially the Gram negative bacteria, as affected by food processing and storage. He has also conducted reseach on bacterial attachment to food and food contact surfaces. The result of this research has led to a patent on a process to reduce bacterial contamination on animal carcasses.

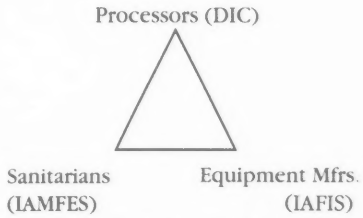
Dr. Dickson has been an active member of IAMFES since 1987. His involvement includes serving on the Nominating Committee in 1995 and 1996; Vice-Chair of the Applied Laboratory Methods Professional Development Group in 1991-92; Current Vice-Chair of the Meat Safety and Quality Professional Development Group; and a member of the *Journal of Food Protection* Management Committee. He has also published numerous articles in the *Journal of Food Protection* and serves on its Editorial Review Board. Other professional involvement includes membership in the American Academy of Microbiology, American Society for Microbiology, Institute of Food Technologists and the International Meat and Poultry HACCP Alliance Expert Committee on Certification.

An outstanding performance award and three certificates of merit for outstanding performance in research from the USDA are among the numerous honors Dr. Dickson has achieved. Others include a Fellow in the American Academy of Microbiology, and a member of Phi Kappa Phi, Phi Tau Sigma, and Gamma Sigma Delta.

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. 228

Dairy, Food and Environmental Sanitation, Vol. 18, No. 2, Pages 102-121

Holders of 3-A Symbol Council Authorization as of February 1998

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, 3020 Bluff Rd., Columbia, SC 29209; Phone 803.783.9258; Fax 803.783.9265

01-07 Storage Tanks for Milk and Milk Products

2 APV Crepaco (5/1/56)
A Division of APV North America, Inc.
100 South CP Avenue
Lake Mills, Wisconsin 53551

28 Waukesha Cherry-Burrell (10/3/56)
(A United Dominion Company)
575 E. Mill Street
Little Falls, New York 13365

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

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

946 APV Fluid Handling-America (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.)

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

568 Allweiler AG, Werk Bottrop (5/15/89)
Kirchhellener Ring 77-79
D-46244 Bottrop
Germany
(U.S. 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
(U.S. 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
(U.S. 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
(U.S. 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)
29 Orchard Street
Oyster Bay, New York 11771

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 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
(U.S. 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

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
(U.S. 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
(U.S. 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
(U.S. Rep.: Viking Pump, Inc.
406 State Street, P.O. Box 8
Cedar Falls, Iowa 50613)

673 Alfa Laval Pumps, Inc. (4/16/92)
9201 Wilmot Road
Kenosha, Wisconsin 53141-1426

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

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

827 PACKO Diksmuide NV (4/14/95)
Cardijnlaan 10
B8600 Diksmuide, Belgium
(Not available in the U.S.A.)

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

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

684 PCM Pompes (7/9/92)
17, rue Ernest Laval
92170 Vanves
France
(U.S. Rep.: Alfa Laval Pump, Inc.
9201 Wilmot Road, P.O. Box 1426
Kenosha, WI 53141-1426)

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

888 Seeberger GmbH + Co. (8/30/96)
Scharnholzstrasse 344
D-46240
Bottop, Germany
(U.S. Rep.: seepex, Inc.
511 Speedway Drive
Enon, Ohio 45323)

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: Allweiler, West 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, 80004

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

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

899 Und Maschinenfabrik (12/31/96)
Lederle GmbH Pumpen
GewerbestraBe 53 D-79194
Gundelfingen, Germany
(U.S. 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 High Pressure Pumps of the Plunger Type

75 APV Homogenizer Group (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 Corp. (11/4/91)
P.O. Box 9101
30 Ossipee Road
Newton, Massachusetts 02164-9101

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

770 Tetra Pak Engineering (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

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

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
(U.S. 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

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

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

720 R-P Products (3/19/93)
Box 388, 407 Jefferson Street
Three Rivers, Michigan 49093

435 Sermia International (11/27/84)
771 Boul. Industriel
Blainville, Quebec
Canada J7C 3V3
(U.S. 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)
8509 Quarry Road
Manassas, Virginia 22110

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

20 APV Heat Transfer Technologies (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 Tuchenagen NA, Inc. (2/2/86)
196 Western Avenue
Fond du Lac, Wisconsin 54936-1458
(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

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

360 Laffranchi Wholesale Co. (7/12/82)
P.O. Box 338
Ferndale, California 95536

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)
(U.S. 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 Schmidt-Bretten, Inc. (10/3/91)
380 E. Central Avenue
Bohemia, New York 11716

670 Flomax International, Ltd. (4/1/92)
2 Robert Street
P.O. Box 14537
Panmurie, Auckland
New Zealand
(U.S. 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 Heat Transfer Tech. (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

734 The Diversified-Berdell Group, Inc. (5/19/93)
1710 Flushing Avenue
Ridgewood, New York 11385

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)

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

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

307 G & H Products Corp. (5/2/78)
P.O. Box 909
Pleasant Prairie, Wisconsin 53158-0909

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

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)

591 Thermotech/Div. of Fristam Pumps, Inc. (2/8/91)
2410 Parview Road
Middleton, Wisconsin 53562

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
(U.S. 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

179R Heavy Duty Products (Preston) Ltd. (3/8/77)
1261 Industrial Road
Cambridge (Preston)
Ontario, Canada N3H 4W3
(Not available in the U.S.A.)

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

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

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

132 APV Anhydro (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)
Food and Dairy Division
1600 O'Keefe Road
Hudson, Wisconsin 54016

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

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

299 Stork Food Machinery, Inc. (11/16/77)
P.O. Box 1258, Airport Parkway
Gainesville, Georgia 30503

17-08 Formers, Fillers and Sealers of Single Service Containers for Milk and Milk Products

366 Autoprod, Inc. (9/15/83)
5355 115th Avenue N.
Clearwater, Florida 34620

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

382 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)
63689 Ranstadt, Hessen, Germany
(U.S. Rep.: Hassia USA, Inc.
1 Harvard Way, #4
Somerville, New Jersey 08876)

473 International Paper Company (6/12/86)
Liquid Pkg. Division
6238 Tri Ridge Boulevard
Loveland, Ohio 45140

735 Kvalitetsproduktion AB (6/11/93)
S-693 29 Degerfors, Sweden
(U.S. 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

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)

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

848 Septipack, Inc. (9/24/95)
2313 Benson Mill Road
Sparks, Maryland 21159
(Mfg. by: ARCII
4, Avenue de l'europe
ZAC des Hawks de Chatou
78402 Chatou Cedex, France)

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

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

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

694 IPFO International, Inc. (9/23/92)
100 Kings Point Drive
Century Towers, Suite 706
Miami, Florida 33160
(Mfg. by: Time Pack
GmbH, Weissensburg, Germany)

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

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

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

903 Coldelite Corp. of America (1/10/97)
Cattabriga
Division of Carpigiani
P.O. Box 4069, North Station
Winston-Salem, North Carolina 27115
(Mfg. by: Carpigiana
Via Emilia 45
Amzola Emilia
Bologna, Italy)

928 Ross' Frozen Custard Corporation (7/14/97)
1605 Sheridan Road
Escanaba, Michigan 49829

286 Tetra Laval Food Hoyer, Inc. (12/8/76)
7711 95th Street, P.O. Box 0902
Pleasant Prairie, Wisconsin 53158-0902
(Mfg. by: Tetra Laval Food Hoyer
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 of North America, Inc. (2/10/65)
100 South CP Avenue
Lake Mills, Wisconsin 53551

168 Waukesha Cherry-Burrell (6/16/65)
575 E. Mill Street
Little Falls, New York 13365

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

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

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

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

928 Ross's Frozen Custard Corporation (7/14/97)
1605 Sheridan Road
Escanaba, Michigan 49829

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

920 Technova, Inc. (4/24/97)
1450 Hebert Street
Drummondville, Quebec
Canada J2C 2A1
(U.S. Rep.: Bay State Truck & Trailer
527 Wintrop
Rehobeth, Massachusetts 02769)

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

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
(U.S. Rep.: L and A Package Sales
356 Millstone Road
Clarksburg, New Jersey 08510
and Packaging Specialist
4500 Greenville Avenue
Dallas, Texas 75206)

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 Mateer-Burt Co., Inc. (7/22/85)
434 Devon Park Drive
Wayne, Pennsylvania 19087

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)
7711 - 95th Street
Pleasant Prairie, Wisconsin 53158
(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

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

161 Waukesha Cherry-Burrell (4/5/65)
575 E. Mill Street
Little Falls, New York 13365

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

162 Waukesha Cherry-Burrell (4/5/65)
575 E. Mill Street
Little Falls, New York 13365

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

(U.S. 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
(U.S. 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

(U.S. 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
(U.S. Rep.: Heat & Control
225 Shaw Road
S. San Francisco, California 94080)

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

409 GEI Mateer-Burt Co. (10/31/83)
434 Devon Park Drive
Wayne, Pennsylvania 19087

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
(U.S. Rep.: Bailey-Fischer & Porter
125 E. County Line Road
Warminster, Pennsylvania 18974)

359 Brooks Instruments (6/11/82)
Highway 301 North
Statesboro, Georgia 30458

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

692 Endress & Hauser Flowtec AG (9/14/92)
Kägenstrasse 7
CH - 4153 Reinach, Switzerland
(U.S. 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 E G & G Flow Technology, Inc. (6/17/87)
4250 East Broadway Road
Phoenix, Arizona 85040

224 The Foxboro Company (11/16/71)
33 Commercial Street
Foxboro, Massachusetts 02035

717 Gemu Valves, Inc. (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 G/H Products Corp. (11/21/91)
P.O. Box 909
Pleasant Prairie, Wisconsin 53158-0909

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

574 Hersey Measurement Co., Inc. (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

744 Honeywell IAC (11/16/93)
1100 Virgina Drive
Fort Washington, Pennsylvania 19034

918 Honeywell, Inc. (4/24/97)
1100 Virginia Drive
Fort Washington, Pennsylvania 19034
(Mfg. by: Endress & Hauser Flowtec AG
Kagenstrasse 7
CH-4153 Reinach
Switzerland)

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 (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 America, 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)

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)
(U.S. 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, Illinois 53126

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

490 Rosemount, Inc. (1/8/87)
12001 Technology Drive
Eden Prairie, Minnesota 55344
(Mfg. by: Brooks Instrument
Highway 301 North
Slalesboro, Georgia 30459)

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 G/H Products Corp. (11/21/91)
P.O. Box 909
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 Crepaco, Inc. (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
(U.S. Agent Manning & Lewis-NJ)

32-02 Uninsulated Tanks for Milk and Milk Products

397 APV Crepaco (6/21/83)
Division of APV North America, Inc.
100 South CP Avenue
Lake Mills, Wisconsin 53551

264 Waukesha Cherry-Burrell (1/27/75)
(A Unit of AMCA Int'l., Inc.)
575 E. Mill Street
Little Falls, New York 13365

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)
500 Reed Street
Belding, Michigan 48809

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
(U.S. 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

809 Damascus-Bishop Tube Co. (1/2/95)
795 Reynolds Industrial Park Road
Greenville, Pennsylvania 16125

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

308 Rath Manufacturing Co., Inc. (6/20/78)
2505 Foster 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 U.S.A.)

776 TGPRO (7/18/94)
Bangkok, Thailand
(U.S. 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)
23 Londonderry Road
Londonderry, New Hampshire 03053

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 North America, Inc. (3/30/95)
GEI Collette
One Indian Lane East
Towaco, New Jersey 07082
(Mfg. by: Machines Collette N.V.
Keerbaan 70
B-2160 Wommelgem
Belgium)

526 Hosokawa Bepex Corporation (3/16/88)
333 Taft Street NE
Minneapolis, Minnesota 55413

914 International Mixing Tech. s.a.r.l. (4/9/97)
469 Avenue Louis Herbeaux
F-59240 Dunkerque
France
(U.S. Rep.: Peregine Consumer Tech.
2004 E. 67 Street
Los Angeles, California 90001)

642 Mondomix Howden B.V. (8/7/91)
Reeweg 13
P.O. Box 98
1394 ZH Nederhorst den Berg
The Netherlands
(U.S. Rep.: Mondomix Howden
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
(U.S. 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 53042-0127

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

453 Hosokawa MikroPul E. Systems (9/4/85)
20 Chatham Road
Summit, New Jersey 07901

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

42-00 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 Driven Diaphragm Pumps

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)

927 Yamada America, Inc. (6/18/97)
1575 High Point Drive
Elgin, Illinois 60123

45-00 Cross Flow Membrane Modules

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

813 Coors Ceramics Company (2/2/95)
4545 McIntyre Street
Golden, Colorado 80403

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)

46-00 (Refractometers and Optical Sensors)

904 AW Company (2/7/97)
8809 Industrial Drive
Franksville, Wisconsin 53126
(Mfg. by: TTS Technologies
Tampereen Teollisuussahko Oy
Nokianite 2
33270 Tampere
Finland)

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

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
(U.S. Rep.: K-Patents, Inc.
253 W. Joe Orr Road
Chicago Heights, Illinois 60411)

737 MSC Moisture Systems (6/17/93)
117 South Street
Hopkinton, Massachusetts 01748-2273

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
(U.S. Rep.: Maselli Measurements, Inc.
P.O. Box 7571
7746 Lorraine Avenue
Stockton, California 95267)

882 optek-Danulat Inc. (6/25/96)
279 S. 17th Avenue, Suite 10
West Bend, Wisconsin 53095
(Mfg. by: optek-Danulat GmbH
HaedenkampstraBe 18
D-45143 Essen
Germany)

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
(U.S. Rep.: BD Services Corporation
300 North Commercial Street
Bellingham, Washington 98227)

919 Perstorp Analytical, Inc. (4/24/97)
12101 Tech Road
Silver Spring, Maryland 20904

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

817 Technitron Labs Inc. (2/24/95)
555 Briarwood Court
Troy, Ohio 45373

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 G & H Products (6/10/57)
P.O. Box 909
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
(U.S. 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)

271 The Foxboro Company (3/8/76)
33 Commercial Street, No. 05-4A
Foxboro, Massachusetts 02035

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
(U.S. Rep.: M. G. Newell Corporation
115 N. 20th Street
Tampa, Florida 33605)

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

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

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

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

552 APV Fluid Handling-America, Inc. (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
(U.S. 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
(U.S. 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 G & H Products Corp. (5/31/88)
P.O. Box 909
Pleasant Prairie, Wisconsin 53158-0909

883 Keystone Hygienic Valve Division (7/12/96)
12-14 Kaimiro Street
Pukete Industrial Estate
Hamilton, New Zealand
(U.S. Rep.: Keystone Valve Division
P.O. Box 40010
Houston, Texas)

607 Kammer Valve, Inc. (9/25/90)
510 Parkway View Drive
Pittsburgh, Pennsylvania 15205-1410
(Mfg. by: Kammer Ventile GmbH
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
(U.S. Rep.: Mr. James Lucas
Lucas & Associates
965 Mission Street
San Francisco, California 94103)

594 Oden Corp. (3/6/90)
255 Great Arrow Avenue
Buffalo, New York 14207

483 On-Line Instrumentation, Inc. (10/15/86)
Rt. 376, P.O. Box 541
Hopewell Junction, New York 12533

652 Pierre Guerin SA (10/4/91)
BP.12 - 79210
Mauze-Sur-Le-Mignon
France
(U.S. Rep.: Alfa Technical Group, Inc.
4905 West Brook Hill Drive
Syracuse, New York 13215)

551 Puriti, S.A. de C.V. (9/12/72)
Alfredo Nobel 39
Fracc. Ind. Puente de Vigas
Tlalnepantla, Mexico
(U.S. 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

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)

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)
(Mfg. by: Otto Tuchenhagen, West Germany)
196 Western Avenue
Fond du Lac, Wisconsin 54936-1458

561 VACU-PURG, Inc. (1/26/89)
214 West Main Street
P.O. Box 272
Fredericksburg, Iowa 50630

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

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

54-01 (Formerly 08-17B) Diaphragm-Type Valves

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

877 APV Fluid Handling (5/14/96)
Division of APV North America, Inc.
100 South CP Avenue
Lake Mills, Wisconsin 53551-1799

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

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

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. 2400, Suite 102
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

494 Saunders Valve, Inc. (2/10/87)
16516 Air Center Boulevard
Houston, Texas 77032-5103

55-01 Boot Seal Valves for Milk & Milk Products

839 G & H Products Corp. (7/11/95)
P.O. Box 909
Pleasant Prairie, Wisconsin 53158-0909
(Mfg. by: Keofitt A/S
Snaremosvej 27
DK-7000 Fredericia
Denmark)

821 Keofitt, Inc. (3/17/95)
1001 W. Glen Oaks, Suite 221
Mequon, Wisconsin 53092
(Mfg. by: Keofitt A/S
Snaremosvej 27
DK-7000 Fredericia
Denmark)

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 G & H Products Corp. (5/31/88)
P.O. Box 909
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 Crepaco (8/24/95)
A Division of APV North America, Inc.
100 South CP Avenue
Lake Mills, Wisconsin 53551

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 G & H Products Corp. (6/22/95)
P.O. Box 909
Pleasant Prairie, Wisconsin 53158-0909

834 Stanfos, Inc. (6/22/95)
3908 - 69th Avenue
Edmonton, Alberta
Canada T6B 2V2
(U.S. 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 Fikex 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 Unit Systems Inc. (4/14/93)
395 Fillmore Avenue
Tonawanda, New York 14150

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

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

874 Q-Jet Systems, 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 Pure Fit, Inc. (4/14/93)
924 Marcon Boulevard
Allentown, Pennsylvania 18103

799 Rubber World (10/21/94)
936 Links Avenue
Landisville, Pennsylvania 17538

698 Sanitary Couplers, Inc. (10/23/92)
696-698 Pleasant Valley Drive
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

470 Advance Fittings Corp. (3/30/86)
218 West Centralia Street
Elkhorn, Wisconsin 53121

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

79R APV Fluding Handling-America, Inc. (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
(U.S. 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 Fluid Handling America (12/31/96)
100 South CP Avenue
Lake Mills, Wisconsin 53551-1799

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

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

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

528 Mark IV Industrial
Dayco Industrial Division (3/16/88)
1 Prestige Place
Miamiburg, Ohio 45342

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

947 FLOWMECA (12/22/97)
47 rue du Bois Chaland
LISSES
91029 Evry Cedex
France
(U.S. 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 G & H Products Corp. (6/10/57)
P.O. Box 909
Pleasant Prairie, Wisconsin 53158-0909

925 Hassia Verpackungsmachinen (6/5/97)
GmbH
P.O. Box 1120
D-63689
Ranstadt, Germany
(U.S. Rep.: Hassia USA, Inc.
One Harvard Way #4
Somerville, New Jersey 08876)

773 Herrli AG (7/15/94)
3210 Kerzers
Switzerland
(U.S. 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

(U.S. Rep.: VNE Corporation
1149 Barberry Drive
Janesville, Wisconsin 53547)

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

703 Parker Hannifin Corp. (11/6/92)
Instrument Connectors Div.
9400 South Memorial Parkway
Huntsville, Alabama 35803

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

726 Pure Fit, Inc. (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
(U.S. 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)

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

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

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)
1303-43Road Street
Kenosha, Wisconsin 53140

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

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 U.S.A.)

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 G & H Products (2/1/94)
P.O. Box 909
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)
590 Young Street
Tonawanda, New York 14150
Strongsville, Ohio 44136

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

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)
23 Londonderry Road
Londonderry, New Hampshire 03053

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/Mansfield & Green Division (10/13/89)
8600 Somerset Drive
Largo, Florida 34643

822 Ametek U.S. 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
(U.S. Rep.: Rawson & Co., Inc.
P.O. Box 924288
Houston, Texas 77292-4288)

872 Brookfield Eng. Lab, Inc. (3/28/96)
240 Cushing Street
Stoughton, Massachusetts 02072-2398

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)
511 Weston Ridge Drive
Naperville, Illinois 60563

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

829 DCT Instruments (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)
2400 N.E. 2nd Street
Minneapolis, Minnesota 55418

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, U.S. Gauge Div.
PMT Products
820 Pennsylvania Boulevard
Feasterville, Pennsylvania 19053)

763 EG & G Berthold Laboritorium Prof. (4/21/94)
Berthold GmbH & Co. KGCalmbacher Str. 22
D-7547 Bad Wildbad 1, Germany
(U.S. 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
(U.S. 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

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
(U.S. Rep.: Haenni Instruments, inc.
1107 Wright Avenue
Gretna, Louisiana 70056)

651 HEINRICH KUBLER AG (10/3/91)
CH-6341 Baar
Switzerland
(U.S. 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

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 U.S.A.)

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 U.S.A.)

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)
4919 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
Wilmington, 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
(U.S. 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 U.S.A.)

909 Ohmart/VEGA (3/4/97)
4241 Allendorf Drive
Cincinnati, Ohio 45209-9961
(Mfg. by: VEGA Grieshaber KG
AM Honenstein 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

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

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

638 Millipore Corporation (7/10/91)
P.O. Box 860709
Plano, Texas 75086-0709

896 TBI-Bailey Controls Company (12/3/96)
2175 Lockheed Way
Carson City, Nevada 89706

641 Tempress A/S (7/16/91)
P.O. Box 2090, DK-8240
Russkov, Denmark
(Not available in the U.S.A.)

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)
P.O. Box 1458
196 Western Avenue
Fond du Lac, Wisconsin 54936-1458

836 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)
2220-3 Midland Avenue
Scarborough, Ontario
Canada M1P 3E6
(U.S. 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 U.S.A.)

BusinessExchange

Services/Products

Department of Health and Human Services, Food and Drug Administration, Center for Veterinary Medicine is seeking two research microbiologists to conduct research in environmental microbiology associated with the food animal production environment. This research will investigate the ecology of human foodborne pathogens associated with preharvest animal production and phenomena related to resistance development in pathogens from antibiotic usage. Position number FDA-8-4004 requires experience in food/environmental microbiology. Position number FDA-8-4005 requires experience in environmental microbiology/microbial genetics. Candidates with a Ph.D. and 0-5 years experience preferred. Positions are permanent and salary is commensurate with experience ($55,969 - $101,142). Positions are subject to peer review. Positions are located at Laurel, Maryland. U.S. Citizenship required. Please contact (301) 827-4287 to receive a faxed copy of either of the vacancy announcements or contact Mary Goodson at (301) 594-0195 . Candidates should submit an Application for Federal Employment and/or resume with transcripts to: **FDA, OHRMS, Room 211, Metro Park North I, HFA-423, 7520 Standish Place, Rockville, MD. 20857**. Applications will be accepted through March 10, 1998. FDA is an equal opportunity employer and has a smoke free environment.

FOOD INDUSTRY SPECIALIST

Instruct food processing institutions throughout the U.S. on food plant sanitation. Maintain full knowledge of new USDA & FDA methods, systems and requirements. Analyze microbiological problems related to hygienic and sanitation practices in food processing plants to improve sanitation systems and prevent microbial contamination of food product using exp. in SSOP, GMP's and HACCP. Confer with food plant microbiologist and quality control personnel to solve microbial contamination problems. Conduct microbiological tests to determine presence of harmful bacteria or pathogen on food equipment. Prepare survey proposals for chemical consumption and monthly reports of all accounts. Develop sanitation procedure manuals and sanitation training manuals that meet regulatory requirements. Instruct and train sales staff on sanitation, microbiology and food safety for certification purposes. Requires: Bachelor's in Food Science and Technology or related field and 2 yrs. exp. in the job offered or 2 yrs. exp. as a Food Safety Microbiologist. Must include two yrs. experience in a food processing environment with resp. for plant sanitation, quality assurance of food, and quality control and production of food products. EOE. 40 hrs/wk; 8:00 a.m.-5:00 p.m. Salary: $39,500/yr. Send resume (no calls) to Melissa Johnson, ZEP Manufacturing Company, 1310 Seaboard Industrial Blvd., Atlanta, GA 30318.

IAMFES 85th Annual Meeting
August 16-19, 1998
Nashville, Tennessee

Preview Program*

Symposia Topics:

- The Leading Edge of Foodborne Disease Surveillance
- Sensory Characteristics of Dairy Products
- Risk Management of Food from Farm to Fork
- HACCP Reflection – One Year After Implementation
- Basic Dairy Field Workshop I and II
- Moving Meat Inspection into the Future
- Potential Foodborne Pathogens Associated with Pork
- Farm to Table: Ecology of Pathogens Associated with Poultry
- Bringing Science to Restaurant Inspection
- Factors Affecting Bacterial Attachment to Meat Surfaces
- Food Worker Hand Hygiene: A Factor in Foodborne Illness
- New Approaches to Food Inspection
- Mandatory Sanitation – SSOP's; A Review
- Pest Control as We Approach 2000
- Computerized Process Control and Record Keeping in the Dairy Industry

Technical & Poster Sessions:

Will include presentations of leading research in food safety from around the world.

REGISTER TODAY! See registration information on the following pages.

*Program subject to change.

GENERAL INFORMATION

IAMFES 85th ANNUAL MEETING AUGUST 16-19, 1998 NASHVILLE, TENNESSEE

IMPORTANT! Please read this information before completing your registration form.

■ Meeting Information

Register today to obtain valuable information on advancing food protection worldwide through the most contemporary methods of food microbiology, processing, safe handling, and current regulatory aspects of food safety. Registration fee includes all technical sessions; symposia; poster presentations; a Cheese and Wine Reception; admittance to the exhibit hall; and a program and abstract book containing general program information and abstracts of symposia, technical papers, and posters. Appropriate dress for the Meeting is business casual.

■ Registration Information

Please mail the registration form with payment today. Registrations post-marked after July 15, 1998 must pay the late registration fee. Checks should be made payable to: IAMFES, Inc., 6200 Aurora Avenue, Suite 200W, Des Moines, IA 50322-2863, U.S.A. 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

Requests for cancellations must be received in writing no later than July 31, 1998 (registration fee less a $50 processing charge will be refunded). Cancellations received after July 31, 1998 will not receive a refund, but the registration may be transferred to a colleague with written notification.

■ New Membership Fees

$ 75.00 *Dairy, Food and Environmental Sanitation*

$ 120.00 *Dairy, Food and Environmental Sanitation* and *Journal of Food Protection*

$ 37.50 *Student Membership with *Dairy, Food and Environmental Sanitation* or *Journal of Food Protection*

$ 60.00 *Student Membership with *Dairy, Food* and *Environmental Sanitation* and *Journal of Food Protection*

**Full-time student verification required.*

SHIPPING CHARGES: OUTSIDE THE U.S.
SURFACE RATE – $ 22.50 per journal title
AIRMAIL – $ 95.00 per journal title

TICKET INFORMATION

■ Cheese and Wine Reception (August 16, 1998)

Share in what has become an IAMFES tradition for Annual Meeting attendees and guests. The Cheese and Wine Reception begins immediately following the Ivan Parkin Lecture on Sunday evening in the IAMFES exhibit hall. Enjoy conversation with exhibitors, colleagues, and friends.

■ Monday Night Social Event Hot Country Night — (August 17, 1998)

There's no time like a good time, and the Wildhorse Saloon is just the place to find it. The evening includes dinner, music, dancing, and a few surprises. Children ages 14 and under must be accompanied by an adult.

■ Awards Banquet — (August 19, 1998)

The IAMFES Annual Meeting concludes with an evening of recognition for deserving food safety professionals. A reception opens the evening outside the banquet hall. Dinner is served in an elegant setting prior to the award presentations. Additional tickets are available. Business attire is requested for this special evening.

■ Other Events

Grand Ole Opry — Saturday, 8/15
IAMFES Golf Tournament — Sunday, 8/16
Music City Sites — Sunday, 8/16
Historic Nashville — Monday, 8/17
Jack Daniel's Distillery — Tuesday, 8/18
Children's Banquet — Wednesday, 8/19

HOTEL INFORMATION

For reservations, contact the hotel directly and identify yourself as an IAMFES attendee to receive a special rate of $116 per night, single or double.

Renaissance Nashville Hotel
611 Commerce Street
Nashville, Tennessee 37203
Phone: 615.255.8400; Fax: 615.255.8163

CHILD CARE

Adult supervised activities for children ages 4 to 12 will be available Monday through Wednesday, 8:30 a.m. to 12:00 p.m. and 1:30 p.m. to 5:00 p.m. A pre-registration fee of $20.00 per day for each child is required; snacks will be provided. The room is subject to a minimum attendance. Participants will be notified if cancellation is necessary by July 24, 1998.

REGISTRATION FORM

❒ Please register me for the IAMFES 85th Annual Meeting – Nashville, Tennessee – August 16-19, 1998

FOR OFFICE USE
Member # _____ First initial _____ Last name _____
Registration # _____ DFES

First Name (please print — will appear on badge) M.I. Last Name

Title Employer

Mailing Address (Please specify: ❒ Home ❒ Work)

City State/Province Country Postal/Zip Code

Telephone # Fax # E-mail

❒ Please indicate here if you have a disability requiring special accommodations.

Status (Please check applicable boxes)

❒ 20 Yr. Member ❒ 30 Yr. Member ❒ 50 Yr. Member ❒ Past President ❒ Speaker ❒ Honorary Life Member ❒ Sustaining Member

REGISTER BY JULY 15, 1998 TO AVOID LATE REGISTRATION FEES

REGISTRATION:	MEMBERS	NONMEMBERS	AMOUNT
Registration (Awards Banquet included)	$ 230 ($280 late)	$335 ($385 late)	
Student	$ 35 ($ 45 late)	Not Available	
Retired IAMFES Member	$ 35 ($ 45 late)	Not Available	
One Day Registration: ❒ Mon. ❒ Tues. ❒ Wed.	$ 115 ($140 late)	$150 ($170 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	
Child Care (Ages 4 to 12): ❒ Mon. ❒ Tues. ❒ Wed.	$ 20 per child/per day		

OTHER EVENTS:			
Grand Ole Opry (Sat., 8/15)	$ 25		
IAMFES Golf Tournament (Sun., 8/16)	$ 80 ($ 95 late)		
Music City Sites (Sun., 8/16)	$ 28 ($ 33 late)		
Historic Nashville (Mon., 8/17)	$ 41 ($ 46 late)		
Hot Country Night (Mon. Night Social, 8/17)	$ 36 ($ 41 late)		
Children's Rate (14 & Under)	$ 21 ($ 26 late)		
Jack Daniel's Distillery (Tues., 8/18)	$ 29 ($ 34 late)		
IAMFES Awards Banquet (Wed., 8/19)	$ 40 ($ 45 late)		
Children's Banquet (Wed., 8/19)	$ 20 ($ 25 late)		

JOIN IAMFES TODAY AND SAVE!!! (Attach a completed membership application) _____

TOTAL AMOUNT ENCLOSED _____
(CHECK PAYABLE TO IAMFES — U.S. FUNDS DRAWN ON U.S. BANK)

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6200 Aurora Avenue, Suite 200W
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EXHIBITORS DO NOT USE THIS FORM

ComingEvents

MARCH

· **3-5, Practical HACCP for Food Processors,** in San Diego, CA. For further information, contact Silliker Laboratories, Phone: 800.829.7879; Fax: 708.957.8405.

· **3-5, Milkfat as a Food Ingredient Course,** University of Wisconsin-Madison, Madison, WI. The course is intended for people manufacturing or using milkfat ingredients. It will provide a better understanding of milkfat's chemical and physical properties, and how to select milkfat-derived ingredients for best performance in foods. For program information, contact Kerry Kaylegian, Program Coordinator-CDR at Phone: 608.265.3086; E-mail: kaylegia@cdr.wisc.edu.

· **9-10, Getting Ready for HACCP,** Edmonton. An introduction to Agriculture & Agri-Food Canada's Food Safety (CFIA) Enhancement Program (FSEP) with a focus on HACCP Prerequisities and a HACCP case study. This workshop will take a "train the trainer" approach to teaching microbial hazards and food plant sanitation to your personnel. For additional information, contact Guelph Food Technology Centre, 88 McGilvray St., Guelph, Ontario, N1G 2W1; Phone: 519.767.5036; Fax: 519.836.1281.

· **16-17, CAMFES Annual Meeting**, in Charlotte, NC. For more information contact Beth Johnson, Phone: 803.935.6201.

· **17, AAMFES Annual Meeting**, University of Alberta, Edmonton. Keynote speaker is IAMFES Vice President, Jack Guzewich. For more information contact Lawrence Roth, Phone: 403.427.4054; Fax: 403.436.9454

· **17-18, 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 further information, contact Jack Brook, Dept. of Food Science Technology, Mt. Hood Community College, 26000 S.E. Stark St., Gresham, OR 97030; Phone: 503.667.7473; E-mail: brookj@mhcc.cc.or.us.

· **17-18, HACCP Workshop,** Chicago, IL. For additional information, contact AIB, 1213 Bakers Way, P.O. Box 3999, Manhattan, KS 66505-3999; Phone 785.537.4750; Fax: 785.537.1493.

· **18-20, MEHA 54th Annual Educational Conference**, at the Novi Hilton, Novi, MI. For more information contact the MEHA office at Phone: 517.372.7391; Fax: 517.372.1731.

· **23-25, Principles of Quality Assurance,** Manhattan, KS. For additional information, contact AIB, 1213 Bakers Way, P.O. Box 3999, Manhattan, KS 66505-3999; Phone 785.537.4750; Fax: 785.537.1493.

· **23-27, Laboratory Methods in Food Microbiology,** South Holland, IL. For further information, contact Silliker Laboratories, Phone: 800.829.7879; Fax: 708.957.8405.

· **23-27, PanAmerican Congress on Mastitis Control and Milk Quality,** Co-sponsored by IAMFES. International authorities from 20 countries throughout the world will present papers. Several plenary sessions will be held along with six workshops. For more information, contact: Dr. W. Nelson Philpot, P.O. Box 120, Homer, LA 71040, U.S.A.; Phone: 318.927.2388; Fax: 318.927.3133.

APRIL

· **1-2, Introduction to Microbiological Criteria and Sampling Plans,** in Las Vegas, NM. For further information, contact Silliker Laboratories, Phone: 800.829.7879; Fax: 708.957.8405.

· **2, UK Dairy Industry—3rd Annual Conference,** London. For further information, contact Agra Europe (London) Ltd, 25 Frant Road, Tunbridge Wells, Kent, TN2 5JT, England; Phone: 44 (0)1892 511807 or Fax: 44 (0)1892 527758/544895.

· **2-3, Applied Sensory Evaluation Techniques,** New Brunswick, NJ. This course is designed to familiarize food and pharmaceutical industry professionals with the essential basic and advanced applied sensory evaluation techniques needed to develop high quality products for today's marketplace. For further information, contact Keith Wilson at Phone: 732.932.9271; Fax: 732.932.1187; or E-mail: ocpe@aesop.rutgers.edu.

· **2-4, 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 with little or no statistical background and demonstrates how to perform the tests and provides a solid basis of understanding for sensory analysis. To register call 800.752.0881; after November 1, 1997, call 530.757.8777. For program information, contact Michael O'Mahony, at 916.752.6389; E-mail: maomhony@ucdavis.edu.

· **6-9, Seoul Food '98,** Korea Exhibition Center, (Koex), Seoul, Korea. For additional information, contact Sue Na, International Trade Specialist, Korea Machinery Information Center, 111 E. Wacker Dr., Suite 2229, Chicago, IL 60601, U.S.A.; Phone 312.644.4323; Fax: 312.644.4879.

· **8-9, Microbiological Techniques for Dairy Quality Control,** offered by the University of Wisconsin-Madison, Dept. of Food Science. This course will teach entry-level laboratory personnel the basis of routine microbiology analyses used in the dairy industry. For further information, contact Steve Ingham at 608.265.4801.

· **15-16, The Food Industry: Pennsylvania's Opportunities for the New Millennium,** Eden Resort Inn and Conference Center, Lancaster, PA. Sponsored by Penn State Dept. of Food Science. Invited to attend are R&D food scientists and engineers, marketing and plant managers from food processing and

manufacturing companies. For more information, contact Dr. Hassan Gourama, Food Science Dept., Penn State-Berks Campus, Phone: 610.396.6121; E-mail: hxg7@psu.edu.

· **17-19, HACCP Workshop,** sponsored by the Food Processors Institute. This course is designated to meet the educational requirements cited in both the FDA regulation requiring HACCP for seafoods and the USDA rule on pathogen reduction and HACCP. For more information, contact Valente Alvarez at 614.292.6281.

· **20-21, Food Micro '98,** Holiday Inn Select in Old Town Alexandria, VA. The workshop will focus on methods of controlling microbial foodborne illness, with speakers to include experts from universities, government agencies, and the food industry in general. The workshop is presented by the National Food Processors Association and is sponsored by the Food Processors Institute. For registration information, call Eric A. Forste, Program Coordinator, Phone: 202.393.0890; E-mail: eforste@nfpafood.org.

· **24-29, Conference for Food Protection,** Swissotel, Boston, MA. To receive additional information, contact Leon Townsend, CFP Executive Secretary, 110 Tecumseh Trail, Frankfort, KY 40601; Phone or Fax: 502.695.0253; E-mail: leontown@dcr.net.

· **27-28, Getting Ready for HACCP,** Edmonton. An introduction to Agriculture & Agri-Food Canada's Food Safety Enhancement Program with a focus on HACCP Prerequisities and a HACCP case study. This workshop will take a "train the trainer" approach to teaching microbial hazards and food plant sanitation to your personnel. For additional information, contact Guelph Food Technology Centre, 88 McGilvray St., Guelph, Ontario, N1G 2W1; Phone: 519.767.5036; Fax: 519.836.1281.

· **28-30, Seafood Processing Europe,** Brussels Exhibition Centre, Brussels, Belgium. For more information, contact Brad MacCachran at 207.842.5504.

MAY

· **7-8, HACCP for Foodservice,** offered by Select Concepts, Dallas, TX. This 2-day workshop covers prerequisite programs and HACCP principles. For more information, contact Leslie Wisniewski, Select Concepts, 3701 W. Northwest Hwy., Suite 169C, Dallas, TX 75220; or Phone: 214.350.8644.

· **18-19, PAMFES 1998 Annual Meeting,** at the Nittany Lion Inn, State College, PA. For additional information, contact Gene Frey at 717.397.0719.

· **19-21, Principles of Food Microbiology,** Philadelphia, PA. For further information, contact Silliker Laboratories, Phone: 800.829.7879; Fax: 708.957.8405.

· **20-21, Applied Dairy Chemistry,** offered by the University of Wisconsin-Madison, Dept. of Food Science, Madison, WI. This course will cover the chemistry of milk and milk products as they relate to specific dairy processing and control functions. For further information, contact Dr. Bill Wendorff at 608.263.2015.

JUNE

· **3-5, Practical HACCP for Food Processors,** Chicago, IL. For further information, contact Silliker Laboratories, Phone: 800.829.7879; Fax: 708.957.8405.

· **7-12, 4th World Congress Foodborne Infections and Intoxications,** in Berlin. The continued increase of foodborne diseases and the emergence of new or newly recognized agents of diseases all over the world underline the importance of the congress. For further information, contact Congress Office 4th World Congress, Federal Institute for Health Protection for Consumers and Veterinary Medicine, Diedersdorfer Weg 1, D - 12277 Berlin; Phone: 49.30.8412.2158; Fax:49.30.8412.2957;E-mail: 4.wkoffice@bgvv.de.

· **8-10, Mykotoxin Workshop,** in Detmold, Germany. The workshop is organized by the Institute for Biochemistry of Cereals and Potatoes, Federal Centre for Cereal, Potato, and Lipid Research, Schutzenberg 12, D-32756 Detmold, Germany. For information, contact Dr. Wolff at Phone: 49.5231.741.121 (131); Fax: 49.5231.741.130 (100); E-mail: betsche.bagkf@t-online.de.

· **16-18, Hazard Analysis & Development of Your HACCP Plan,** Guelph. A practical, business approach to help you in designing your own HACCP plan. You'll build product descriptions, conduct a hazard analysis, determine critical limits and control measures–all on your own processing line. For additional information, contact Guelph Food Technology Centre, 88 McGilvray St., Guelph, Ontario, N1G 2W1; Phone: 519.767.5036; Fax: 519.836.1281.

JULY

10-11, 18th International Workshop on Rapid Methods and Automation in Microbiology, at Kansas State University, Manhattan, KS. Hands-on experiments, demonstrations, lectures, colloquium, scientific poster sessions and competition will occur. For scientific content, contact: Daniel Y. C. Fung, Director; Phone: 785.532.5654; Fax: 785.532.5681; E-mail: dfung@oz.oznet.ksu.edu. For registration information, contact: Janice Nikkel, U.S. Phone: 800.432.8222; Outside the U.S. 785.532.5575; Fax: 785.532.5637; E-mail: ksucon@dce.ksu.edu.

· **27-31, Laboratory Methods in Food Microbiology,** South Holland, IL. For further information, contact Silliker Laboratories, Phone: 800.829.7879; Fax: 708.957.8405.

AUGUST

· **16-19, IAMFES Annual Meeting,** in Nashville, Tennessee at the Renaissance Nashville Hotel. Registration information available in this issue of *DFES* on pages 124-125 or contact Julie Cattanach at Phone: 800.369.6337; 515.276.3344; Fax: 515.276.8655; E-mail: jcattanach@iamfes.org.

· **24-28, The 10th International Conference on Production Diseases in Farm Animals,** Utrecht, The Netherlands. For additional information, contact the Congress Secretariat: Royal Netherlands Veterinary Association, P.O. Box 14031, 3508 SB Utrecht, The Netherlands; Phone: 31 30 251 01 11; Fax: 31 30 251 17 87; E-mail: knmvd@pobox.ruu.nl; Internet: http://www.knmvd.nl.

In Memory of...

Ken Kirby
Edgerton, WI

We extend our deepest sympathy to the family of Mr. Kirby who recently passed away.

Ken was a long-time IAMFES member and recipient of the 1988 Harold Barnum Award.

IAMFES will always have sincere gratitude for his contribution to the Association and the profession.

ADVERTISING INDEX

HAVE YOU JOINED THE IAMFES FOOD PROTECTION REGISTER?

We invite you to become a part of the IAMFES Food Protection Register. Registry Members may be called upon to answer questions received through the IAMFES office and other sources. If you are willing to serve the Association in this manner, please fill out the information below and return to:

IAMFES
Attn: Rick McAtee
6200 Aurora Ave., Suite 200W
Des Moines, IA 50322-2863
Fax: 515.276.8655
E-mail: iamfes@iamfes.org

Name: _____ Title: _____

Company: _____

Address: _____

City: _____ Province/State: _____ Postal Code: _____

Phone: _____ Fax: _____

E-mail: _____

I AM WILLING TO ANSWER QUESTIONS ON THE FOLLOWING TOPICS IN FOOD PROTECTION: (please print or type)

_____

_____

_____

Please attach additional paper if more space is needed.

I agree to provide information to other professionals as referred by IAMFES in areas of my interest. I also understand that if a referral is made to me and I am not comfortable in answering the question or do not feel I have the expertise, I can indicate this and decline answering. I agree to allow IAMFES to publish my name and areas of interest in *Dairy, Food and Environmental Sanitation* as as member of the Food Protection Register.

Signature: _____ Date: _____

The International Association of Milk, Food and Environmental Sanitarians, Inc.
6200 Aurora Avenue, Suite 200W • Des Moines, Iowa 50322-2863 • 515.276.3344 or 800.369.6337

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IAMFES Booklets

Quantity	Description	Member or Gov't. Price	Non-Member Price	Total
	Procedures to Investigate Waterborne Illness–2nd Edition	$8.00	$16.00	
	Procedures to Investigate Foodborne Illness–4th Edition	6.00	12.00	
	Procedures to Investigate Arthropod-borne and Rodent-borne Illness	6.00	12.00	
	Procedures to Implement the Hazard Analysis Critical Control Point System	6.00	12.00	
	*Pocket Guide to Dairy Sanitation (minimum order of 10)	.50	.75	
	*Before Disaster Strikes...A Guide to Food Safety in the Home (minimum order of 10)	.50	.75	
			Shipping Handling (See Below)	
			Booklet Total	

Multiple copies available at reduced prices.
Phone our order desk for pricing information on quantities of 25 or more.

3-A Sanitary Standards

Quantity	Description	Member or Gov't. Price	Non-Member Price	TOTAL
	Complete Set 3-A Dairy & Egg Standards	$70.00	$140.00	
	Five-year Update Service on 3-A Dairy & Egg Standards	95.00	190.00	
			Shipping Handling (See Below)	
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Mail order to the IAMFES address listed above, or
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Shipping and Handling

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Within U.S.

First booklet	$2.00
Each additional booklet	$1.00
*Guide Booklets–per 10	$2.50

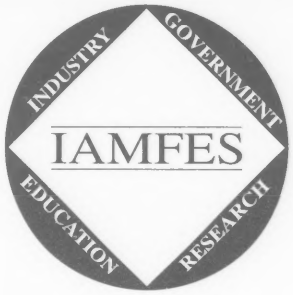
Outside U.S.

First booklet	$4.00
Each additional booklet	$1.00
*Guide Booklets–per 10	$3.50

3-A Sanitary Standards

Within U.S. (each item)	$6.25
Outside U.S. (each item)	$10.25

Prices effective through August 31, 1998



Your Invitation to Join

The International Association of Milk, Food and Environmental Sanitarians, founded in 1911, is a non-profit educational association of food safety professionals with a mission *"to provide food safety professionals worldwide with a forum to exchange information on protecting the food supply."*

* Who are IAMFES Members?

The Association is comprised of a diverse membership of 2,800 from 50 nations. IAMFES Members belong to all facets of the food protection arena including: Industry, Government and Academia.

* What are your Benefits as an IAMFES Member?

Dairy, Food and Environmental Sanitation — A reviewed monthly publication that provides practical and applied research articles and association news, updates, and other related information for food safety professionals. All IAMFES Members receive this publication as part of their membership.

Journal of Food Protection — An international, refereed scientific journal of research and review papers on topics in food science and food aspects of animal and plant sciences. This journal is available to all individuals who request it with their membership.

The IAMFES Lending Library — Provides quality training videos dealing with various food safety issues. IAMFES Members are allowed free use of these videos.

The IAMFES Annual Meeting — Is a unique educational event; three days of technical sessions, symposia and exhibits provide attendees with over 200 presentations on current topics in food protection. IAMFES Members receive a substantially reduced registration fee.

* To Find Out More...

To learn more about IAMFES and the **many** other benefits and opportunities available to you as a Member, please call 515.276.3344 or 800.369.6337; Fax: 515.276.8655; E-mail: iamfes@iamfes.org.

International Association of Milk, Food and Environmental Sanitarians

MEMBERSHIP APPLICATION

MEMBERSHIP

☐ Membership with JFP and DFES $120.00
(12 issues of the *Journal of Food Protection* **and** *Dairy, Food and Environmental Sanitation*)

◀ **BEST VALUE**

☐ Membership with DFES $75.00
(12 issues of *Dairy, Food and Environmental Sanitation*)

☐ Check here if you are interested in information on joining your state/province chapter of IAMFES

SUSTAINING MEMBERSHIP

☐ Membership with BOTH journals $525.00
(Includes exhibit discount, Annual Meeting issue advertising discount, company monthly listing in both journals and more)

STUDENT MEMBERSHIP*

☐ Membership with JFP and DFES $60.00

☐ Membership with *Journal of Food Protection* $37.50

☐ Membership with *Dairy, Food and Environmental Sanitation* $37.50

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Des Moines, IA 50322-2863

OR Use Your Charge Card:
800.369.6337 (U.S. & Canada)
515.276.3344
515.276.8655 Fax

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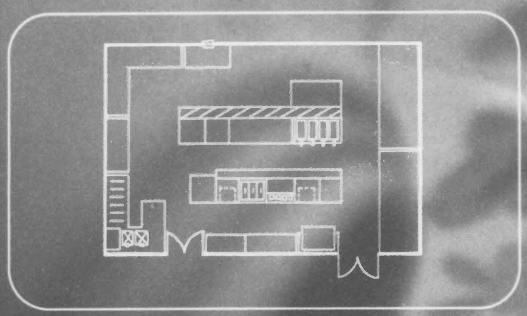

Proper dining etiquette includes forks on the left, knives on the right and UL Marks on all the food equipment.

The standard of excellence in the food industry doesn't just apply to the food and its preparation. It also applies to the food service equipment. That's where UL's product certification expertise comes in. You'll know food equipment meets nationally recognized standards if it bears the UL Classification Mark for public health. We're accredited by the American National Standards Institute (ANSI) and the Standards Council of Canada in many public safety areas including food service equipment and drinking water additives. We use a team of experts including engineers, chemists and toxicologists who can assist you with technical questions. Plus our field representatives make follow-up visits to the factory at least four times a year to help maintain the UL Mark's integrity. Sure, proper etiquette is important. But proper certification is essential.

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For more information, call one of our locations: Northbrook, IL 1-800-595-9844; Research Triangle Park, NC 1-800-595-9841; Camas, WA 1-800-595-9845; Melville, NY 1-800-595-9842; Santa Clara, CA 1-800-595-9843. Or visit our Web site at www.ul.com.