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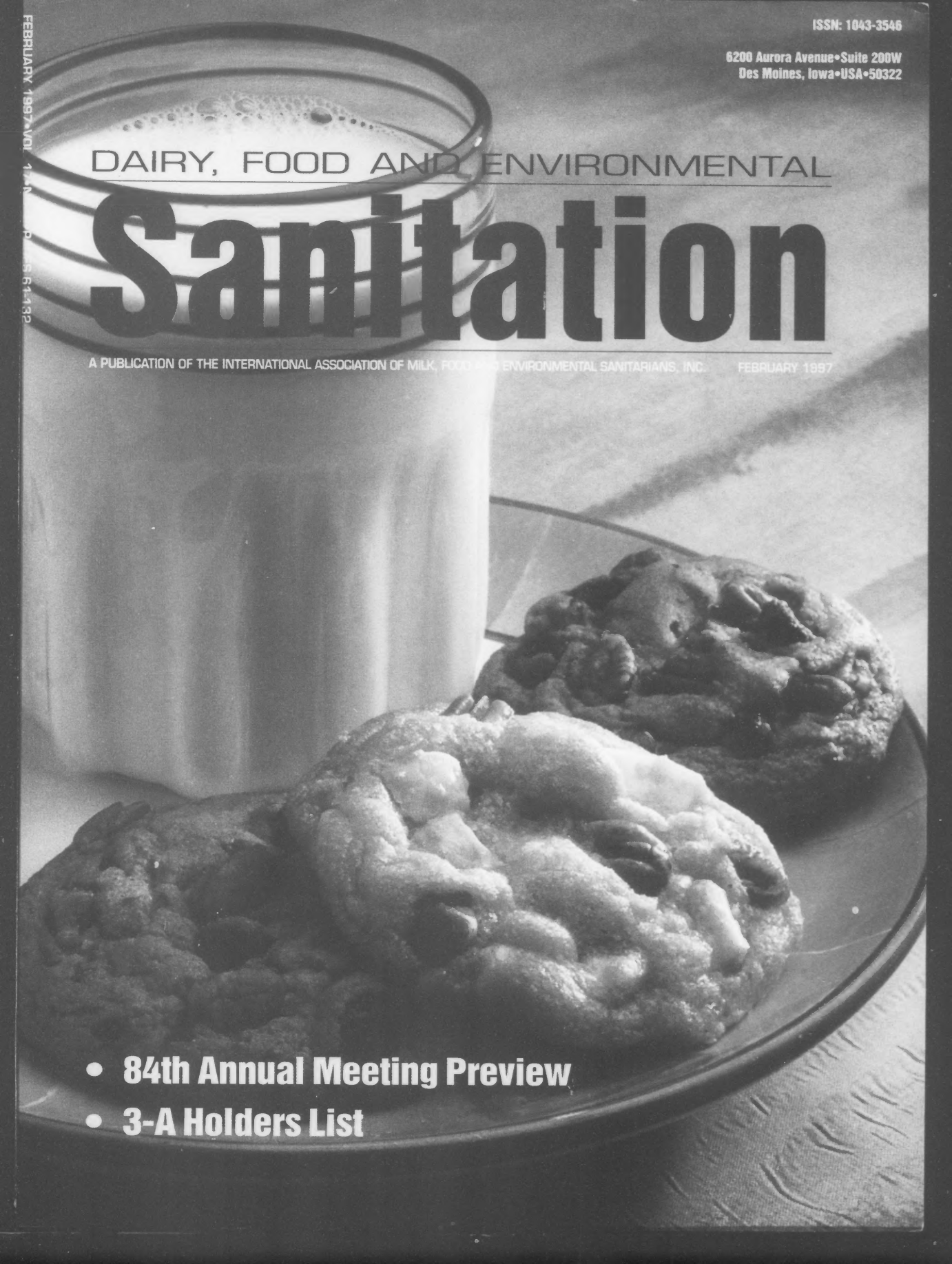
DAIRY, FOOD AND ENVIRONMENTAL

Sanitation

A PUBLICATION OF THE INTERNATIONAL ASSOCIATION OF MILK, FOOD AND ENVIRONMENTAL SANITARIANS, INC. FEBRUARY 1997



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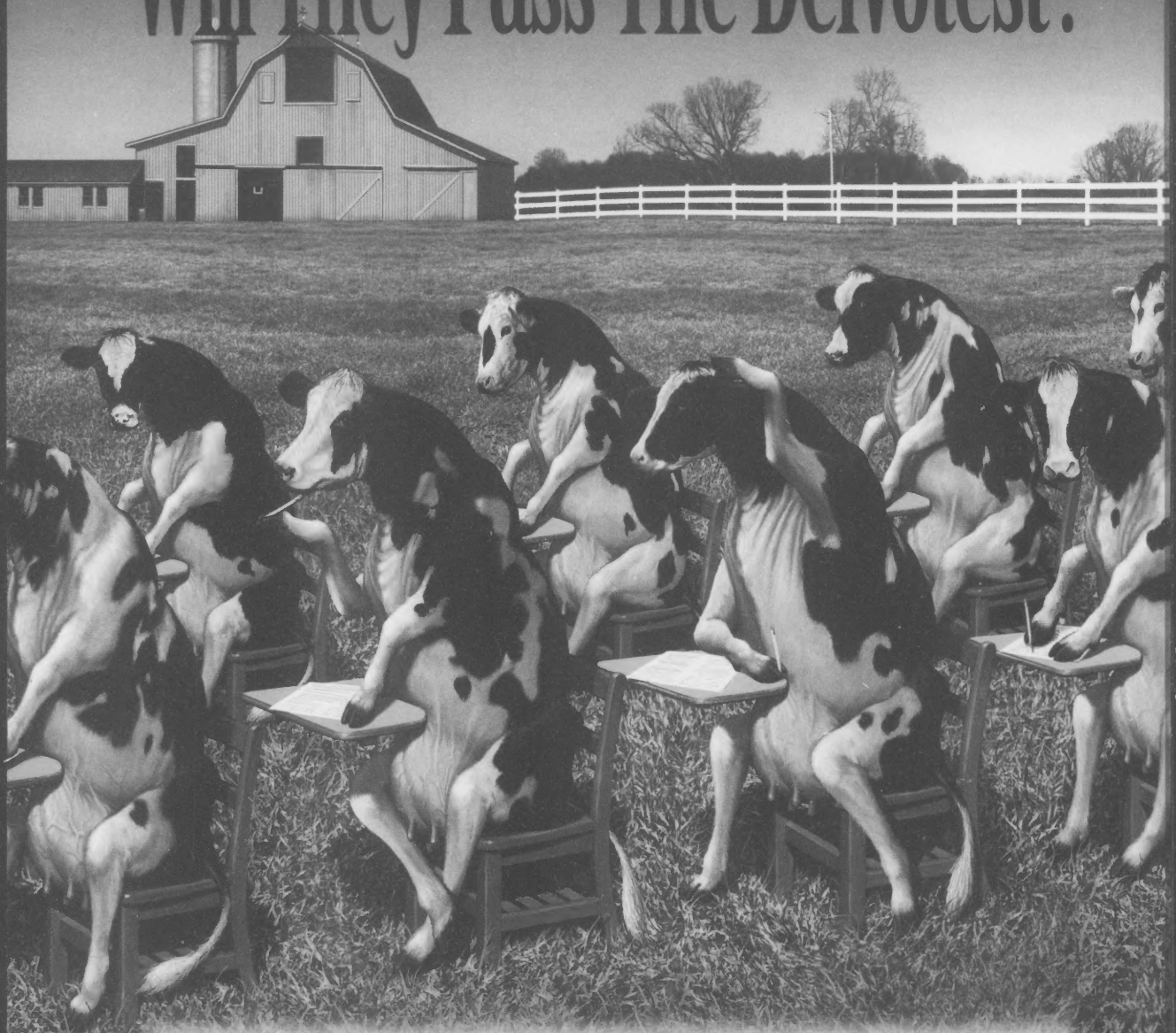

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Photo courtesy of American Dairy Association.

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Sanitation

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OFF THE TOP

FROM THE PRESIDENT

By MICHAEL H. BRODSKY,
IAMFES President

"Board, but not Bored"

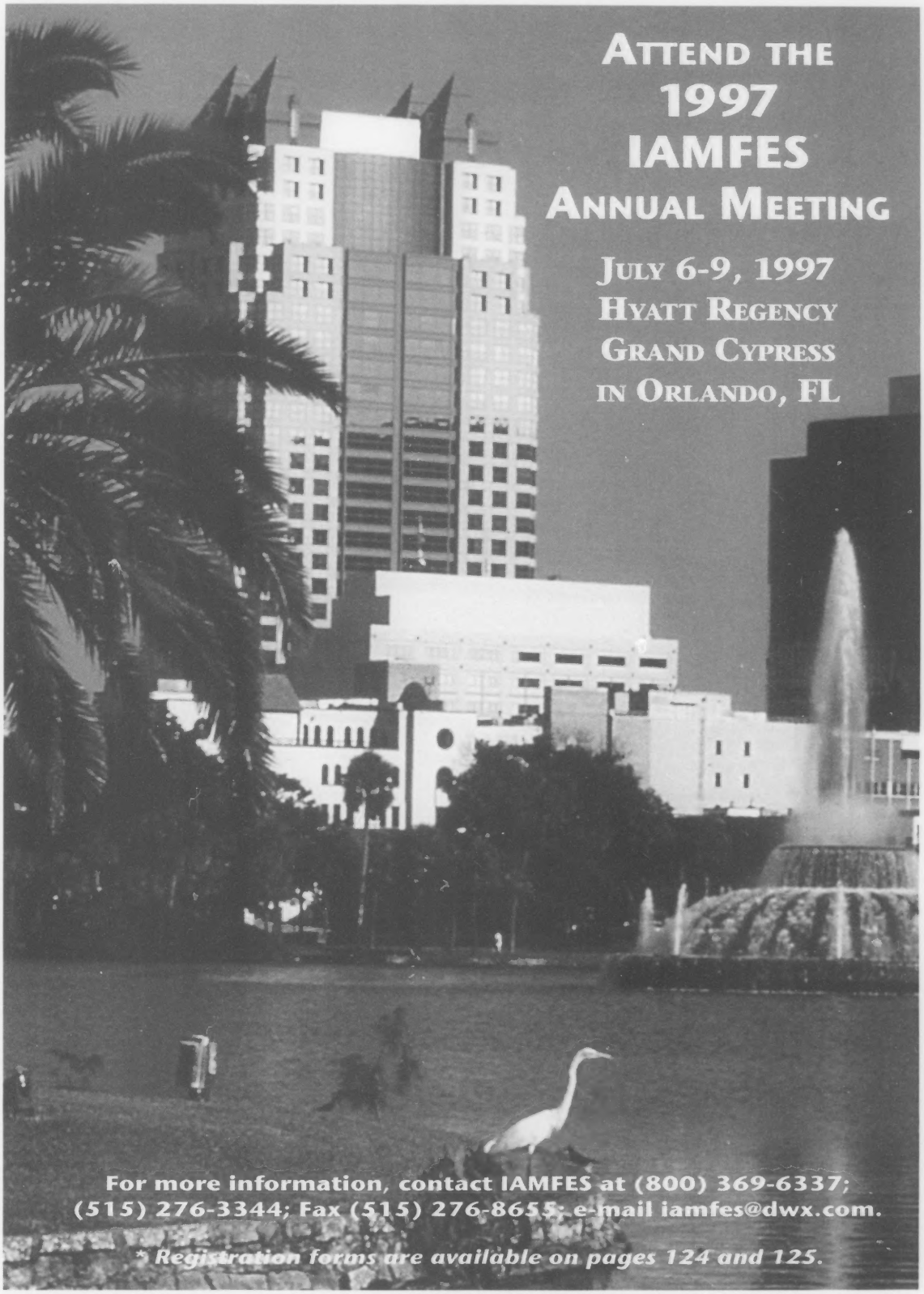
I don't know how your New Year's celebration was, but I can tell you that for me 1996 ended with a boom and 1997 started with a bang. Dave Merrifield notified me on December 27, 1996 that with regrets, he was resigning from his position as Executive Director of IAMFES, to assume a new position with a trade organization. As your President, I was faced with the unenviable task of trying to contact members of the Executive Board between Christmas and New Years to arrange for an emergency meeting to address this issue (thank goodness for e-mail). We did manage two meetings by conference call and were able to develop an appropriate strategy. I am pleased to inform you that David Tharp, former Director of Finance and Administration for IAMFES was selected and has accepted the position of Executive Director for IAMFES as of January 10, 1997. I am sure that you will join the Board in wishing David much success in his promotion.

David has jumped right into the breach by attending both the Program Advisory Committee (PAC) and the Executive Board meetings in Orlando, Florida. The PAC met January 10-11 to finalize the scientific and technical program for the 1997 Annual Meeting being held at the Hyatt Regency Grand Cypress Hotel in Orlando, Florida, July 6-9. Under chair John Cerveny, the committee worked diligently and efficiently to put together another outstanding program. Because the program is jam-packed, speakers will be reminded to strictly adhere to the time allotted for their presentations. This policy will be enforced by the respective convenors and we anticipate full cooperation by all participants. This year we will initiate seeking additional corporate financial support for events and symposia to ensure that we can continue to attract top-notch speakers and hold the type of functions that our members can truly enjoy. The continued support of our Sustaining Members and Affiliates is always appreciated.

The Executive Board met January 12-14 at the site of the 1997 IAMFES Annual Meeting. The Hyatt Regency Grand Cypress Hotel is an outstanding facility. Be sure to bring your family this year. As a jogger, I appreciated the 3 jogging trails available right on site, covering 1.5 to 4.7 miles. If there are any other early morning joggers who would like to join me for morning runs, let me know. Perhaps we can form an IAMFES Joggers PDG! The agenda for our board meeting addressed many issues of concern to the organization and a summary of the outcome of the meeting will be copied to all Affiliate Representatives. Some of the highlights of the meeting included the creation of an IAMFES Fellows Program under the chair of Bob Gravani. More details will follow as the program is developed. A regional workshop is being developed under the guidance of PAC for presentation in 1997. Look for more information on this in future issues of *DFES*. We are continuing to explore developing our own web site and have taken the first step by registering IAMFES as our domain name. We'll keep you posted.

Speaking of annual meetings, although it may seem a little early, now is the time to start thinking about submitting topics for symposia and preparing your scientific/technical presentation for the 1998 Annual Meeting in Nashville, Tennessee.

As always, if you have any comments on the column, please don't hesitate to contact me (e-mail: brodskm@gov.on.ca, telephone (416) 235-5717 or fax (416) 235-5951.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Dairy, Food and Environmental Sanitation, Vol. 17, No. 2, Pages 72-75

Phosphorus Reduction in Dairy Wastes by Conservation of Burst Rinses

William L. Wendorff,* Sarah J. Westphal, and Jenny C. Y. Yau

SUMMARY

Burst rinses of the interior surfaces of bulk milk tankers, processing tanks, and sections of transfer pipes were analyzed for milk solids and total phosphorus. The amount of milk recovered in the burst rinses of bulk tankers ranged from 5.84 to 36.69 kg per tanker. Approximately 6 to 34 g of phosphorus per tanker was recovered in the burst rinses. Recovery of milk products in burst rinses was proportional to the viscosity of the product. However, phosphorus recovery was not proportional to the viscosity of the product. With conservation of burst rinses from milk tanks and pipelines, milk product losses were reduced by 55 to 70% and phosphorus discharges were reduced by 57 to 80%.

INTRODUCTION

Because milk is a very rich source of phosphorus, dairy plants processing milk and milk products discharge high levels of phosphorus in wastewater from their processing operations. Whole milk contains an average of 93 mg of phosphorus per 100 g of milk *(10)*, which is equivalent to about 1000 mg of phosphorus per liter of milk. Phosphorus levels in other fluid milk products are very similar to that of whole milk *(5)*. Whey contains from 339 to 766 mg of phosphorus per liter *(12)*.

Recent environmental regulations *(13)* have established a phosphorus limit of 1.0 mg/l on effluent discharges to surface waters. Dairy plants are experiencing serious problems in meeting these new effluent limits. Harper et al. *(5)* reported a range of 11 to 160 mg of phosphorus per liter of wastewater from a variety of dairy plants. Cocci et al. *(2)* reported a phosphorus concentration of 139 mg/l in the effluent from a multi-product dairy plant in Maryland. Marshall *(8)* reported phosphorus concentrations in wastewater ranging from 12 to 56 mg/l for butter/powder plants and 17 to 280 mg/l for cheddar cheese plants. Currently in Wisconsin, fluid milk plants are discharging phosphorus concentrations of 10 to 40 mg/l and cheese plants 25 to 80 mg/l in their influents to waste treatment plants *(11)*.

Because the cost of phosphorus removal from dairy plant wastewater is significantly higher per unit than biochemical oxygen demand (BOD) or total suspended solids (TSS) *(1)*, a concentrated effort must be made to reduce milk losses going to the sewers. For each 9 kg of milk lost to the sewer, there is 9 g of phosphorus in the wastewater from that milk. Several researchers *(3, 6, 7, 11)* have reported on various methods of reducing milk losses in dairy plants. One of the steps recommended to minimize waste involves saving the initial or burst rinse from processing equipment for inclusion in further processed products. Harper and Carawan *(6)* reported that a well-managed dairy plant using burst rinses could reduce the BOD of the waste influent by 2 kg per 1000 kg of milk processed.

Information on phosphorus reduction in dairy wastewater through waste minimization is very limited. The purpose of this study was to determine the effect of conserving burst rinses from dairy

TABLE 1. Total phosphorus and milk recovered in burst rinses from bulk tankers[1]

Truck No.	Capacity of tanker (kg)	Milk recovered per load (kg)	Total phosphorus per load (g)
T1	18,200	6.66	6.46
T2	17,700	6.43	6.24
T3	20,450	8.37	8.12
T4	13,650	8.12	7.87
T5	22,050	7.67	7.44
T6	15,450	12.89	12.50
T7	20,300	9.10	8.83
T8	22,500	21.35	20.70
T9	19,500	5.84	5.66
T10	19,100	6.88	6.67
T11	15,700	8.37	8.12
T12	20,150	8.76	8.50
T13	21,600	8.23	7.98
T14	20,450	23.17	22.47
T15	22,950	20.12	19.51
T16	13,900	36.69	34.69
T17	19,550	17.73	17.20
T18	22,750	18.34	17.78
T19	20,450	10.20	9.89
T20	19,200	12.70	12.29

[1]Means of duplicate determinations of each tanker sample.

equipment on the phosphorus level in wastes from dairy plants.

MATERIAL AND METHODS

Raw milk intake samples

Twenty bulk milk tank trucks were unloaded in the usual manner at the intake of a major dairy cooperative. The tanks were allowed to drain for 1 min after the load was pumped off. Then 68 l of potable water was atomized into the tanker through the spray ball located in the manhole lid. Accumulated liquid from the burst rinse was collected, and a representative 500-ml sample was taken for analysis. Burst rinses were collected at the intake from 8:30 a.m. to 1:00 p.m. Burst rinse samples were stored on ice immediately after collection and were transported to the laboratory in Madison under refrigerated storage. Until analyzed, samples were maintained in frozen storage at -18°C.

Process tank samples

Burst rinse samples were recovered from a 1135-l stainless steel processing tank in the University of Wisconsin Dairy Plant. Five replicates each were obtained for whole milk, skim milk, 1% chocolate drink, 18% cream, and ice cream mix. For each sample, the product was pumped from the tank, allowed to drain for 1 min, and the tank was then sprayed with 38 l of potable water. The burst rinse was collected and a representative sample taken for analysis. Samples were frozen immediately after collection and were maintained in frozen storage until analyzed.

Laboratory samples

A series of five 26-cm sections of 3.5-cm diam. stainless steel pipes was fitted with neoprene stoppers and polypropylene/teflon stopcocks at the bottom end. The pipes were filled with 230 ml of milk or milk product and held at 7°C for 1 h. The pipes were then emptied and allowed to drain for 1 min. A spray bottle was used to deliver 10 ml of distilled water as a burst rinse. The burst rinse was allowed to drain for 1 min and then saved for analysis. Twenty-five milliliters of a 1% solution of chlorinated alkaline cleaner (Monarch 1313SD, H.B. Fuller Co., Minneapolis, MN) at 65°C was added to the pipes. The pipes were capped and agitated for 30 sec. Wash solution was allowed to drain for 1 min and saved for analysis. Pipes were rinsed with 10 ml of distilled water and allowed to drain for 1 min. Studies included trials with whole milk, skim milk, chocolate drink, half and half, heavy whipping cream, and ice cream mix.

Initial product, burst rinses, wash solutions, and final rinses were analyzed for chemical oxygen demand (COD) and total phosphorus as outlined in *Standard Methods for the Examination of Water and Wastewater (4)*. Total phosphorus was determined by the sulfuric acid-nitric acid digestion procedure and the ascorbic acid colorimetric method. Initial products and burst rinses were analyzed for total solids by the vacuum oven procedure, as described in *Standard Methods for the Examination of Dairy Products (9)*. Analyses were conducted in duplicate. Milk and milk product losses in wash solutions and final rinses were determined from COD values of the washes and rinses after subtracting COD values of the alkaline cleaner blank.

TABLE 2. Total phosphorus and milk product recovered in burst rinses from 1135-liter processing tank[1]

Milk product	Milk product recovered (kg)	Total phosphorus recovered (kg)
Whole milk	4.33	4.19
Skim milk	3.05	3.13
1% chocolate milk	3.59	3.67
18% cream	4.72	3.84
Ice cream mix	6.99	3.62

[1]Means of five replicates for each milk product.

TABLE 3. Total phosphorus, COD and total solids of milk and milk products[1]

Product	Total solids (g/100 ml)	COD (mg/l)	Total phosphorus (mg/l)
Whole milk	12.1	147,000	995
Skim milk	8.9	121,400	1035
1% chocolate milk	15.8	127,600	1080
Half & half	23.1	223,900	970
Heavy whipping cream	40.9	373,100	620
Ice cream mix	40.6	266,700	570

[1]Means of duplicate determinations.

RESULTS AND DISCUSSION

The amount of milk and total phosphorus recovered in burst rinses from bulk tankers at the raw milk intake is shown in Table 1. Bulk tanker capacities ranged from 13,650 to 22,950 kg. The average amount of milk recovered in burst rinses was 12.59 kg per load. Milk recoveries in the burst rinse increased during the latter part of the day as haulers became more rushed to unload their tankers and get on the road for their second pickups. The average amount of total phosphorus recovered in the burst rinses was 13.25 g per load. With more than 60 tankers per day unloading at the intake, this plant was discharging more than 750 liters of milk containing over 0.8 kg of phosphorus which could have been recovered by conserving burst rinses.

The recovery of milk and total phosphorus in burst rinses from the dairy plant processing tank is shown in Table 2. The recovery of milk products in burst rinses was proportional to the viscosity of the milk product processed, skim milk having the lowest viscosity and ice cream mix the highest. Burst rinses from the processing tank contained larger amounts of milk than those from the tankers at intake. Samples from the processing tank averaged 7.56 g of milk/100 cm^2 of surface area for whole milk whereas burst rinses from the tankers averaged 2.94 g of milk/100 cm^2. The higher retention of milk in the process tank was most likely because of the flat surface in the bottom of the tank and the longer length of discharge pipe on the process tank.

The amount of phosphorus recovered in the burst rinses was not proportional to the viscosity of the milk products (Table 2) because the viscous, higher fat products do not contain as much phosphorus (Table 3).

Because isolating the clean-in-place (CIP) systems for the intake and processing tank made it difficult to obtain representative samples during the cleaning cycles, a series of trials with the stainless steel pipe sections as conducted to determine the efficiency of phosphorus reduction by conserving burst rinses. The compositions of the milk products used in the trial are given in Table 3. Milk recovery in the burst rinses from stainless pipe sections was lower than that observed for the tankers or the processing tank (Table 4). The average burst rinse concentration of 0.77 g/100 cm^2 for whole milk was lower because of more complete drainage of product from the pipe sections prior to cleaning. Vertical tanks or pipes provide a more complete drainage of product than horizontal tanks or pipes. Ice cream mix exhibited the greatest product loss in the cleaning process. With conservation of burst rinses from the pipe sections, 55 to 70% of product losses could be recovered for further use.

Without saving burst rinses, phosphorus concentrations in spent cleaning solutions ranged from 13.6 mg/l for heavy whipping cream to 64.0 mg/l for 1% chocolate milk. Phosphorus concentrations in burst rinses were highest for 1% chocolate milk and lowest for heavy whipping cream (Table 5). Conserving burst rinses would have reduced phosphorus in waste discharges by 57 to 81%.

Phosphorus losses from milk handled in the three types of equipment were proportional to the size of the equipment and its surface area. Phosphorus losses from milk would be much greater in pipelines than in large storage tanks where only a small volume of milk would have contact with the tank surface.

TABLE 4. Milk product recovered in burst rinses from stainless steel pipe sections[1]

Product	Product loss in cleaning[2] (g)	Product in burst rinse (g)	Reduction in product loss (%)
Whole milk	3.00	2.10	70.1
Skim milk	2.50	1.87	74.8
1% chocolate milk	3.97	2.49	62.7
Half and half	2.14	0.90	59.3
Heavy whipping cream	1.52	1.03	67.5
Ice cream mix	5.65	3.15	55.6

[1]Means of five replicates for each milk product.

[2]Includes burst rinse, alkaline wash, and final rinse.

TABLE 5. Total phosphorus (P) recovered in burst rinses from stainless steel pipe sections[1]

Product	Total P loss in cleaning[2] (mg)	Total P in burst rinse (mg)	Reduction in total P loss (%)
Whole milk	2.89	2.00	69.3
Skim milk	2.50	1.92	76.9
1% chocolate milk	4.06	2.53	62.5
Half and half	2.02	1.16	57.7
Heavy whipping cream	0.98	0.72	73.3
Ice cream mix	2.92	2.39	81.8

[1]Means of five replicates for each milk product.

[2]Includes burst rinse, alkaline wash, and final rinse.

CONCLUSION

With increased restriction on phosphorus in wastewater effluents from dairy plants, a greater emphasis must be placed on reducing product losses in the plant. By saving burst rinses of tanks and pipelines, milk product losses can be reduced by 55 to 70% and phosphorus discharges by 57 to 80%. With good product management and conservation of burst rinses, dairy plants should be able to meet new phosphorus discharge limits, significantly reducing the cost of waste treatment and improving plant efficiencies.

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HACCP Verification Procedures Made Easier by Quantitative *Listeria* Testing

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SUMMARY

Analysis of environmental samples for the presence of *Listeria* spp. is part of many HACCP programs. For environmental monitoring, isolation of *Listeria* spp. or of *Listeria monocytogenes* on microscopic immunomagnetic beads using the ListerTest™ kit has been shown to reduce test time to 24 h and improve sensitivity relative to cultural methods *(8)*. Data similar to that reported by Mitchell and co-workers was obtained in further studies designed for the AOAC Research Institute validation of ListerTest *(2)*. In addition to sensitivity, a property of ListerTest useful for environmental testing is the production of quantitative data. *Listeria* spp. or *Listeria monocytogenes* are reported as CFU *Listeria* spp. /g or *L. monocytogenes* /g, which permits differentiating sites of higher and lower contamination.

In this report, ListerTest was applied to environmental sampling of surfaces in food processing areas. ListerTest was used to monitor levels of *Listeria* spp. on environmental surfaces, including processing equipment. The level of *Listeria* spp. present was quantified, and sites contaminated with different levels of *Listeria* spp. were distinguished. ListerTest can also be used to detect *Listeria monocytogenes*. However, this capability was not applied in this study.

Applying this method to one processing line, it was possible to show that both the line and incoming raw product had little or no contamination, except for a slicer. Although the slicer had been scrupulously cleaned, more thoroughly than called for in the manufacturer's specifications, *Listeria* populations could become established. This was indicated by the higher levels of *Listeria* spp. present in environmental samples from the slicer than at any other sites in the processing line. Using this information, it was possible to decontaminate the slicer, specifically, and to show that finished product coming from the decontaminated line did not contain *Listeria* spp. or *Listeria monocytogenes*.

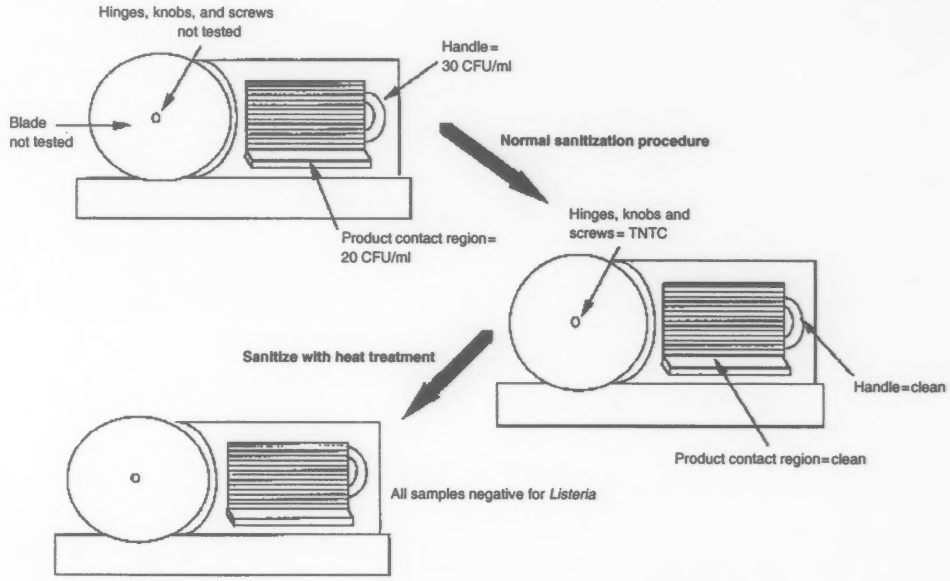
This type of testing was repeated with similar results on two other types of processing lines. Discrete sites of higher *Listeria* spp. contamination were identified and decontaminated, and the product was shown to be free of *Listeria* spp. These studies illustrate how, because of its speed, sensitivity and quantitative nature, ListerTest, can be of unique value in identifiying *Listeria* spp. (or *L. monocytogenes*, if desired) and confirming effective sanitizing of processing environments.

INTRODUCTION

Accurate detection of *Listeria* spp. in environmental samples is a critical component of HACCP programs, which emphasize environmental monitoring. Such detection is complicated by several factors. Exposure of cells in the environment to sanitizers or other agents can produce injury that renders cells hard to detect *(1)*. The microbial status of the processing environment changes rapidly, and test results must be obtained rapidly, because old data is of little value.

Cultural methods have inherent weaknesses when applied to environmental monitoring. By their nature, they are lengthy because of enrichment, and this decreases the value of their results. The selective agents in the enrichment can kill injured organisms, resulting in false negatives *(8)*. Testing in-plant is desirable because of speed. However, the biohazard associated with enriching samples and generating biohazardous waste may be unacceptable. An additional disadvantage is the qualitative nature of enrichment-based tests, which prevents identifying highly contaminated sites that may cross-contaminate other sites.

Figure 1. Levels of *Listeria* spp. on a manually operated slicing machine determined by ListerTest before and after sanitizing.



For these reasons, alternative methods of environmental testing may be more suited to such applications. Immunomagnetic bead capture of target pathogens has been used to isolate *Staphylococcus (5)*, *Listeria (10)*, and *Salmonella (9, 11)*. It has also been used to isolate subtypes of *Escherichia coli (7)* and for subtyping *Salmonella (6)*. Using immunomagnetic capture by ListerTest, a nonenriching 24-h test, it was possible to identify sites of contamination on processing lines and, using the rapid quantitative data, to quickly pinpoint key sites and sanitize them. After decontamination, product coming from the lines was uniformly negative for *L. monocytogenes*, as evaluated by the cultural method recommended in the BAM manual *(3)*.

That ListerTest might be particularly successful in identifying environmental *Listeria* spp. and indicating the effectivness of sanitization was suggested in a study by Mitchell and co-workers. They showed that ListerTest detects *Listeria monocytogenes* in environmental samples that produce false-negatives in cultural methods *(2, 8)*. ListerTest also detects injured cells, which is not generally considered to be a property of enrichment-based tests *(8)*.

This report describes the use of ListerTest to survey processing lines for the presence of *Listeria* spp. and to determine the effectiveness of different sanitation methods. Data are presented from various types of processing lines, initially surveyed and during and after different sanitation procedures. The results illustrate how nonenriching quantitative testing can provide advantages when applied to environmental monitoring.

MATERIALS AND METHODS

Cultures

For a control strain, *Listeria monocytogenes* 4b (ATCC 19115) was obtained from and maintained according to guidelines of the American Type Culture Collection (Rockville, MD).

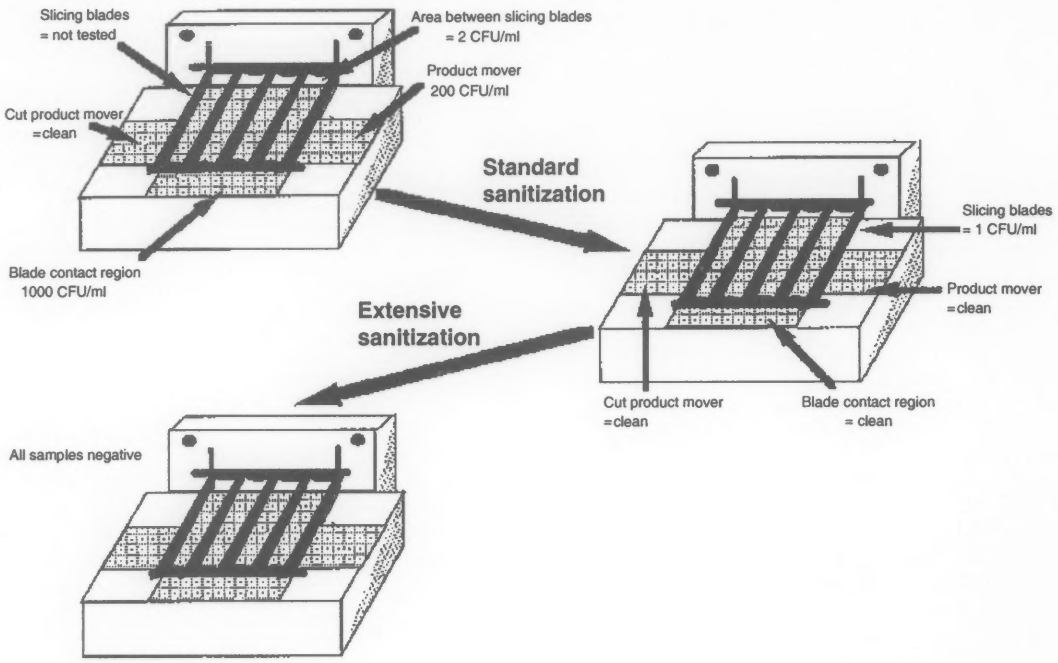
Preparation of samples

The regions to be sampled were swabbed with a cotton or rayon-tipped plastic applicator (Hardwood Products Company, Guilford, ME) that had been moistened in D/E neutralizing broth (Difco Laboratories, Detroit, MI). The swab was placed in a tube containing 2.5 ml of D/E neutralizing broth, and the tube was mixed vigorously on a mechanical mixer. The swab was removed, and samples were placed on cold packs for shipping. Within 48 h, 2 ml of each environmental sample was analyzed by ListerTest. For raw or in-process product analysis, swabs of product surfaces were placed in D/E neutralizing broth, or surface washes were obtained and analyzed.

Methods of analysis

Two milliliters of environmental sample, broth, stomachate, or wash from product was analyzed by immunomagnetic capture and subsequent characterization of *Listeria* spp. in the ListerTest method (Vicam, Watertown, MA).

Figure 2. Levels of *Listeria* spp. on an automated slicing machine determined by ListerTest before and after sanitizing.



RESULTS

Survey of a processing line ending in slicing of product by a manually operated slicing machine

Survey results of the line and the incoming raw product revealed a low level of *Listeria* spp., as often found, in incoming raw product. The line itself was negative for *Listeria* spp., except for the slicing machine, which was negative except for two swabs (Figure 1). A hand contact region was positive for *Listeria* spp. at 30 CFU/ml, and a product contact region was positive at 20 CFU/ml. These environmental samples consisted of 2-ml liquid into which a swab is placed after being rubbed over an area of four cm^2. The area was estimated by eye for irregular surfaces, such as locking rings and nuts. These low-level positives were interpreted to indicate that a more extensive survey of the machine was needed. It was decided to perform more extensive sampling after sanitizing the machine.

The slicer was disassembled, and all reachable areas were cleaned and sanitized. The slicer was resurveyed more extensively than in the first survey. Retesting indicated that a newly surveyed region containing hinges, knobs, and screws was positive for *Listeria* spp. at levels too numerous to count (>250 CFU/environmental sample).

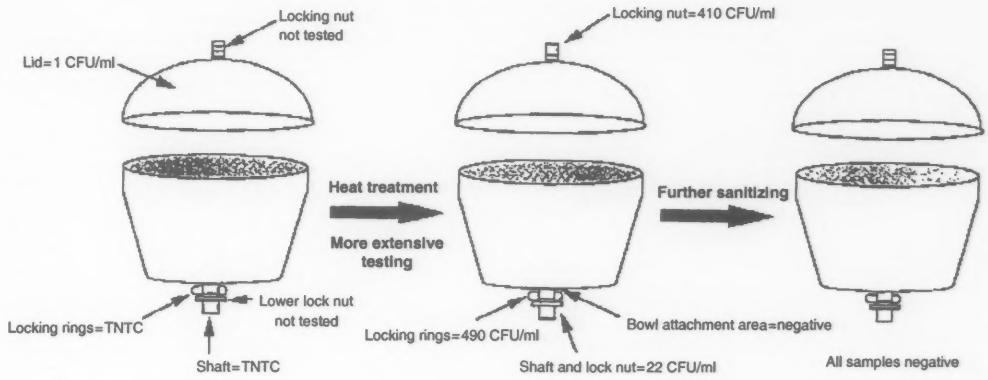
Because the results with ListerTest were quantitative, they could differentiate less contaminated regions of the machine from those regions which, by being highly contaminated, could serve as contamination sources. This suggested that *Listeria* spp. from this strongly positive area might be cross-contaminating other areas of the machine, which would then be positive at low levels, as seen in the first survey. It was also clear that the manufacturer's recommended cleaning and sanitizing procedures were inadequate for cleaning this area.

The slicing machine was subjected to a very rigorous decontamination by heat treatment, carried out by running the flame of a blow torch over contaminated areas. The machine was allowed to cool to room temperature before further environmental testing was performed. Upon retest, all swabs from the machine were negative for *Listeria* spp. Subsequently, all environmental and finished product samples tested negative for *Listeria* spp. by ListerTest and by the FDA method (data not shown).

Survey of a processing line ending in slicing of product by an automated slicer

Survey results of the line and the incoming raw product revealed a low level of *Listeria* spp. in the incoming raw product. The line itself was negative for *Listeria* spp.,

Figure 3. Levels of *Listeria* spp. on a blending/mixing bowl determined by ListerTest before and after sanitizing.



except for the automated slicing machine. The automated slicing machine had been tested before cleaning to determine contamination levels prior to sanitizing. Although almost all swabs of the automated slicer were negative, even prior to clean-up, three regions were positive (Figure 2). A region that carried product forward to the blades was positive at 200 CFU/ml, the region between the slicing blades was positive at 2 CFU/ml, and the region across which the blades moved during slicing was positive at 1000 CFU/ml.

The automated slicer was cleaned but not subjected to the extensive cleaning and sanitizing that precedes operation. It was then extensively retested to determine the effect of the standard cleaning method on the levels of *Listeria* spp. Only the blade regions remained positive at a low level (1 CFU/ml). This result indicated that removal of *Listeria* spp. from the machine was possible with mild cleaning, in contrast to the previously discussed processing line ending in the manual slicer, where even rigorous sanitizing was not fully effective until a heat treatment was included. The automated slicer was cleaned and sanitized more extensively. Upon retest, it was uniformly negative for *Listeria* spp. Subsequently, all environmental and finished product samples tested negative for *Listeria* spp. by ListerTest and by the FDA method (data not shown).

Survey of a processing line ending in mixing of product

Survey results of the line and the incoming raw product revealed a low level of *Listeria* spp. in the incoming raw product. The line itself was negative for *Listeria* spp., except for nonfood-contact regions of the mixing machine used to mix product at the end of the processing line. Most swabs from the mixing machine were negative, except for a locking ring on the underside of the mixing bowl and the shaft from the machine on which the locking ring of the bowl fitted (Figure 3). Environmental samples from the locking ring and shaft contained *Listeria* spp. at levels too numerous to count (>250 CFU/2 ml environmental sample). A very low count of 1 CFU/ml was obtained from the lid used to cover the bowl.

The mixing machine was dismantled and cleaned by heat treatment, after which more testing was performed. This time, the bowl attachment area tested negative, and the contamination of the shaft threats and lock nut was reduced to 22 CFU/ml of environmental sample. Using the quantitative data from these tests, it was decided to focus on sampling the locking nut and locking rings as potential sources of the contamination that was being detected. When the locking ring for attaching the bowl to the machine was sampled alone it gave 490 CFU/ml of *Listeria* spp., and the locking nut for attaching the lid to the bowl gave 410 CFU/ml. Cross-contamination from the higher level of *Listeria* spp. on the nut (used to attach the lid to the bowl) to the lid itself may explain why, in initial surveys, the lid was contaminated at a low level. Further rounds of cleaning resulted in total decontamination. All environmental and finished product samples tested negative for *Listeria* spp. by ListerTest and by the FDA method (data not shown).

DISCUSSION

The ability of ListerTest to quantify *Listeria* spp. in environmental samples was applied to testing and sanitizing processing lines to pinpoint areas needing special attention and to determine the effectiveness of the sanitizing process. Although incoming raw product was contaminated at a low level with *Listeria* spp., the processing lines were negative except for the machines at the ends of the

lines, which included different slicing machines and a mixing device. Different parts of those machines were contaminated with various levels of *Listeria* spp. Sites with higher levels of contamination were identified as potential sources from which cross-contamination could occur.

The effectiveness of sanitation methods was also determined using the quantitative nature of ListerTest. As sanitizing procedures were applied, the number of *Listeria* spp. present, at first, decreased but did not drop to undetectable levels initially at all sites tested. Because ListerTest could quantify contamination, it was possible to see that all sanitizing methods applied were effective, even though, in all cases, they did not immediately reduce *Listeria* spp. numbers to undetectable levels. This information was used to initiate additional rounds of sanitizing, rather than making radical changes in what were clearly effective methods. The effectiveness of sanitization was shown when all samples became negative for *Listeria* spp. through additional rounds of sanitizing.

Had cultural methods been used rather than the ListerTest, three detrimental consequences would have been observed. Identification of highly contaminated sites for *Listeria* spp., which could serve as sources of cross-contamination, would not have been possible due to lack of quantitation. The effectiveness of sanitizing procedures that inactivated some *Listeria* spp., but did not immediately reduce the number of *Listeria* spp. to undetectable levels, would not have been evident because the cultural method cannot indicate levels of contamination. Complete decontamination of processing lines would have been slower, because the cultural method takes 5 d for positive samples whereas the turnaround time for ListerTest results is 24 h.

Both the speed and the quantitative nature of ListerTest permitted more rapid sanitization, which could be specifically directed to problem areas. Production on lines known to be *Listeria*-free could, thus, be resumed quickly. This HACCP-oriented application capitalizes on ListerTest's speed and sensitivity, which has already resulted in successful application to food testing *(4)*.

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Pasteurized Milk Sedimentation Defect – A History Lesson

April J. Pontius,[1] John E. Rushing,* and Peggy M. Foegeding

SUMMARY

A finely granular, brown sediment has been observed in pasteurized milk processed at many locations in the United States.The milk had been processed with modern desludging separators. Recent studies have implicated microbial causes for sediment production. To determine if this sediment was of microbial origin, pasteurized milk samples obtained from three processors were heated at 65.6°C, 71.7°C, and 76.7°C for 5 min. Heated samples were stored at refrigeration temperatures and evaluated for 30 d to monitor the presence, amount, microscopic appearance, and color of the sediment. Regardless of the severity of heat treatment, the samples formed sediment 1 to 2 d after heating, a time too short for growth of psychrotrophic bacteria. After 14 d, microscopic examination of the sediment showed somatic cells but no bacteria. Centrifugation at 5000 × gravity for 7 s was studied as a method of removing sediment by conditions simulating a dairy plant separator. The centrifuged milk samples did not form sediment, whereas the uncentrifuged control samples did. This quality defect is not of microbial origin but is a physical problem which can be solved by adequate centrifugation during processing to remove the debris from the milk. Similar observations and conclusions in 1935 led to the use of clarifiers now largely abandoned to conserve energy.

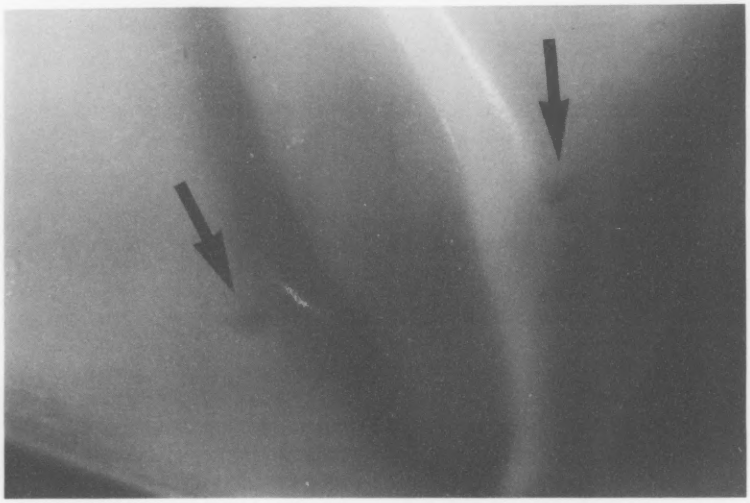
The use of trade names does not imply endorsement by North Carolina State University of the products named or criticism of similar ones not mentioned.

INTRODUCTION

A sediment in milk has been frequently observed by dairy processors within the southeastern region of the United States, including North Carolina, South Carolina, Tennessee, and Georgia and elsewhere within the U.S. The sediment forms light tan to dark brown colored pellets in the bottom corners of plastic milk jugs (Figure 1). The pellets are finely granular and disappear or resuspend when the containers are shaken. They have been observed in the corners of plastic milk containers as early as one to two days after the milk has been processed and appear to become darker the longer the milk remains undisturbed. Similar sedimentation problems have been observed in the Southwest and have been studied by Feijoo and White *(6)*. They hypothesized that the sediment was enhanced by a spoilage microorganism, possibly a *Pseudomonas* spp., but could not conclusively demonstrate a cause *(6)*.

Milk clarifiers are designed to remove foreign materials (dirt and debris), somatic cells, and some bacteria which may otherwise produce noticeable sediments. Due to increased energy conservation in the 1970s, many dairy plants removed clarifiers from process

Figure 1. Light tan to dark brown granular pellets of sediment in milk lying in the bottom corners of plastic milk jugs.



lines. With the clarifiers removed, mechanical filters and desludging separators are relied on to remove the somatic cells and other debris. Therefore, separators have the double duty of separation and partial clarification. Sedimentary material is commonly removed through an intermittent discharge from automatically desludging separators. A separator functions as a continuous centrifuge treating milk at a force of about 4000 to 5000 × gravity during a dwell time of about 6 to 7 s.

Preliminary observations implicated sporeforming bacteria in the formation of the sediment quality defect because, microscopically, these organisms seemed to be associated with somatic cells in the milk sample. Psychrotrophic sporeformers are found in pasteurized milk and milk products *(2, 3, 4, 5, 7, 9)*. Meer et al. *(8)* reviewed milk spoilage by psychrotrophic *Bacillus* spp. Additionally, Feijoo and White *(6)* hypothesized that microorganisms may be involved in sediment formation, but they had inconclusive results.

We hypothesized that either microorganisms, possibly sporeforming *Bacillus* sp., or improper separation/ clarification may be responsible for this defect. Since heat would kill bacteria, we determined whether heating reduced sediment formation. To find out if the sediment could be removed by a treatment mimicking industrial separation, the effect of centrifugation on sediment formation was studied.

MATERIALS AND METHODS

Milk sources

Pasteurized whole milk was obtained from three North Carolina dairy processing plants and one local grocery store. At the dairy plants, gallon jugs of milk were removed directly from the filler lines, transported on ice to the laboratory, and stored at 5°C for one or two days prior to use. Milk from the grocery store was used on the day of purchase. Only one of the milk samples was processed with a clarifier.

Heating experiment

Since vegetative bacterial cells are destroyed by heat, pasteurized milk was heated to determine if the sediment resulted from bacteria. Representative 250-ml aliquots of 2- day-old milk were aseptically added to 250-ml conical centrifuge tubes (Corning). Sets of five tubes each were heated and held for 5 min at the following temperatures: 65.6°C, 71.7°C, and 76.7°C in a circulating water bath (Blue M Magni Whirl, Blue Island IL). Heating was monitored by a thermometer placed in a representative tube. Tubes were mixed by gently shaking during heating to facilitate heat transfer. Five control tubes were not heated. The heated tubes were cooled to room temperature in an ice bath. All of the tubes were incubated at 6 to 7°C for 30 d. Thus, for milk from each plant, there were 15 heated tubes of milk (five at each temperature) plus five control (unheated) tubes.

The heated tubes of milk were stored vertically and periodically observed for the onset of sediment and for changes in sediment appearance. At 14 d and 28 d the sediment was observed microscopically after Gram staining.

Centrifugation experiment

To determine if the sediment could be removed by centrifugation, heated (17 min at 121°C) and unheated milk were evaluated. The experimental samples were centrifuged at 2°C for 7 s at 5000 × gravity. The timing started once the desired speed was reached. The supernatant milk was immediately decanted and 250-ml volumes were placed in conical centrifuge tubes. Control samples containing either heated or unheated milk were not centrifuged. Test and control samples (250 ml) were held vertically at 6 to 7°C for a week and checked daily for the onset or changes in the sediment.

Evaluation of pellet

Tubes from all experiments were observed daily for one week for the formation of sediment. After this time, tubes from the reheating experiment were analyzed every four days for any changes in the amount of sediment. A line was drawn on the tubes marking the amount and position of the sediment to simplify subsequent

Figure 2. Typical micrograph of milk sediment containing somatic cells.

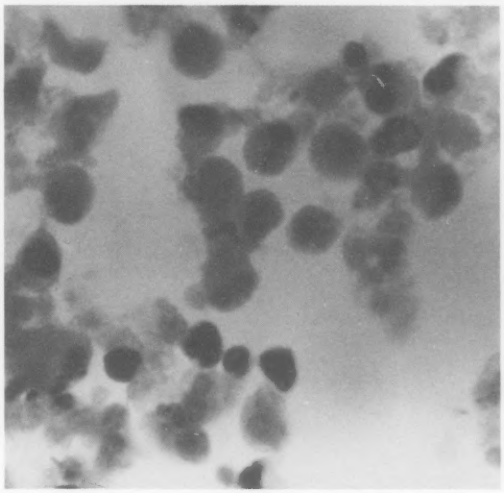


TABLE 1. Effect of heating pasteurized milk on sediment formation

	Heat treatment[a]				
Milk sample	None	6 5.6°C	7 1.7°C	76.7°C	Sediment appearance[b]
A	1d (5/5)	1d (5/5)	1d (5/5)	1d (5/5)	tan to dark tan; 50-90mm
B	1d (3/5) 2d (5/5)	1d (4/5) 2d (5/5)	1d (4/5) 2d (5/5)	1d (2/5) 2d (2/5) 5d (5/5)	initially white, then darkening by 2nd week; 25-35mm
C	1d (5/5)	1d (5/5)	1d (5/5)	1d (5/5)	tan to dark tan; 55-75mm

[a]Data presented are the day of observation and the ratia af the samples which showed sediment. The day of abservatian was the first day sediment was noted.

[b]Color and pellet diameter are indicated.

observations for changes in the quantity of sediment. The amount of sediment was semiquantitatively determined by measuring the diameter of the pellet. Changes in the color of the sediment were recorded. Samples with an off-odor were considered spoiled and were not used for these observations.

After 14 and 28 days in the incubation period, selected tubes of milk from the heating experiment were drained without disturbing the pellets, and the pellets were Gram stained and observed at 1500× magnification.

RESULTS AND DISCUSSION

Heating experiment

If the sediment was due to microbial activity or was enhanced by microbial growth, then (i) it would take time (at least several days) to develop at refrigeration temperatures, (ii) the time at which the pellet could be detected would be delayed with increasing severity of reheating, and (iii) high numbers of microorganisms would likely be associated with the pellets.

Milk samples A and C showed visible sediment in all tubes on the day after the samples were heated (Table 1). Sediment was visible in 65% of the tubes of milk sample B one day after heat treatment and in 85% two days after treatment. By the fifth day, all tubes of milk sample B had sediment. Milk sample C, the clarified sample, showed no difference from milk sample A in the amount or appearance of sediment. Figure 2 is a typical micrograph of sediment. The sediment observed in the various samples ranged from nearly white in color to a dark tan.

At 14 days, somatic cells but no detectable bacteria were associated with the pellets in all the heat-treated samples. After 14 days many long Gram-negative rods were observed in the unheated samples. At 30 days, many somatic cells and a mixed bacterial culture were observed in all the pellets with one

TABLE 2. Effect of centrifugation on sediment formation[a]

Sample	Centrifuged		Control (not centrifuged)	
A1 - heated	day 4	2/3	day 1	3/3
	6 mm		71 mm	
A1 -unheated	day 2	1/3	day 1	3/3
	day 3	2/3	55 mm	
	day 4	3/3		
	11 mm			
B1 -heated	day 7	0/3	day 1	3/3
			40 mm	
B1 -unheated	day 7	0/3	day 1	3/3
			49 mm	
C1 -heated	day 7	0/3	day 2	3/3
			29 mm	
C1 - unheated	day 7	0/3	day 1	1/3
			day 2	3/3
			31 mm	

[a]Data presented are the ratio of samples displaying sediment formation on the specified day of observation after centrifugation. Where sediment formation was observed, the average diameter of the sediment is indicated.

exception, the autoclaved sample of milk C. This sample contained only somatic cells; bacteria were not observed. A Gram stain of the milk above the pellets showed debris, epithelial cells, and an occasional somatic cell. These data suggest that a microbial cause/enhancement cannot be entirely ruled out but is not likely. The time period in which sediment was initially detected (one day to two days) was too short for psychrotrophic bacterial growth. Psychrotrophs take a minimum of four days at 6 to 7°C to show appreciable growth. If this were a microbial phenomenon, the sediment production or amount of sediment should be delayed in the more severely heated samples. This was not the case. Despite heat treatment, the sediment was observed at the same time in the majority of the samples. Microscopic observation did not implicate high numbers of microorganisms with the pellet as would be expected if the defect was caused by microorganisms.

The effect of heat on the milk's viscosity and its relationship to the formation of sediment was studied. The data showed that increased viscosity because of heating did not affect sediment production (unpublished data).

Centrifugation experiment

Centrifugation was evaluated to see if sediment formation could be eliminated by physically removing debris (Table 2). If sediment could be removed by this method with no further sediment formation, then the problem is not of microbial origin. As closely as possible, conditions simulated those of a separator in a dairy plant.

For samples B1 and C1, no sediment formation was observed in the centrifuged heated or unheated milk samples. All the uncentrifuged samples showed sediment after the first (sample B1) or second (C1) day. Sample A1 formed some sediment after centrifugation within four days in the heated and unheated samples. However the uncentrifuged milk, both heated and unheated, formed more sediment (about five times) faster (within 24 h) than the centrifuged milk.

This data indicates that the sedimentation defect is a physical, not a microbial problem. The data further suggest that the defect could be resolved with increased centrifugation (separation or clarification) of milk. These results are consistent with early reports on the consumer acceptability of market milk. In 1935, in a paper entitled "Causes and practical methods for control of sedimentation in homogenized milk," Charles and Sommer *(1)*, note consumers' displeasure with sediment in homogenized milk marketed in glass bottles. This defect had not been noted in the traditional, unhomogenized, market milk. They concluded that "Clarification of the milk directly after homogenizing, while still hot, promises to be a practical method for the commercial control of the defect." In the same year, Tracy *(10)* indicated that "Clarification is essential in order to avoid sedimentation and should be done if practicable before pasteurization."

CONCLUSIONS

Sediment formed in pasteurized milk from three locations which was characteristic of a defect observed in the southeastern U.S. and was not of microbial origin. Sediments shown to appear within one to two days at refrigeration temperatures consisted mainly of somatic cells. Milk samples which were clarified by centrifugation in the laboratory did not develop sediment as quickly as those not

clarified. This indicates that the sediments are formed by debris which should be removed from the milk by a properly functioning desludging separator. It is necessary to optimize separator conditions to effect their removal efficiency. Two factors which seem most likely to contribute to the efficiency of removal sediment materials are the flow rate of milk through the separator (dwell time) and the effectiveness of removing of sludge accumulated in the separator bowl (discharge rate and condition).

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Call for New Task Committee on Pulsation Damper

The 3-A Sanitary Standards Committees have recommended 3-A Sanitary Standards for pulsation dampeners (A.K.A. suction chambers, alleviators, discharge chambers, dampers, suction bottles, surge chambers, inlet bottles, suction stabilizers, stand pipes, desurgers, air chambers, pulsation suppressors, or accumulators) be developed. As defined in Hi Reciprocating Power Design and Application—"A pulsation dampener is a device which reduces liquid pulsations in the suction or discharge piping." A 3-A Steering Committee member has requested that these standards also include vibration isolators and expansion devices if they fit the scope of this activity.

This is a call for equipment suppliers materially affected and interested in this 3-A activity on pulsation dampeners to be represented on a new task committee. This task committee—Pulsation Dampeners TC—would develop and review proposed standards on the subject.

If you are willing to take a leadership role in helping the 3-A Secretary prepare proposed standards prior to the TC's first meeting, please contact Tom Gilmore directly at phone (703) 761-2600, or fax (703) 761-4334.

FederalRegister

Safety of Chemical Impurities Included in FDA Evaluation of Petition

In evaluating the safety of the additive, FDA reviewed the safety of the additive itself as well as that of the chemical impurities that may be present as a result of the manufacturing process. The agency found that while the additive itself has not been shown to cause cancer, it has been found to contain "minute amounts" of 2,4,6-trimethylaniline, which is a carcinogenic impurity. FDA did note, however, that residual amounts of such substances are "commonly found" as contaminants in chemical products, including food additives.

FDA estimated that the "hypothetical worst-case" exposure to 2,4,6-trimethylaniline from the petitioned use of the additive would result in an upper-bound limit of lifetime human risk from exposure to the chemical to be 4.2 in a billion. The actual lifetime-averaged individual exposure to 2,4,6-trimethylaniline is likely to be "substantially less," leading the agency to conclude that there is "reasonable certainty" that no harm would result from the proposed use of the additive.

Specifications for use of the additive are not necessary, FDA also noted, because the level at which 2,4,6-trimethylaniline is expected to remain as an impurity is low; the agency "would not expect" the impurity to become a component of food at other than "extremely low levels," and the risk from exposure to the impurity, even at "worst-case" assumptions, is very low.

As amended, §178.3297 provides for use of 1,4-bis[(2,4,6-trimethylphenyl)aminol-9,10-anthracenedione at levels not to exceed 0.0004% by weight of polyethylene phthalate polymers complying with §177.1630.

FDA Revokes Standards of Identity for Certain Low-Fat Dairy Products

The Food and Drug Administration announced that it will revoke the standards of identity for 12 dairy products, including skim and low-fat milk, sour half and-half and low-fat cottage cheese. The move means that manufacturers of 2% and 1.5% milk will no longer be able to use the term "low fat" as part of a product name.

In a final rule published Nov. 20, the agency said it would also modify its rules to make the term "skim" synonymous with "nonfat" (i.e., 0.5 g of fat or less per serving). The regulation is based on petitions from the Center for Science in the Public Interest, the Milk Industry Foundation and the American Dairy Products Institute.

An FDA official said that nutrient content claim rules for milk had previously been inconsistent with nutrient content claim rules for other food products. For example, the agency defined low fat as 3 g or less fat per serving, yet "low-fat" 2% milk contains 5 g of fat per 8-oz. serving.

"Revocation of the standards will remove 12 regulations for standardized lower-fat dairy products that could be covered by the more flexible general definition and standard," FDA said. "This will remove the conflict between the use of the terms 'low fat' and 'nonfat' in the names of these products and the nutrient content claim regulations established by FDA as a result of the Nutrition Labeling and Education Act of 1990, thereby providing for consistency on food labels. It will also increase flexibility for manufacturers and increase consumers' product choices."

When the rule goes into effect Jan. 1, 1998, the following food standards will be revoked: sweetened condensed skimmed milk; low-fat dry milk; evaporated skimmed milk; low-fat milk; acidified low-fat milk; cultured low-fat milk; skim milk; acidified skim milk; cultured skim milk; sour half-and-half; acidified sour half-and-half; and low-fat cottage cheese.

The agency emphasized that "manufacturers may continue to declare fat content as part of the name of the food for lower-fat milk products, and on the labels of other products, when such statements are not misleading." The regulation finalizes a Nov. 9, 1995 proposal and is part of the Clinton administration's regulatory reinvention initiative.

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UpDates

USDA Microbiologist Wins Presidential Award

Pina M. Fratamico of Elkins Park, Pa., a microbiologist with the U.S. Department of Agriculture, is among 60 young researchers selected to receive the first annual Presidential Early Career Awards for Scientists and Engineers (PECASE).

The new awards, created last spring, recognize demonstrated excellence and promise of future success in scientific or engineering research, and the potential for eventual leadership of the awardees in their respective fields. Candidates are nominated by agencies across the federal government, and recipients receive up to $500,000 over a five-year period to further their research. Fratamico and the other scientists received their awards at a White House ceremony. Fratamico leads a research team that has developed several rapid and sensitive techniques to detect the foodborne pathogen *E. coli* O157:H7, including a test that provides results in less than 24 hours. Other methods can take four to five days. Fratamico works at the Eastern Regional Research Center operated at Philadelphia by the Agricultural Research Service, chief research agency of USDA. Fratamico was honored by ARS on Dec. 11 as the agency's "Early Career Scientist of the Year."

A native of Chieti, Italy, Fratamico came to the United States with her parents in the 1960s. She earned a bachelor's degree in medical technology in 1983 and a doctorate in microbiology and immunology in 1990. Both degrees are from Temple University in Philadelphia.

The list of 60 PECASE winners included scientists and engineers with the Department of Commerce, Department of Defense, Department of Energy, Department of Veterans Affairs, Environmental Protection Agency, National Aeronautics and Space Administration, the National Science Foundation and the National Institutes of Health in the Department of Health and Human Services.

Penn State Dairy Management and Profitability Program Hires Eastern Regional Coordinator

Dairy-MAP, a program developed by Penn State's College of Agricultural Sciences has added a new staff member. Robert Turner, extension associate in dairy and animal science, has been named Dairy-MAP's eastern regional director.

Turner will help maintain communication with local Dairy-MAP teams, industry partners and faculty at Penn State's University Park Campus. He also will coordinate Dairy-MAP program scheduling and promotion in eastern Pennsylvania.

Turner will assist in producing high-quality materials for marketing and delivery of the Dairy-MAP program. He also will conduct educational workshops as part of a team, help teach Dairy-MAP personnel, and summarize program evaluations.

Turner holds a bachelor's degree in economics from West Virginia Wesleyan College and a business management diploma from Chicago Technical College. From 1980 to 1996, he was employed by Westfalia Systemat Inc., most recently as territory manager for the Northeast. In this position, he marketed high-tech electronic milking and computerized feeding equipment to dealers and dairy farmers and conducted training for over 300 dairy farmers, Westfalia dealers and staff members in the region.

Turner has been an elected board member of the National Dairy Practices Council since 1993 and has served as vice president since 1995. He also was among 18 consultants to the dairy industry recognized by Penn State's Dairy-MAP program.

Ohio Creamery Supply Company Changes Name to OCS Process Systems

Ohio Creamery Supply Company (OCSCO), based in Westlake, Ohio has changed its name to OCS Process Systems. The new name better reflects the company's broadened business scope.

The company was founded at the turn of the century, delivering butter and eggs to Cleveland-area hotels and restaurants via a horse-drawn wagon. In the 1920s, the company began supplying dairies with equipment and systems. Today, OCS serves all areas of the sanitary processing industry with engineering, equipment, systems and service. Not only does OCS work in the dairy and food industry, it also serves processors of pharmaceuticals, cosmetics, chemicals, paint and beverages.

The company employs 33 and is headquartered in a 25,000 square foot facility on Detroit Road in

Westlake that houses fabrication, engineering and production space. OCS Process Systems serves customers across the U.S. and internationally.

New Pump Sales Manager Hired at G&H Products Corp.

G&H is pleased to announce that Russell Jones has accepted the position of Pump Sales Manager, responsible for the sales and marketing of G&H's entire pump line.

Russell has many years of experience with Alfa Laval Pumps in England, as well as from his latest appointment in Singapore as the Regional Manager for Alfa Laval Pumps Asia. In addition, Russell worked successfully as Pump Product manager for G&H Products Corp. from 1992 to January of 1995.

Flavorite Laboratories, Inc. Names Chip Colonna Vice President of Sales & Marketing

Flavorite Laboratories, Inc. is pleased to name Chip Colonna as Vice President of Sales & Marketing. Colonna's goal will be to help Flavorite reach a new level of success by focusing much of his time and resources toward the company's newly adopted strategic long range business plan.

Prior to joining Flavorite, Colonna's entire professional career was with Kraft Foods, initially with General Foods and most recently with Kraft Foods Ingredients. Colonna has accumulated an impressive background of experiences throughout his tenure with Kraft that makes him well suited for his new assignment with Flavorite. During his tenure, Colonna has held positions in finance, operations, product and marketing management, as well as regional and national account sales management.

Colonna received his B.S. degree in Business Administration & Accounting from Washington & Lee University in Lexington, VA, and his MBA from College of William & Mary in Williamsburg, VA.

Educational Foundation Appoints Michael R. Peltier, C.S.P., Risk and Safety Manager

The Educational Foundation of the National Restaurant Association announces the appointment of Michael R. Peltier, C.S.P. to the position of Risk and Safety Manager.

Before joining The Foundation, Peltier served as a safety director and section administrator for the National Safety Council, where he participated as an instructor in the National Safety Council's Fundamentals of Hospital Safety Course and was responsible for implementing safety programs at the Council. He was also responsible for the technical review of Council publications and products.

From 1980 to 1987, Peltier was a safety officer for the University of Chicago Medical Center, where he designed and implemented safety training programs for various departments throughout the hospital.

Peltier, a certified safety professional, will oversee the technical review and regulatory relations for The Educational Foundation's new Aware™: Employee and Customer Safety Training System; the Bar Code®: Serving Alcohol Responsibly program; and the Foodservice Security program.

Kraft VP Appointed to UDIA Board

Kevin Ponticelli, Kraft Cheese Division vice president of marketing, strategy and development for Kraft Foods, Inc., was appointed a board member of the United Dairy Industry Association (UDIA), one of the funding organizations of Dairy Management, Inc. (DMI).

Ponticelli was appointed to the board by UDIA Chairman Herman Brubaker as the only processor representative among dairy farmers who represent various state and regional dairy checkoff organizations. He was seated at the UDIA annual meeting November 8 in San Antonio.

Ponticelli replaces fellow Kraft executive Todd Brown, formerly vice president and general manager, Pollio Dairy Products, who stepped down to take on broader responsibility with Kraft Foods' Desserts and Snacks Division.

With 15 years of experience at Kraft, Ponticelli has held key marketing, sales and strategy assignments within both its Cheese and Pizza Divisions. He graduated with a B.S. from Wayne State University and an MBA from Michigan State University.

Dairy Management, Inc. is the nonprofit organization formed by the National Dairy Board and the United Dairy Industry Association that conducts programs in integrated marketing, communications, promotion and research for U.S. – produced dairy products on behalf of America's dairy farmers.

Indictments in Veal Drug Cases Announced

On November 21, 1996, U.S. Attorney, Thomas P. Schneider, Milwaukee, WI, announced federal indictments in the ongoing nationwide investigation into the smuggling, distribution, and use of illegal drugs in the veal industry.

Gerard Hoogendijk of the Netherlands has been indicted as the principal supplier of these black market drugs. Hoogendijk is the owner of Pricor, B.V., the Dutch animal premix company which owns a majority of Vitek, a firm previously convicted on twelve counts of conspiracy, smuggling and distribution of unapproved animal drugs into and throughout the United States. The new indictment charges Hoogendijk with nine federal offenses including conspiracy to defraud the United States and to smuggle and distribute misbranded and adulterated animal drugs. Hoogendijk is also charged with six smuggling counts. Both the conspiracy and smuggling charges each carry a prison term of up to five years, a fine of up to $250,000, or both. In addition, Hoogendijk is charged with two counts of introducing the drug clenbuterol into interstate commerce, an offense which carries a maximum prison term of three years, a fine of up to $250,000, or both. Arrangements are continuing with the Dutch government for the extradition of Hoogendijk, who is a Dutch citizen.

Additional indictments were returned against Travis Calf Milk, Inc., and its president, Gerald R. Travis; and VIV, Inc. (aka Hying America), and its operators Jan Van Den Hengel and Hennie Van Den Hengel. They are charged with conspiracy to smuggle and distribute unapproved, adulterated and misbranded animal drugs. Each of the defendants is also charged with five additional counts of violating

food and drug laws prohibiting the distribution or receipt of unapproved and adulterated animal drugs. In addition, VIV and the Van Den Hengels are accused of smuggling various chemicals into the U.S., resulting from a seizure of animal drugs found concealed in a container destined for Vitek in February, 1994.

The indictments allege that both VIV and Travis Calf Milk, Inc., received over 200,000 and 150,000 pounds, respectively, of Vitek veal feed supplements containing clenbuterol, zinc bacitracin, and/or avoparcine. Travis Calf Milk, a Wisconsin feed company, is accused of using the unapproved drugs in its veal feed. VIV, a Pennsylvania veal grower, is accused of using the unapproved drugs on veal raised in its own facilities.

If convicted, the corporate defendants face fines of up to $500,000 on each count, totaling $3,500,000 for VIV and $3,000,000 for Travis Calf Milk, Inc. Jan and Hennie Van Den Hengel face fines of up to $250,000 for each count, up to five years in prison for each of the smuggling and conspiracy counts, and up to three years in prison for each of the adulterated drug charges.

A plea agreement was reached with Provimi Veal Corp., a Wisconsin corporation charged with violating food and drug laws prohibiting the distribution of adulterated and misbranded animal drugs which stem from their involvement in a 1988-89 lamb raising venture. Information provided alleges that Provimi was a half-owner of Vitek from 1988 until 1992 and purchased lambs fed with Vitek products containing clenbuterol. In early 1992, Provimi sold its interest in Vitek before the current investigation began.

These charges are the result of over three years of joint investigations conducted by criminal investigators from U.S. Customs, the Food and Drug Administration (FDA), and the U.S. Department of Agriculture (USDA). Also involved are attorneys from the Office of Consumer Litigation in the Department of Justice and the U.S. Attorney's Office in the Eastern District of Wisconsin, as well as numerous state and local agencies, including the Pennsylvania State Police. Investigations are ongoing and additional indictments are expected in the near future.

Vegetative Filters can Ease Milk House Wastewater Disposal

Some small dairy farms in Pennsylvania are having trouble disposing of the wastewater from their milk houses, but vegetative filters can provide a solution, says a dairy housing specialist in Penn State's College of Agricultural Sciences.

"Milk house wastewater disposal is a problem," says Robert Graves, professor of agricultural engineering. "Whether it comes from a small 30-50 cow milk house or a milking center with a large parlor-utility room complex, milk house wastewater can find no home."

Milk house wastewater, a dilute mixture of washwater from the parlor, equipment sanitation water

and manure, usually contains nitrogen, phosphorus, fats and minimal sanitizers and detergents. "Depending on the farm, milk house washwater only amounts to 100-300 gallons per day," Graves says. "It doesn't seem like a lot—unless you're trying to get rid of it."

Subsurface disposal through a settling tank and leach field was a common wastewater disposal method for small farms, but since the early 1990s, no new or repaired subsurface systems are allowed by the State Department of Environmental Protection (SDEP).

A 1995 memorandum agreement between DEP and the Department of Agriculture's Milk Inspection Program gave enforcement of this regulation to Pennsylvania Department of Agriculture milk inspectors, who examine a farm's milking conditions each year.

"Milk inspectors check conditions that may affect milk quality, including the milk house wastewater disposal system," Graves says. "Traditionally, milk inspectors like subsurface disposal because surface disposal can attract flies and other disease-carrying organisms near good milk, but under the new agreement, a subsurface system that isn't working must be replaced with an alternative system."

The simplest disposal solution is to collect and pipe the wastewater into a liquid manure system. "If you don't have and can't afford a liquid manure system, milk house wastewater can be stored temporarily, then hauled and land-applied with a liquid manure tanker," Graves says.

Another disposal method is the vegetative filter, specially designed acreage where vegetation can absorb wastewater nutrients before being harvested, Graves explains. "Parlor wastewater is temporarily held in a tank and then land applied, discharged or allowed to trickle through perforated pipe directly into the field. Properly managed vegetative filters are economical, environmentally sound and approved by DEP."

Proper design and management are essential. "The filter design must take into account vegetation nutrient needs, wastewater characteristics, soil water holding capacity and loading rates," Graves says. "Filters should be located away from critical areas such as streams and ditches. Harvesting also is critical, because periodic crop removal prevents nutrient buildup in the soil and eventually in the groundwater."

Whichever disposal method they select, Graves urges dairy farmers to consult their milk inspectors. "A county conservation district representative can provide guidance on design and maintenance of vegetative filters."

FDA Approves New Milk Labeling for Dairy Industry

A Food and Drug Administration (FDA) regulation published recently will soon change how milk is labeled, making it clear to consumers that when they buy skim milk they're getting a fat-free product.

This change is aimed at making consumer choices clearer and is a result of an unprecedented partnership between the milk industry and the Center for Science in the Public Interest (CSPI), a consumer advocacy and watchdog group well known for their concern for fat in the diet. The Milk Industry Foundation (MIF) and CSPI jointly filed the petition with the FDA, which led to these new labeling regulations.

Concerns about fat have caused many people to avoid milk, but the new labels will make it clearer that there are fat-free and lowfat options.

The milk varieties will be affected by the new regulations as follows:

- Skim (or nonfat) milk will be permitted to be called fat-free milk.
- 1% lowfat milk will be able to use the term light – which is widely used on other foods to define at least a 50 percent reduction in total fat.
- 2% lowfat milk will be changed to 2% reduced fat milk, referring to at least a 25 percent reduction of fat compared to whole milk.
- Whole milk, commonly labeled as homogenized or vitamin D milk will remain unchanged.

"These changes will make it easier for consumers to shop for reduced fat, lowfat and, most importantly, fat-free milk," said Bruce Silverglade, legal director of CSPI.

The milk industry is promoting drinking milk as a way to help reverse the widespread calcium deficiencies in this country. According to USDA figures, 70 percent of American adults do not meet the recommended daily requirements for calcium. Getting the recommended amounts of calcium may help prevent osteoporosis, and many studies suggest a diet adequate in calcium may reduce the risk of hypertension.

According to milk industry statistics, milk consumption patterns are shifting to lower fat varieties. Sales of skim and 1% are on the upward swing, and have recently helped drive a significant increase in milk consumption after a long period of flat to declining sales.

Milk processors have been gradually introducing the fat-free benefit of skim milk prior to the FDA approval of the new standard by highlighting "fat free" in addition to the name "skim milk" on the label. With the new regulations, processors can now call the product "fat-free milk."

Don't Introduce Infected Cattle into Dairy Herd

If you plan to bring new animals into your dairy herd, be careful to avoid the introduction of infectious disease. Jerry Olson, veterinarian with the University of Minnesota's Extension

Service, suggests the following strategies to prevent the introduction of infected cattle:

- Only purchase cattle from herds with known health status.
- Only purchase animals from herds with a known effective vaccination program.
- Avoid purchasing cattle from unknown sources or from comingled sources.
- Transport purchased animals in farm-owned trucks or require that hired transporters start with a sanitized truck.
- Isolate and monitor purchased cattle for 30 days before allowing contact with the herd.
- Test new herd additions for infectious diseases before introduction to the herd.
- Above all, have a sound vaccination program in place in your resident herd to protect your animals from potential diseases brought into the herd by new arrivals.

Court Issues Preliminary Decision on the Northeast Interstate Dairy Compact

The U.S. District Court in the District of Columbia issued a preliminary decision in the case brought by the Milk Industry Foundation (MIF) against the Secretary of Agriculture on implementation of the Northeast Interstate Dairy Compact. The court said there is an "almost certain likelihood of success" in the case brought by MIF based on arguments that the Secretary of Agriculture failed to set forth adequate reasons for implementing the Compact under the Administrative Procedure Act. However, the court did not comply with MIF's request for a temporary injunction, noting that no injury had yet occurred as a result of the Compact's formation. This was because no prices above the Federal Order milk price have yet been imposed by the Compact. The judge invited MIF to file for a renewed motion for preliminary injunction if circumstances change.

MIF also had argued in its preliminary brief that Congress could not delegate authority to the Secretary of Agriculture to approve the Compact; on this point the judge indicated that MIF's argument was "not likely to prevail" in the case.

The judge set the next court date for hearing the case for February 25. Additional briefs are to be filed by both sides in January and February.

The Northeast Compact was passed as part of the farm bill last April, but required approval by the Secretary of Agriculture to ensure that there is a "compelling public interest" for the Compact. In August, the Secretary of Agriculture decided to allow the six states of Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont to implement the Compact – which supplants the federal order system for pricing fluid milk. MIF's suit, filed in August, challenges in part that the Secretary never established a "compelling public interest."

The dairy processing industry nationwide, as well as leaders in the business community, have voiced strong opposition to the compact on the grounds that it creates a regional interstate cartel for milk pricing, which would limit competition, disrupt current federal programs and boost prices to consumers.

Hosokawa Micron Group Acquires L.E. Stott

The Hosokawa Micron Group announced the acquisition of L.E. Stott for an undisclosed amount of cash.

L.E. Stott, headquartered in Bacup, Lancashire, England, is a design, sales and manufacturing operation specializing in hygienic powder, filling and weighing systems and technology.

The Stott products and technologies include: filling and weighing systems which incorporate unique patented packing heads that easily adapt to most pack-out stations; engineered bulk bag systems primarily serving the pharmaceutical, chemical and food processing industries; dust free tipping booths for the handling of hazardous powders used in the pharmaceutical and chemical industries, and laminar flow booth systems which provide total containment of powders during the filling cycle. Stott filling and weighing systems offer system design flexibility to meet the needs of bulk packers of dry solids. Plant hygiene, sanitation and operator safety are key elements to the design of all Stott products.

Prior to the acquisition, Stott was a licensor to the Hosokawa Micron Group. The operation will continue under Mr. John Hammond, Managing Director.

ADPI Invites Nominations for 1997 Award of Merit

The American Dairy Products Institute invites the submission of nominees to receive its 1997 Award of Merit. Established in 1991, the purpose of the award is to recognize individuals who

have made outstanding contributions to the processed dairy products industry. The first Award of Merit recipient was M. E. "Mel" Franks, M. E. Franks, Inc., who was recognized posthumously at the 1992 Annual Meeting of the American Dairy Products Institute. Subsequent recipients of the Award of Merit were: William F. Dietrich, Dietrich Milk Products and Nico van Zwanenberg, Cuba Cheese, Inc. in 1993; Harvey H. Ebert, Land O'Lakes, Inc., in 1994; Wesley E. Eckert, Darigold, Inc., 1995; and William A. Diehl, Diehl Inc. in 1996. Individual(s) selected to receive the Award of Merit will be honored at the 1997 Annual Meeting of the Institute, to be held at The Fairmont Hotel at Grant Park, Chicago, IL, on April 20-23, 1997.

Persons wishing to nominate individuals to be considered to receive the American Dairy Products Institute's Award of Merit may submit the candidate's name in a brief letter of nomination to either Dr. Warren S. Clark, Jr., Chief Executive Officer, American Dairy Products Institute, 130 N. Franklin St., Chicago, IL 60606, or to Ms. M. Jane Carlisle, Jr., Chairman of the Institute's Affiliate Member Committee, c/o United International Industries, Inc., 1005 Callahan Road, Ste. 101, Wentzville, MO 63385.

ADPI is the national trade association of the processed dairy products industry. It was formed in 1986 through a merger of the American Dry Milk Institute and the Whey Products Institute; in 1987, the Evaporated Milk Association merged with the ADPI. Headquartered in Chicago, IL, the Institute represents evaporated and dry milk products as well as whey and whey products, including lactose.

U.S.- Canada NAFTA Dispute Panel Rules in Canada's Favor

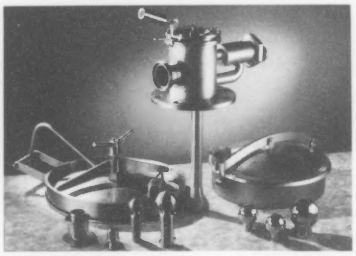
The North American Free Trade Agreement (NAFTA) Dispute Settlement Panel, which was charged with resolving a conflict between the U.S. and Canada over Canadian tariffs on U.S. dairy and poultry products, ruled in Canada's favor. The panel's five members voted unanimously to uphold the Canadian position that its tariff structure is permissible under NAFTA.

IDFA has pursued the issue of fair trade with Canada over the past several years. Canada asserts that its rights under the General Agreement on Tariffs and Trade (GATT) supersede its NAFTA obligations. GATT requires that a country need only convert existing trade quotas to tariffs, rather than eliminate them. The U.S. argued that the Canadian tariffs violate NAFTA, which was designed to eliminate such tariffs between the U.S., Canada, and Mexico.

In July 1995, at the request of IDFA and other dairy and poultry groups, the U.S. Trade Representative's Office asked the NAFTA commission to form a review panel to examine Canada's tariffs. A panel headed by international lawyer Elihu Lauterpacht and consisting of two Americans and two Canadians was appointed in January 1996. The panel issued a preliminary decision favoring Canada in July; this ruling reaffirms that decision.

A joint statement issued by U.S. Secretary of Agriculture Dan Glickman and Acting U.S. Trade Representative Charlene Barshefskey stated, "We think that open trade—rather than prohibitive tariffs—is consistent with the NAFTA... The U.S. will do everything possible, consistent with our trade laws, to see the ultimate elimination of these duties and to improve U.S. access to the Canadian market for dairy, poultry, eggs, barley and margarine products."

IndustryProducts



G & H Products, Corp.

New Tank Equipment Launched

A new line of tank top plate assemblies is now available from G&H Products Corp. These new top plates are the latest addition to G&H's line of tank and tank cleaning equipment, including manway covers, fixed and rotary cleaning heads, tank legs and sight glasses.

The new top plate assemblies combine all necessary tank top equipment, such as pressure and level transmitters, anti-vacuum and pressure relief valves, gas or CIP valves and sight units into one custom fabricated unit. With the top plate, only one cut for the counterflange need be made, eliminating the increased cost, time and sanitation threats separate cutouts introduce for individual fittings. Top plate assemblies are manufactured from 304L or 315L stainless steel and are available with full certification and material traceability supplied.

G & H Products Corp., Pleasant Prairie, WI

Reader Service No. 333

Indoor Air Quality Test Instrument

Solomat introduces a powerful new tool for proactive measurement of indoor air quality (IAQ) and for diagnosing and mitigating IAQ problems; the IAQ Surveyor™ is designed with ease of use as a top priority so that facility personnel, heating ventilating air conditioning contractors, industrial hygiene technicians and others can use it for routine, yet detailed monitoring of indoor air conditions. A comprehensive range of high accuracy measurements are performed by this meter: carbon dioxide, carbon monoxide, relative humidity, temperature, airspeed, differential pressure, dewpoint and particle concentration are complemented by a highly functional range of features. All sensors have extremely quick response, minimizing user time when moving from zone to zone during the walkthrough phase of a survey. The "STORE" button records each measurement along with time, date and site code to document the walkthrough. Continuous datalogging can be initiated at the "LOG" button with weeks of data storage capacity. A portable meter, the IAQ Surveyor operates up to one full week continuously on internal batteries and is supplied with an AC adaptor for longer term monitoring. Additional features include: tactile rubber grip with heavy duty hand strap, instrument and sensor calibration date recall, minimum/maximum/average reading display, optional alarm condition beep and more. The instrument comes with Windows based software for analysis and report generation of collected information.

Solomat Neotronics, Norwalk, CT

Reader Service No. 334

Fast Loop Sample Filters

A new line of Balston® stainless steel sample filters designed specifically to protect process analyzers and monitoring equipment are now available from Whatman, Inc.

The models 31S6, 31G, 41S6, 41G, and the 91S6 remove solids and liquids from gases with 99.99% efficiency at 0.01 μm, and solid particulate removal from liquids to .2 μm. These filters protect analyzers from sample impurities which are the most frequent cause of maintenance problems for instruments in an industrial environment.

These new filters are lower in cost than the Balston conventional stainless steel filter line. They are also more compact in design resulting in a smaller internal volume and faster sampling times.

The new improved design requires no tools to change the filters. Other design features include 1/2" NPT ports, maximum temperature of up to 400°F, and maximum pressure of up to 500 psig.

Whatman, Inc., Haverhill, MA

Reader Service No. 335

Custom Stainless Steel Containers Available for Food and Pharmaceutical Applications

Eagle Stainless Container, a manufacturer of high quality stainless steel containers, has announced the capability to make extensive modifications to its standard products. End users have the ability to specify such requirements as mounted mixers, NPT Ports, stands, handles and clamping systems.

Eagle Stainless Containers manufactures a wide variety of containers, from drums to beakers with a complete line of stainless accessories. Typical applications include storage of solid to powder products, closed system production of proteins, buffer storage, validation/stability testing and Aseptic sampling systems.

All products are passivated and electropolished for maximum corrosion resistance. Passivating the steel removes any harmful contaminants from the surface of the steel. Electropolishing the steel reduces adhesion and contamination of the stainless steel surface and reduces Ra by as much as 50%. Electropolishing also increases corrosion resistance while allowing for easy cleaning.

Eagle Stainless Containers, Horsham, PA

Reader Service No. 336

Hannay Makes Narrow-Frame Stainless Steel Reel for Confined Spaces

Hannay Reels' stainless steel reels offer protection against contamination and are ideal in sensitive environments. Because there is no potential for rust or corrosion, these reels are invaluable in the food and beverage, dairy, pharmaceuticals, and cosmetics industries. Applications include washdown, chemical transfer, potable water, food ingredient transfer, or fire protection.

The SSN700 Series, made for heavy-duty applications, is especially popular because of its compact size, which makes it useful for mounting where space is at a premium. The SSN700, like all our stainless steel models, is constructed of fine grade 304 or 316 stainless frames, discs, and drums. It handles single hose from 1/4" through 1/2" I.D. and features a heavy-duty spring motor with self-contained rewind power.

Hannay Reels, Westerlo, NY

Reader Service No. 337

Solatron

Monel 400 Densitometer is Impervious to Highly Corrosive Liquids

Solartron, Inc., has developed a Monel 400 version its 7826 liquid density transducer for applications involving highly corrosive liquids. Users of caustic soda (sodium hydroxide – NaOH), for example, need to reduce its concentration prior to use by blending with water, continuously monitoring the mixture to ensure the correct dilution. By building the wetted parts of the 7826 densitometer from Monel 400, Solartron has enabled the concentration of caustic soda and such liquids as hot brines, sulfuric and hydrofluoric acid to be monitored accurately.

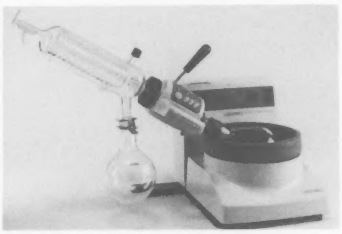
Solartron's 7826 insertion liquid density transducer uses a vibrating tuning fork element to measure the density of a wide variety of liquids. The transducer is mounted directly in the pipeline, with the tines of the tuning fork fully immersed in the liquid and resonated at their natural frequency by means of piezo-electric crystals. To eliminate the corrosive effects of aggressive liquids, Solartron has manufactured the tuning fork and mounting flange of the new 7826 in Monel 400.

Caustic soda is manufactured in two concentrations, 73% and 47% by weight, for on-site dilution by the user. However, since caustic soda freezes at 12°C at such concentrations, manufacturers, transporters and users must maintain the material at high temperatures, intensifying its corrosive properties. Carbon steel and Austenitic stainless steels are subject to corrosion attack at around 100°C; above this temperature, materials such as Monel 400 must be used.

Resonant frequency is inversely proportional to the square root of the mass; in a vibrating element densitometer, this mass is the sum of that of the tuning fork and the liquid surrounding it. By measuring the frequency and knowing the mass of the tuning fork the liquid's density can be calculated accurately and continuously. A PRT (platinum resistance thermometer) mounted at the root of the tines allows the 7826 to correct for changes in liquid temperature that affect the dimensions and modulus of elasticity of the element. The Monel 400 version 7826 offers an accuracy of ±0.00lgm/cc (i.e. 0.1% for liquids with densities similar to water).

Solartron, Inc., Houston, TX

Reader Service No. 338



Labconco Corporation

Labconco Presents the Only Rotary Evaporator Made in the USA

Labconco Corporation, is pleased to introduce the new Rotary Evaporator, which is the only Rotary Evaporator made in the U.S.A. This new Rotary Evaporator features reliable, straight-forward operation with innovative, lab-friendly features.

The controls are on a soft-touch key pad which is located up front and high, for easy accessibility and to prevent risk of splash from solvent spills or the bath. A digital LED display permits monitoring of rotation speed, bath temperature and optional vapor temperature. The sparkless, high torque motor is belt driven and rotates glassware from 20-250 rpm. The lift is controlled manually by a trigger-action handle from the front of the unit.

The bath is constructed of Teflon®-coated aluminum. It is insulated by a thermoset polyester housing and a rubber trim ring, which prevents risk of burn and serves as a shock absorber for glassware. The water bath temperature ranges from ambient to 100°C and the optional oil bath temperature ranges from ambient to 180°C. A safety limiter turns the bath off automatically if it should run dry. The bath is separate from the drive so it may be repositioned to accommodate different size flasks.

The glassware is positioned up front for easy accessibility. Condenser styles include diagonal, vertical, reflux, and Dewar with one liter evaporating and receiving flasks. Two and three liter flasks and plastic-coated glassware are also available.

Other features of the new Rotary Evaporator include a pivot control, which allows for different size flasks to be positioned at particular angles and an adjustable counterbalance mechanism, which compensates for weight differences due to selected glassware and sample sizes. All wetted parts of the Rotary Evaporator are Teflon® or glass.

Labconco Corporation, Kansas City, MO

Reader Service No. 339

Colilert®-18 Approved by EPA for Drinking Water Testing

IDEXX Laboratories, Inc., announces that the U.S.-Environmental Protection Agency has approved the use of Colilert-18 in laboratories for drinking water and source water testing. Under the Total Coliform Rule (40 CFR 141.21), Colilert-18 is an approved method for total coliform and *E. coli* testing.

Colilert-18, an 18-hour version of the popular Colilert test, is the fastest coliform test available. It simultaneously detects down to one coliform and one *E. coli* in a 100 ml sample and gives both results in only 18 hours. Afternoon samples tested with Colilert-18 can be read the next morning. Like Colilert, the test also minimizes false positives by suppressing growth of heterotrophic organisms, eliminating interference.

Colilert-18 can be used as a P/A test or as a quantitative method in a Quanti-Tray™ or in MPN tubes.

IDEXX Laboratories, Westbrook, ME

Reader Service No. 340

SVRU Wash-Heads Provide Effective Cleaning, Long-Term Reliability

Sellers® Cleaning Systems SVRU Series of wash-heads are ideal for the general purpose cleaning of pipes, barrels, containers, enclosed spaces or small tanks. Providing long-term reliability, these wash-heads are effective for general rinsing, pressure cleaning, chemical distribution and for use in passivation applications.

With reach capabilities up to 24 feet (3.6 m) in diameter, the SVRU Series features a balanced thrust design for operation in any position (vertical, horizontal, etc.) and a 360-degree wash pattern. Able to fit through openings as small as 1 1/16 in (27 mm), these wash-heads feature such technical specifications as:

- minimum starting pressure of 10 psi (.7 bar);
- maximum working pressure of 120 psi (8.2 bar); and
- a flow range from 1.3 gpm (4.9 lpm) to 29 gpm (109.6 lpm).

Constructed with 316 stainless steel materials, the SVRU Series operates at temperatures to 180°F (83°C). Designed with no ball bearings, these wash-heads provide cost-effective, low-maintenance operation. Technical support and equipment is provided 24 hours a day.

Sellers Cleaning Systems, Piqua, OH

Reader Service No. 341

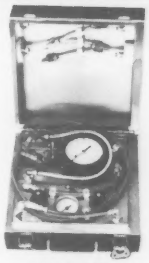
BusinessExchange

Services/Products

COMPLETE LABORATORY SERVICES

Ingman Labs, Inc.
2945 - 34th Avenue South
Minneapolis, MN 55405
612-724-0121

Reader Service No. 153



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ANNOUNCING!

In-Line Business Exchange Advertisements are now available in the Business Exchange Section of *Dairy, Food and Environmental Sanitation.*

85¢ per word

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For more information on how your organization may utilize these ads, call Rick McAtee, IAMFES Advertising/Exhibits Manager at (800) 369-6337 or (515) 276-3344.

Dairy, Food and Environmental Sanitation, Vol. 17, No. 2, Page 98

RESPONSIBILITIES OF THE 3-A SYMBOL COUNCIL

by Earl O. Wright

The 3-A Sanitary Standards Symbol Administrative Council (the Council) may revoke any authorization for use of the 3-A Symbol because of noncompliance with the applicable 3-A Sanitary Standard.

If equipment which is in use in the industry bears the 3-A Symbol, but does not comply with the 3-A Sanitary Standards, it should be reported by any sanitarian, fieldman or other industry interested person to the 3-A Symbol Council office. The administrative office is located at 3020 Bluff Rd., Columbia, SC 29209; telephone (803) 783-9258. Unauthorized use of the 3-A Symbol should also be reported to the same office.

Reports of alleged noncompliance should be submitted on noncompliance forms obtainable from the administrative office.

When a report of alleged noncompliance is received, the Symbol holder is notified of the allegation and given 30 days to submit a response. The Council then reviews and investigates the matter. The Council may request information on which to base a decision from Dairy and Food Industries Supply Association (DFISA) Technical Committee, the Sanitary Standards sub-committee of Dairy Industry Committee (DIC), or the IAMFES Committee on Sanitary Procedures.

After the investigation is completed, a decision regarding the allegation is made by the Council. The 3-A holder is then notified of the Council's decision.

The 3-A holder may appeal the finding to the Council. The Council will invite the holder to present his/her case at the next Council meeting. If the Council's decision remains the same, the manufacturer must modify the equipment to bring it into compliance, or remove the 3-A Symbol from the equipment that is not in compliance. The holder's name will then be deleted from the authorized holders' list that is published twice a year in *Dairy, Food and Environmental Sanitation*.

Dairy, Food and Environmental Sanitation, Vol. 17, No. 2, Pages 99-116

Holders of 3-A Symbol Council Authorization on February 1997

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, Inc. (5/1/56)
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

76 Damrow Company (10/31/57)
196 Western Avenue, P.O. Box 750
Fond du Lac, Wisconsin 54936-0750

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

571 Viatec Process Incorporated (8/15/89)
500 Reed Street
Belding, Michigan 48809

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

02-08 A1 Pumps for Milk and Milk Products

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

830 APV Fluid Handling-Americas (5/5/95)
100 South CP Avenue
Lake Mills, Wisconsin 53551-1799

858 APV Fluid Handling-Americas (10/30/95)
100 South CP Avenue
Lake Mills, Wisconsin 53551-1799

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

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

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

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

205R Boumatic (5/22/69)
1919 S. Stoughton 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. (4/1/92)
1900 Lake Park Drive
Smyrna, Georgia 30080

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)

792 KSB, Inc. (9/14/94)
4415 Sarellen Road
Richmond, VA 23231
(Mfg. by: KSB AK Tiengesellschaft
Frankenthal, Germany)

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

810 O.M.A.C. SRL Pompe (1/2/95)
Via Falcone 8 42048
Rubiera (RE) Italy
(U.S. Rep.: Sanchelima International Inc.
1783 N.W. 93rd Avenue
Miami, Florida 33172)

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

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

888 Seeberger GmbH + Co. (8/30/96)
Scharnholzstrasse 344
D-46240
Boltrop, Germany
(U.S. Rep.: seepex, Inc.
1834 Valley Street
Dayton, Ohio 45404)

887 seepex, Inc. (8/30/96)
1834 Valley Street
Dayton, Ohio 45404
(Mfg. by: Seeberger GmbH + Co.
Scharnholzstrasse 344
D-46240 Bottrop
Germany)

595 seepex, Inc. (3/16/91)
(Formerly Pumpen-und Maschinenbau)
1834 Valley Street
Dayton, Ohio 45405

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

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

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 (11/28/95)
4403 First Avenue SE, Suite 500
Cedar Rapids, Iowa 52402
(Mfg. by: Sudmo Schleicher AG
Industiestr. 7
D-73469, Reisburg
Germany)

462 TEXMAC Inc. (12/5/85)
3001 Stafford Drive
Charlotte, North Carolina 28266-8128
(Mfg. by: Nokamura Osaka, Japan)

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

04-03 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)

847 Stork Food Machinery (8/25/95)
Airport Parkway
Box 1258
Gainesville, Georgia 30503
(Mfg. by: Stork Amsterdam B.V.
Ketelstraat 2
021 JX Amsterdam
The Netherlands)

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

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

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.
1201 W. Allen, No. 15
Bloomington, Iowa 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 Niro, Inc. Evaporator Division (2/2/86)
9165 Rumsey Road
Columbia, Maryland 21045-1991

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

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 11-020
Ellerslie, Auckland 5
New Zealand
(U.S. Rep.: Masport, Inc.
6140 McCormick Drive
Lincoln, Nebraska 68507)

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

885 Tranter, Inc. Texas Division (7/11/96)
1900 Old Burk Hwy.
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)
11200 Rockville Pike, Suite 300
Rockville, Maryland 20852
(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 368
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
P.O. Box 1102
Buffalo, New York 14240-1102

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

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

614 Tetra Pak Processing Systems (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 53716

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

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

107R C.E. Rogers Co. (7/31/58)
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

17-07 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

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)
63691 Ranstadt 1/Hessen Germany
(Hassia U.S.A., Inc. 39 Plymouth Street
Fairfield, New York 07007)

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, Ste. 345
Smyrna, Georgia 30080)

731 LIEDER-Maschinenbau Gmbh & Co. KG (5/18/93)
Postfach 1252/Im Laab 3
3033 Schwarmstedt, Germany
(U.S. Rep.: Leider Machines N.A.
Woodcock Mountain Drive
Washingtonville, New York 10992)

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

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

442 Milliken Packaging (3/21/85)
White Stone, South Carolina 29386

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

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)

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)

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

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

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)

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

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

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

22-05 Silo-type Storage Tanks for Milk and Milk Products

154 APV Crepaco, 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

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

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

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

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

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

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

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

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

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

23-02 Equipment for Packaging Viscous Dairy Products

174 APV Crepaco, Inc. (9/28/65)
100 South CP Avenue
Lake Mills, Wisconsin 53551

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

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

343 Tetra Laval Food Hoyer, Inc. (7/6/81)
201 Broad Street
Lake Geneva, Wisconsin 53147
(Mfg. by: Alfa Hoyer, Denmark)

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

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

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

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

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

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

222 Sweetheart Packaging (11/15/71)
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

819 JayBee Precision, Inc. (3/17/95)
Kirk Pasture Road, P.O. Box 231
Bristol, New Hampshire 03222-0231

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

27-02 Equipment for Packaging Dry Milk and Dry Milk Products

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

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)

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

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

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
Houston, Texas 77099-5298

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

764 Johnson Yokogawa (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 Corporation (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

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

386 Turbo Instruments, Inc. (5/11/83)
4 Vashell Way
Orinda, California 94563
(Mfg. by: Turowerk, West Germany)

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

664 Schutte & Koerting (12/16/91)
(A division of Ketema, Inc.)
XO Technologies Products
2233 State Road
Bensalem, Pennsylvania 19020

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, P.O. Box 352
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)

32-01 A1 Uninsulated Tanks for Milk and Milk Products

397 APV Crepaco, Inc. (6/21/83)
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 Siam Stainless Pipe (7/18/94)
Fittings & Tubulars
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

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 Processing, Inc. (3/30/95)
Machines 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

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)
P.O. Box 390161
Cambridge, Massachusetts 02139-9998

846 IKA Works, Inc. (9/7/95)
2635 North Chase Parkway, S.E.
Wilmington, North Carolina 28402-7499

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

37-01 A1 Liquid Pressure and Level Sensing Devices

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

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

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

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

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

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

829 DCT Instruments (4/13/95)
1165 Chambers Road
Columbus, Ohio 43212
(Mfg. by: Sensotec Inc.
1200 Chesapeake Avenue
Columbus, Ohio 43212)

862 Delta Controls Corporation (11/30/95)
585 Fortson Street
Shreveport, Louisiana 71107

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)

459 Endress + Hauser, Inc. (10/17/85)
2350 Endress Place
Greenwood, Indiana 46142
(Mfg. by: Endress + Hauser GmbH
Hauptstrasse 1
D-79689 Maulburg, Germany)

524 E G & G Flow Technology (1/14/88)
4250 E. Broadway Road
Phoenix, Arizona 85040

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)

463 The Foxboro Company (12/6/85)
33 Commercial Street
Foxboro, Massachusetts 02035

668 GP: 50 New York, Ltd. (3/30/92)
2770 Long Road
P.O. Box 1150
Grand Island, New York 14072

651 Granzow, Inc. (10/3/91)
2300 CrownPoint Executive Drive
Charlotte, North Carolina 28227
(Mfr: Kubler AG
Baar, Switzerland)

633 Griffith Industrial Products Company (6/21/91)
P.O. Box 111
Putnam, Connecticut 06260

749 Haenni Cie & AG (1/17/94)
CH-3303
Jegenstorf, Switzerland
(Not available in the U.S.A.)

771 Hawk America (6/13/94)
1741 W. Rose Garden Lane
Phoenix, Arizona 85027

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)

557 Honeywell, Inc. (12/21/88)
Industrial Controls Div.
1100 Virginia Drive
Fort Washington, Pennsylvania 19034

629 ISE-Magtech (5/20/91)
907 Bay Star
Webster, Texas 77598-1531

598 FMC Invalco, Inc., (3/22/90)
A FMC Corp. Subsidiary
P.O. Box 1183
Hutchinson, Kansas 67504-1183

572 ITT Conoflow (9/25/89)
P.O. Box 768, Rt. 78
St. George, South Carolina 29477

798 Kay-Ray/Sensall, Inc. (10/14/94)
1400 Business Center Drive
Mount Prospect, Illinois 60056

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

501 Lumenite Electronic Company (4/27/87)
2331 N. 17th Avenue
Franklin Park, Illinois 60131

768 MTS Systems Corporation (6/6/94)
Sensors Division
3001 Sheldon Drive
Cary, North Carolina 27513

596 Magnetrol International (3/20/90)
5300 Belmont Road
Downers Grove, Illinois 60515

627 Milltronics, Inc. (4/12/91)
730 The Kingsway
Peterborough, Ontario
Canada K9J 7B1
(U.S. Rep.: Milltronics, Inc.
709 E. Stadium Drive
Arlington, Texas 76011)

597 NUOVA FIMA S.p.A. (3/20/90)
Via C. Battisti 59
28045 - INVORIO (N0) Italy
(Not available in the U.S.A.)

523 Paper Machine Components, Inc. (1/3/88)
Miry Brook Road
Danbury, Connecticut 06810

554 Par Sonics, Inc. (11/30/88)
R.D. #1 - Box 505
Centre Hall, Pennsylvania 16828

563 PI Components Corp. (2/13/89)
350 Loop 290 South
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

328 Rosemount, Inc. (5/22/80)
12001 Technology Drive
Eden Prairie, Minnesota 55344

784 Sensotec, Inc. (9/2/94)
1200 Cheseapeake Avenue
Columbus, Ohio 43212-2288

515 Setra Systems, Inc. (9/14/87)
45 Nagag Park
Acton, Massachusetts 01720

583 S. J. Controls, Inc. (11/11/89)
2248 Obispo Avenue #203
Long Beach, California 90806

875 SOR (4/15/96)
14685 W. 105th Street
Lenexa, Kansas 66215-5964

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

285 K Systems Corp. (Tank Mate Division) (12/7/76)
4919 Butterfield Road
Hillside, Illinois 60162

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

765 Tri-Clover, Inc. (4/27/94)
9201 Wilmot Road
Kenosha, Wisconsin 53141

754 Valmet Automation (2/15/94)
30 Thomas Drive
Westbrook, Maine 04092
(Mfg. by: Valmet-Finland
P.O. Box 237 SF-33101
Tampere, Finland)

410 Viatran Corporation (11/1/83)
300 Industrial Drive
Grand Island, New York 14072

569 WEISS Instruments, Inc. (5/24/89)
85 Bell 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)

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

41-00 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)
1900 Lake Park Drive, No. 345
Smynra, Georgia 30080

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

44-01 Air Driven Diaphragm Pumps

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

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

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

45-00 Cross Flow Membrane Modules

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

813 Golden Technologies Co., Inc. (2/2/95)
1697 Cole Boulevard, Suite 300
P.O. Box 4040
Golden, Colorado 80402

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)

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)

737 Katrina, Inc.
P.O. Box 418 (6/17/93)
91 Western Maryland Parkway
Hagerstown, Maryland 21740

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)

767 Perstorp Analytical, Inc. (6/6/94)
12101 Tech Road
Silver Spring, Maryland 20904

750 PT Papertech, Inc. (1/20/94)
#204 - 2609 Westview Drive
North Vancouver
B. C. Canada V7N 4M2
(U.S. Rep.: BD Services Corporation
300 North Commercial Street
Bellingham, Washington 98227)

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

52-00 (Formerly 08-17H) Thermoplastic Plug Type Valves

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 C P Avenue
Lake Mills, Wisconsin 53551-1799

552 Alloy Products Corp. (11/23/57)
P.O. Box 529
1045 Perkins Avenue
Waukesha, Wisconsin 53187

245 Babson Brothers Company (2/12/73)
Dairy System Division
P.O. Box 659
20903 West Gale Avenue
Galesville, Wisconsin 54630

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
Xicotepcc de Juarez
Edo, Puebla Mexico
(U.S. Rep: Ben Dolphin Consulting
4735 Lansing Drive
North Olmsted, Ohio 44070)

376 Defontaine, Inc. (1/25/83)
16720 W. Victor Road
New Berlin, Wisconsin 53151

530 G & H Products Corp. (5/31/88)
P.O. Box 909
Pleasant Prairie, Wisconsin 53158-0909

480 GEA ECOFLEX (8/8/86)
Division of Niro, Inc.
9165 Rumsey Road
Columbia, Maryland 21045-1991

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 (11/18/94)
4040 First Avenue S.E., Suite 500
Cedar Rapids, Iowa 52402
(Mfg. by: Sudmo Schleicher AG
Industriester 7 D-73469
Reisburg, Germany)

823 Sudmo North America (3/17/95)
4403 First Avenue SE, Suite 500
Cedar Rapids, Iowa 52402
(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

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

86R Waukesha Specialty Co., Inc. (12/20/57)
P.O. Box 160, Hwy. 14
Darien, Wisconsin 53114

54-00 A3 (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 Crepaco, Inc. (5/14/96)
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, Inc. (2/1/91)
16720 W. Victor Road
New Berlin, Wisconsin 53151

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

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

55-00 A1 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

57-00 A1 (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, Inc. (8/24/95)
100 South CP Avenue
Lake Mills, Wisconsin 53551

691 Defontaine of America, Inc. (9/19/92)
16720 W. Victor Road
New Berlin, Wisconsin 53151

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

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

422 BS & B Safety Systems, Inc. (6/12/84)
7455 E. 46th Street
Tulsa, Oklahoma 74145-6379

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

62-00 (Formerly 08-17L) Hose Assemblies

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

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

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

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

63-00 (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 Alloy Products Corp. (11/23/57)
1045 Perkins Avenue, P.O. Box 529
Waukesha, Wisconsin 53187

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 (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 Cajon Company (8/4/92)
9760 Shepard Road
Macedonia, Ohio 44056

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

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

528 Dayco Products, Inc. (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

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

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

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

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

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 Types Valves

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

74-00 Sensors and Sensor Fittings and Connections Used on Milk and Milk Products Equipment

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

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

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

321 Anderson Instrument Co., Inc. (6/14/80)
156 Auriesville Road
Fultonville, New York 12072

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

851 Chicago Stainless Equipment (9/28/95)
511 Weston Ridge Drive
Naperville, Illinois 60563

586 Diversey Lever Equipment (12/14/89)
151 Harvey West Boulevard
Santa Cruz, California 95060

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

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

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

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

866 Dovex S.S., Inc. (1/29/96)
2400 N.E. 2nd Street
Minneapolis, Minnesota 55418

620 Larad Equipment (2/25/91)
213 Airport Drive Extension
Hopedale, Massachusetts 01747

794 Honeywell, Inc. (9/14/94)
1100 Virginia Drive
Fort Washington, Pennsylvania 19034

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)

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)
2400 Barranca Parkway
Irvine, California 92714

826 Rosemount, Inc. (4/6/95)
12001 Technology Drive
Eden Prairie, Minnesota 55344

732 SensorTec, Inc. (5/18/93)
16335-7 Lima Road
Huntertown, Indiana 46748

873 Smar International Corporation (4/2/96)
7240 Brittemoore, Suite 118
Houston, Texas 77041

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

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

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

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)

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

779 Wahl Instruments, Inc. (8/10/94)
5750 Hannum Avenue
Culver City, California 90231

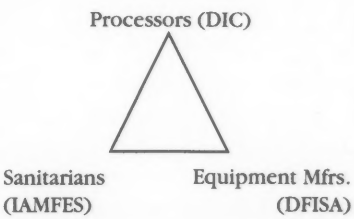
522 Weed Instrument Company, Inc. (12/28/87)
707 Jeffrey Way
Round Rock, Texas 78664

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.)

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 DFISA
- **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

Preview

of the 84th Annual Meeting Orlando, FL

Monday Morning—July 7, 1997

Opening Doors to New Dairy Markets

- New Product Opportunities, What are Consumers Seeking?
- Moo Kooler–Breaking New Ground
- Square Pegs in Round Holes
- How do IDF, Codex and Trade Agreements Impact the Dairy Farmer?
- Some Implications of the Dairy Portions of the Farm Bill

Technical Session—Foodborne Pathogens

- Effects of Culture Temperature, Inoculum Concentration, and Contact Time on Attachment of *E. coli* O157:H7 and *L. monocytogenes* to Chicken Skin
- Factors Affecting Inhibitory Activity of Lactates Against *E. coli* O157:H7 at 10°C
- A Sensitive 24 h Vero Cell Tissue Culture Assay for Cytotoxins of EHEC O157:H7 Strains
- Stimulation of Growth and Survival of *E. coli* O157:H7 at Suboptimal Temperatures by Sodium Lactate
- A Small Outbreak of Listeriosis Linked to the Consumption of Imitation Crab Meat
- Thermal Destruction of *L. innocua* in Ground Beef Patties with 5, 25 or 50% Fat
- Accelerated Recovery on Injured *Salmonella* through Media Modification *Salmonella* Control in Poultry
- Factors Affecting Growth and Toxin Production by *Clostridium botulinum* in Peanut Spread
- Response to Acid Challenge by *Yersinia enterocolitica* Depends on Physiological State and Strain
- A Quantitative Risk Assessment of *Vibrio vulnificus* in Gulf of Mexico Oysters Consumed in Canada

The Impact of the WTO and *Codex Alimentarius* on International and Domestic Food Standards

- Codex Alimentarius Initiatives to Meet International Trade Agreement Responsibilities: Overview
- Science/Risk Based Requirements of International Trade: Agreements and Responsibilities of Countries
- Codex Alimentarius Initiatives to Meet International Trade Agreement Responsibilities: Microbiological Risk Assessment: Principles, Relationship to HACCP and Microbiological Criteria, Future Needs
- Codex Alimentarius Initiatives to Meet International Trade Agreement Responsibilities: Microbiological Risk Assessment, Chemical Risk Assessment: Procedures for Food Additives and Pesticides, Harmonization Activities, Initiatives for Food Additives
- Risk Assessment/Risk Management: Clarifying the Relationships
- U. S. Codex Strategic and Action Plans for Sound Science and Transparency

Quantitative Microbial Risk Assessment: From Start to Finish

- Risk Assessment: The Link between HACCP and Public Health
- Modeling the Prevalence of Contamination
- Growth, Survival and Thermal Death Models to be Used in the Process of Risk Assessment
- Dose Response Modeling
- Simulation Modeling–Monte Carlo Techniques
- Risk Management and Economic Analyses

Special Poster Session—Washing Makes a Difference

- Update of Washing and Sanitizing of Milk Haulers and Dairy Plant Equipment

- An Assessment of the Cleaning and Disinfection of Poultry Transport Containers and Truck Beds
- Efficacy of Holding Pen Washing to Reduce Bacterial Levels
- New Methods for Sanitization of Egg Shells
- Biofilms in Aquatic Food Processing
- Washing Fresh Fruits and Vegetables

Poster Session—Methodology

- A New Rapid Automated Method for the Detection of *Listeria* spp. from Environmental Swabs
- Development of a New Medium to Assess Injury in Heat & Sanitizer Injury for *Listeria*
- Suitability of Selective Media for Recovery and Enumeration of Sublethally Heat-and Acid-Injured *L. monocytogenes*
- Identification and Enumeration of *Salmonella* on Sample Slides of Poultry Carcass Wash Water Using Image Analysis
- Evaluation of an Automated Enzyme-Linked Fluorescence Immunoassay (ELFA) for the Detection of *Salmonella*
- Antibody-Direct Epifluorescent Filter Technique (Ab-DEFT) for Rapid, Specific Enumeration of *Listeria* in Food
- Quantitative Screening of Reactivity of *Bacillus* and *Clostridium* Spores in a Dot-Blot Immunoassay
- Detection of *Staphylococcus aureus* Using an Enhanced Chemiluminescent Biosensor
- Multiplex PCR for the Detection of Human Enteroviruses, Hepatitis A Virus, and Norwalk Virus
- Modification of the Sample Preparation Protocol in the BAX™ System for Screening *Salmonella* to Permit Detection of Food Matrices with Inhibitory PCR Effects
- Rapid Molecular Method for the Detection of *Salmonella* spp. Using PCR and LCR
- Rapid Detection of *Salmonella* in Feces from Dairy Cows Using a Fluorescent PCR-Based Assay
- Results of Testing a Variety of Foods for *Salmonella* Using a Fluorogenic PCR-Based Assay
- Evaluation of an Enzyme-Linked Immunosorbent Assay, Direct Immunofluorescent Filter Technique and Multiplex PCR for Detection of *E. coli* O157:H7 in Beef Carcass Wash
- Development of PCR-Based Homogeneous Confirmative Assays for *L. monocytogenes* and *E. coli* O157:H7
- Development and Evaluation of a PCR-Based Assay for the Detection of *L. monocytogenes* in Foods
- Concentration of Pathogenic Microorganisms from Dairy Products for Detection of PCR
- Rapid Methods for Identification of Lactic Acid Bacteria
- Genetic Characterization of *Shewanella putrefaciens* and *Pseudomonas* spp. Isolated from Fish Processing and Spoilage Using Automated Ribotyping
- Comparison of Excision Versus Swabbing Techniques for Assessing the Bacteriological Quality of Pig Carcass Surfaces
- A Novel Technique for *E. coli* Testing of Beef and Pork Carcasses
- A 24 Hour Test for Enumeration of Total Coliforms and *E. coli* in Food
- The Occurrence of Non-Coliform Bacteria on VRBA
- Evaluation of a Novel Method for the Detection of *Staphylococcus aureus* in Dairy Samples
- The Evaluation of an Automated Rapid Microbial Detection System for Sterility Testing of an Aseptically Processed Tomato-Based Vegetable Beverage
- SimPlate™ for Yeast and Mold: A New Method for Rapid Fungi Enumeration in Food

Monday Afternoon—July 7, 1997

Fresh-Cut Fruits—Pitfalls and Challenges for the Future

- An Introduction to Fresh-Cut Fruits Market Potential in Both the Foodservice and Retail Arenas
- The Effect of Farm Management Practices on the Quality of Fresh-Cut Fruits
- Factors Affecting the Suitability of Commodity Fruits Headed for the Fresh-Cut Processor
- Processing and Quality Factors Affecting the Quality and Storage Life of Fresh-Cut Processor
- Fruit Spoilage
- Microbiological Safety and Control of Fresh-Cut Fruits

Technical Session—Methodology and Education

- Comparison of *Staphylococcus aureus* Detection by Conventional and New Petrifilm™ Methods
- A Single Test Unit for Quantitating Coliforms, *E. coli* and *Salmonella* in Waters and Foods
- Ensuring the Microbiological Quality of a Low Proof Beverage
- Assessing Surface Cleanliness–An Integrated Approach Using ATP Bioluminescence and Microbiological Analysis
- The Use of Bioluminescence for Evaluating Plant Cleanliness in a Baking Facility
- Rapid Molecular Method for Detection of Human Enteric Viruses in Prepared Hamburgers and Leaf Lettuce
- Immunomagnetic Separation and Flow Cytometry for Rapid Detection of *E. coli* O157:H7
- Hazard Analysis Critical Control Point (HACCP) Implementation of Foodservice Directors

- Handwashing vs. Gloving for Food Protection
- Foodborne Disease in the Home
- Statewide Training for Environmental Health Specialist
- Recipe HACCP

USDA "Mega-Reg" Microbiological Requirements

- Microbiological Sampling and Testing Aspects of the "Mega-Reg"
- *E. coli* Testing and Process Control
- *E. coli* and *Salmonella* Levels on Beef Carcasses-Survey Results Compared to Mega-Reg Requirements
- Consumer Perspective of the "Mega-Reg"
- International Perspective of the "Mega-Reg" Microbiological Testing Requirement
- Microbiological Performance Standards and HACCP

Food Allergies and Intolerances

- Medical Aspects of Food Allergies and Intolerances
- Food Allergy: Scope, Risk and Severity Issues
- Assessing the Potential Allergenicity of New Food Pathogens
- The Consumer Perspective on Food Allergy
- Food Allergy: Food Industry Risk Management
- Food Allergy: The Regulatory Perspective

Poster Session—General Food Microbiology

- Biological Properties of a Bacteriocin-Like Inhibitory Substance Produced by a Newly Isolated *Bacillus subtilis*
- Use of HPLC to Demonstrate Aflatoxin B_1 Degradation by *Flavobacterium aurantiacum* in Corn
- Occurrence of Molds and Levels of Aflatoxins and Fumonisins in Venezuelan Corn
- Enumeration and Characterization of *Aeromonas* sp. in Vegetable Products from Venezuela
- Inhibition of Microbial Growth and Toxin Production in Honey
- Effect of Diet on the Indicative and Pathogenic Microbiological Quality of Aquacultured Pacu (*Piaractus mesopotamicus*)
- Antibiotic Resistant Bacteria in Aquacultured Catfish Fillets
- Effect of Production System on the Indicative and Pathogenic Microbiological Quality of Aquacultured Finfish
- Effects of Vitamin E Supplementation and High vs. Low Initial Microbial Loads on Retail Display Life of Beef Muscle
- Rapid Catalytic Activity Method for Measurement of End-Point Temperature in Cooked Beef and Sausage
- Shelf-Life of Ground Beef Patties Treated by Gamma Irradiation
- Sensory Changes of Irradiated Ground Beef through Six Weeks of Storage
- The Effect of Growth Medium and Heating Menstruum on Heat Resistance of *Pediococcus* sp.
- Evaluation of Changes in Microbial Populations on Beef Carcasses Resulting from Steam Pasteurization
- Comparison of Methods for Beef Carcass Decontamination
- Efficacy of Trisodium Phosphate for Destruction of *Salmonella* on Cantaloupe
- Growth and Adherence on Stainless Steel by *Enterococcus faecium*
- Evaluation of Surface Topography of Food Grade Polyethylene, Polypropylene, Acetatl and Stainless Steel by Scanning Electron Microscopy
- Scanning Electron Microscopy of High Density Polyethylene Conveyor Surfaces during Normal Processing in Meat Plant Operations
- Delamination in Polyethylene Structures and the Influence of Multilayered Upper Surfaces on Deterioration Processes
- Microbial Spoilage of Chub-Packed Ground Beef from Four Processing Plants in the United States
- Simulation of *Bacillus* Spoilage in a Model Food System
- Development of an Experimental Model for Microbial Cross-Contamination and Evaluation of the Efficiency of an Antibacterial Kitchen Disinfectant
- Efficacy of Three Sanitizers Against Food Spoilage Bacteria
- Bacterial Populations of Different Sample Types from Poultry
- Microbial Ecology of South African Retail
- Microbiological Quality of Cream-Fillings from Doughnuts Sold at Bulawayo, a Zimbabwean City
- Microbial Quality of Koshari, One of the Most Famous Floksy Meals Common in Egypt

Tuesday Morning—July 8, 1997

Ensuring Proper Equipment Design

- World Issues and Organizations Involved in Equipment Design and Standards Harmonization
- The Meaning of the 3-A Symbol
- Regulatory and Inspection Bodies Involved—A Panel Discussion
- Interest Parties: Is the System Working? A Panel Discussion

- Interested Parties: Is the System Working? A Panel Discussion (3-A Standards Practical Application)

Technical Session—General Food Microbiology

- A Risk Assessment for *Salmonella enteritidis* in Eggs in Canada
- Verification of a Quantitative Risk Assessment for *E. coli* O157:H7 in Hamburgers
- Rapid Desiccation with Heat in Combination with Water Washing for Reducing Bacteria on Beef Carcass Surfaces
- A Purge Sampling Method to Detect Total Aerobic Bacteria and *E. coli* O157:H7 in Raw Beef Combos
- Evaluation of the USDA Sponge Sampling Technique for Beef Carcasses for Enumeration of *E. coli*
- Reductions in Microbial Populations at Five Anatomical Locations on Steam Pasteurized Beef Carcasses
- Characterization of Lactic Acid Bacteria from a Sow, a Healthy Piglet and an Ill Piglet
- Thermotolerance of *Enterobacter sakazakii* in an HTST Pasteurizer
- Reducing Conditions and Seryl and Sulfhydryl Inhibitors on Aflatoxin B_1 Degradation by *F. aurantiacum*
- Effect of Prebiotics on *Bifidobacterium*

Safety of Genetically Modified Foods

- An Overview of Technology and Products
- Consumers' Perceptions
- National and International Regulatory Perspectives
- Recent Trends in Biotechnology
- Risks, Public Opinion and Risk Communication

International Trends in Microbiological Methods

- Laboratory Accreditation: Is It Needed and Can It be Standardized?
- International Efforts to Standardize Microbiological Methods
- Tolerance Limits and Methodology: Effect on International Trade
- How to Design a Comprehensive Validation Program: Association of Official Analytical Chemists (AOAC)
- How to Design a Comprehensive Validation Program: MicroVal

Cyclospora—The Parasite that Raspberries Made Famous

- Epidemiology of the Outbreak
- Tracebacks–Untangling the Maze
- Microbiology and Testing of Cyclospora
- Ontario Experience and Response to Cyclospora Ontario Infection, 1996
- Cyclospora–FDA Regulatory Aspects
- Environmental Assessment in Guatemala

Poster Session—Foodborne Pathogens

- Survival of *L. monocytogenes* in Refrigerator Dill Pickles
- Fate of Gamma Irradiated *L. monocytogenes* on Raw or Cooked Turkey Breast Meat during Refrigerated Storage
- Effectiveness of Two Cooking Systems in Destroying *E. coli* O157:H7 and *L. monocytogenes* in Ground Beef Patties
- Fate of *E. coli* O157:H7, *L. monocytogenes*, and *Salmonella* spp. in Reduced Sodium Beef Jerky
- The Impact of Cold Shocking on the Minimum Growth Temperature for *E. coli* O157:H7
- Influence of Package Atmosphere on Growth and Survival of Uninjured and Sublethally Heat-Injured *E. coli* O157:H7
- Fate of Selected Pathogens in Vacuum-Packaged Dry-Cured (Country-Style) Ham Slices at 2°C and 25°C
- Fate of *L. monocytogenes* on Smoked Fish Coated with Sorbate-Containing Cellulose-Based Edible Films
- Effect of Acidulant Identity on the Acid Tolerance Response of Enterohemorrhagic *E. coli*
- Effect of pH and Acid Tolerance on Radiation Resistance of Enterohemorrhagic *E. coli*
- Acid Tolerance and Acid Shock Responses of *E. coli* O157:H7 and Non-O157:H7 Strains in the Presence of Arginine, Lysine and Methionine
- Characterization of Acid Shock and Acid Tolerance Response in *L. monocytogenes* Strains V7, V37, and CA
- Comparison of Chlorine and a Produce Rinse for Killing Pathogens on Fresh Produce
- Inhibition of *Listeria innocua* in Manchego Cheese by Bacteriocin-Producing *Enterococcus faecalis*
- Inhibition of *L. monocytogenes* on Fresh Pork Loin Using a Nisin-Based Treatment
- Control of *L. monocytogenes* by Use of Lysozyme, Lactoferricin-ß and EDTA
- Antimicrobial Activities of Lysozyme and Lactoferricin-ß Against *Salmonella*
- Incidence of *Salmonella* on Beef Carcasses at Various Stages of the Slaughtering Process
- Probabilities of Passing *E. coli* Performance Criteria in Seven Beef Slaughtering Plants
- Incidence of *Edwardsiella*, *Salmonella* and *Shigella* on Fresh Catfish Fillets
- Incidence of *Giardia lamblia* in Finished Potable Water Samples in Hermosillo, Sonora, México

- Occurrence of *Vibrio* spp. in Guacuco Clams (*Tivela mactroides*) and Chipi-chipi Clams (*Donas denticulatus* and *Donas striatus*) from Venezuela
- Revised Model for Aerobic Growth of *Shigella flexneri* to Extend the Validity of Predictions at Low Temperatures
- Lag Phase Durations of *L. monocytogenes* Cells in Different Physiological States to Changes in the Environment
- Updated Models for the Effects of Temperature, pH, NaCl, and $NaNO_2$ on the Aerobic and Anaerobic Growth of *L. monocytogenes*
- A Computer Model Describing the Competitive Growth of *L. monocytogenes* and *Lactococcus lactis* in Cucumber Juice
- Modulation of Lag Phase at 5°C of *L. monocytogenes* Scott A by Osmolytes

Tuesday Afternoon—July 8, 1997

General Session—Food Safety Issues for Special Populations

- Populations at Increased Risk for Foodborne Disease
- Special Pathogens: Foodborne Agents Posing Special Risk Concerns
- The Impact of an Aging Population on the Special Consumer Risk Concern
- The Value of Society of Protection Population Subgroups at Special Risk
- Food Safety and the Special Consumer
- Communicating Risk: Where should Special Consumers get Their Food Safety Information?

Wednesday Morning—July 9, 1997

HACCP Implementation in the Seafood Industry: Are You Prepared?

- Benefits and Pitfalls of HACCP for the Seafood Industry
- Experiences in Implementation of HACCP in Seafood Processing Plant
- Experiences in Implementation of HACCP in Seafood Processing Industry
- Experiences in Implementation of HACCP in Seafood Foodservice Industry
- FDA's Expectation for Seafood Industry Compliance
- Global Perspective on HACCP in Seafood Industry

Future Trends and Considerations in Sanitation

- Mega Regs—As It Applies to Sanitation
- Contracting Sanitation Services, an Evaluation
- Sanitizers, What can be Done to Reduce the Problem of New and Old Pathogens
- Pest Control Without Pesticides, 2000 and Beyond
- Foreign Material Control
- Rapid Hygiene Monitoring, A New Light

Ensuring a Safe Global Food Supply—Part Two

- The Birth of an Emerging Foodborne Pathogen and a Strategy for the Future
- Highlight of the March 1997 "Conference on Emerging Foodborne Pathogens: Implications and Control"
- Lessons Learned from the 1996 Outbreak of Enterohemorrhagic *Escherichia coli* Infection in Japan
- Panel Discussion—Integrated Science-Based Approaches to Food Safety Regulation

Wednesday Afternoon—July 9, 1997

Viral Foodborne Disease: Emerging Agents, Emerging Methods

- Overview of the Viral Foodborne Disease Issue: New York State Perspective
- Presumed Viral
- Hepatitis A Virus: Molecular Methods of Detection
- Update on SRSV's (Norwalk-like) Viruses
- Detection of Human Enteric Viruses
- Inactivated Hepatitis A Virus Detection by Antigen Capture-PCR
- Application of the 5' Nuclease Assay for the Detection of Bacterial and Viral Foodborne Pathogens

Food Safety and Quality Concerns Associated with Juice Products

- Microbiological Concerns Associated with Juice Products
- Spoilage of Juice Products by Sporeforming Microorganisms
- Fungi in Packaging Material: How does It Effect Juice Quality and Shelf-life?
- Processing Alternatives to Pasteurization
- Impact of Foodborne Disease from a Regulatory Perspective
- Impact of Foodborne Disease from an Industry Perspective

Epidemiological Typing of Foodborne Organisms

- Molecular Methods for Epidemiological Typing of Foodborne Pathogens
- PCR-RFLP for Epidemiological Typing
- RAPD and Fatty Acid Profiling for Typing of Foodborne Microorganisms
- Ribotyping
- PFGE for Typing of Foodborne Pathogens

84th IAMFES Annual Meeting

Tours and Special Events

Sunday, July 6, 1997 – 8:30 a.m. – 4:30 p.m.
Kennedy Space Center
Registration: $42 (Late $50) Lunch included

Enter the world of outer space with a guided tour of Kennedy Space Center. Hear the history behind the Mercury, Gemini, and Apollo rockets during a tour of the Rocket Garden! Walk through a full-size replica of the space shuttle. Then board the NASA bus and see the launching pads and the enormous Saturn V Rocket. Experience the spectacular IMAX film "The Dream is Alive," filmed by astronauts in outer space. Simply out of this world!

Opening Session
Ivan Parkin Lecture
Sunday, July 6, 1997 – 7:00 p.m.

Lecture: Martha Rhodes Roberts, Ph.D., Florida Department of Agriculture and Consumer Services.

Cheese and Wine Reception
Held in the Exhibit Hall
Sunday, July 6, 1997 – 8:00 p.m. – 10:00 p.m.

Join friends and colleagues for complimentary refreshments while viewing over 80 educational exhibits.

Exhibit Hall Hours

Monday, July 7, 1997–9:30 a.m.–4:00 p.m.
Tuesday, July 8, 1997–9:30 a.m.–4:00 p.m.

Monday, July 7, 1997 – 6:00 p.m. – 10:30 p.m.
Sail Away... A Key West Evening
Registration: $55 (Late $60)

Put on your best Florida shirt and join us poolside at the Hyatt Regency Grand Cypress as we transform you to the relaxing, casual atmosphere like the Florida Keys. Start your evening enjoying a tropical fruit drink with old and new friends. Then move on to a luscious and tantalizing dinner; don't forget the Key Lime pie for dessert!

Spend the rest of the evening enjoying the sounds of the Keys – Jimmy Buffet style. While enjoying the entertainment, you could try your hand at a friendly game of sand volleyball or horseshoe pitching. If that's not your style you can sit comfortably poolside and watch the waterfalls or stroll along the lake. It's sure to be a relaxing night to sail away.

Monday, July 7, 1997 – 9:00 a.m. – 4:00 p.m.
All Around Orlando
Registration: $30 (Late $35) Lunch on own

During this tour you will see Orlando in all its glory. The fun begins with a narrated tour through downtown Orlando. See the historic Church Street District and beautiful Lake Eola. You will drive through and see one of the most exclusive areas of Orlando, Winter Park. Our tour will also stop at the home of the Orlando Magic, the O-rena. Throughout the day there will be opportunities for some unique shopping experiences.

Tuesday, July 8, 1997 – 8:30 a.m. – 4:00 p.m.
Cypress Gardens
Registration: $49 (Late $55) Lunch on own

Travel across the rolling hills of central Florida, through orange groves to Cypress Gardens; a 223-acre family attraction that is home of the first, and still the finest, water-ski show. The botanical garden, created out of a swamp, was first opened to the public in 1936. Walk through exquisite gardens and see huge banyan trees, along with central Florida's flora and fauna. Meet graceful Southern Belles and shop the antebellum village, Southern Crossroads. There are a variety of shows, animal exhibits and rides for kids of all ages. Be sure to visit the all-new "Wings of Wonder" Butterfly Conservatory with more than 1,000 free-flying butterflies.

Wednesday, July 9, 1997
IAMFES Annual Awards Banquet
Reception: 6:00 p.m. – 7:00 p.m.
Banquet: 7:00 p.m.
Registration: $35 (Late $40)

Wednesday, July 9, 1997
IAMFES Children's Banquet
Time: 6:30 p.m. – 9:30 p.m.
Registration: $15 (Late $20)

Child Care

Child care can be arranged through the Hyatt Child Care or Camp Hyatt. Please contact the Hyatt Grand Cypress at (404) 293-1234 ext. 4440 for further details. Pre-registration is advised.

84th IAMFES Annual Meeting Registration Form

Hyatt Regency Grand Cypress — Orlando, FL — July 6 - July 9, 1997
(Use photocopies for extra registrations)

FOR OFFICE USE
Date Rec'd.
Registration #

First Name (will appear on badge) (please print) Last Name

Title Employer

Mailing Address (Please specify: Home or Work)

City State/Province Country Postal/Zip Code

Telephone # Fax #

Please check where applicable:

___ IAMFES Member
___ Non-Member
___ Local Arrangements
___ 30 Yr. Member
___ 50 Yr. Member
___ Past President
___ Executive Board
___ Speaker
___ Honorary Life Member
___ Exhibitor
___ IAMFES Sustaining Member
___ IAMFES Program Advisory Committee

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Sign up to become a NEW member
and take advantage of the member discount.

***REGISTER BY MAY 30, 1997 TO AVOID LATE REGISTRATION FEES**

REGISTRATION:	MEMBERS	NON-MEMBERS	AMOUNT
Registration (Banquet included)	$220 ($270 late)*	$305 ($355 late)*	
Student Member	$ 35 ($ 45 late)*	Not Available	
One Day Registration (Circle: Mon/Tues/Wed)	$110 ($135 late)*	$145 ($165 late)*	
Spouse/Companion (Name): _____	$ 35 ($ 35 late)*	$ 35 ($ 35 late)*	
Children (14 & Under, Names): _____	FREE	FREE	

NEW MEMBERSHIP FEES:		
Membership with *Dairy, Food & Environmental Sanitation*	$ 75.00	
Membership with *Dairy, Food & Env. Sanitation & Journal of Food Protection*	$ 120.00	
**Student Membership ❒ *Dairy, Food & Env. San.* or ❒ *Journal of Food Protection*	$ 37.50	
**Student Membership with *Dairy, Food & Env. San. & Journal of Food Protection*	$ 60.00	
***Full-time student verification required.*		
SHIPPING CHARGES: OUTSIDE THE U.S. - SURFACE RATE	$ 22.50 per journal	
AIRMAIL	$ 95.00 per journal	

OTHER FEES:	PER PERSON	# OF TICKETS	
Cheese and Wine Reception (Sun., 7/6)	FREE		
Sail Away... A Key West Evening (Mon., 7/7)	$ 55 ($ 60 late)		
IAMFES Awards Banquet (Wed., 7/9)	$ 35 ($ 40 late)		
Children's Banquet (Wed., 7/9)	$ 15 ($ 20 late)		

SPOUSE/COMPANION EVENTS:	PER PERSON		
Kennedy Space Center (Sun., 7/6)	$ 42 ($ 50 late)		
All Around Orlando (Mon., 7/7)	$ 30 ($ 35 late)		
Cypress Gardens (Tues., 7/8)	$ 49 ($ 55 late)		

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

Credit Card Payments: Please Circle: VISA/MASTERCARD/AMERICAN EXPRESS

Card # _____ Exp. Date _____

Name on Card _____ Signature _____

Total Amount Enclosed $_____
U.S. FUNDS DRAWN ON U.S. BANK

Registration Information

Send payment with registration to IAMFES, 6200 Aurora Avenue, Suite 200W, Des Moines, IA 50322-2863. Make checks payable to IAMFES. Registration must be post-marked by May 31, 1997. Registration post-marked after May 31, 1997 will be charged the late registration fee. For additional information contact Julie Cattanach at (800) 369-6337.

Refund/Cancellation Policy

The IAMFES policy on refunds and/or cancellations is as follows: Registration fees, minus a $50 processing fee, will be refunded for written cancellations post-marked by June 20, 1997. No refunds will be made for cancellations post-marked after June 20, 1997, however, the registration may be transferred to a colleague with written notification to IAMFES.

Rental Car Information

Budget

For information on special rental car rates from Budget call (800) 772-3773. Please mention Rate Code: BCD #: UO51950.

Guest Room Commitment
GOOD UNTIL JUNE 4, 1997
Make Your Reservation Now

HOTEL RESERVATIONS

IAMFES

84th Annual Meeting
July 6 – July 9, 1997
Hyatt Regency Grand Cypress
Orlando, FL

Please check accommodation requested:

❑ Single (1 person) ❑ Triple (3 persons)
❑ Double (2 persons) ❑ Quad (4 persons)

Bed type:

❑ King Bed
❑ 2 Double Beds

Special Requests _____

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

NAME _____

SHARING WITH (Name) _____

COMPANY NAME _____

ADDRESS _____

_____ CITY _____

STATE/PROVINCE _____ COUNTRY _____ ZIP _____

TELEPHONE _____

ARRIVAL DATE _____ (Check-In Time is after 4 p.m.) DEPARTURE DATE _____ (Check-out Time is 12 p.m.)

SPECIAL REQUESTS _____

All Reservations must be held with one (1) night's deposit payable by credit card (or check received within fourteen (14) days). Reservations canceled less than seventy-two (72) hours prior to arrival will forfeit the deposit. After June 4, 1997, reservations will be accepted on a space and rate available basis.

CREDIT CARD # _____ TYPE OF CREDIT CARD _____

EXPIRATION DATE _____

CARD-HOLDERS SIGNATURE _____

SPECIAL ROOM RATES for this convention:
$120 per night, plus taxes

For Reservations Call: (800) 233-1234 or (407) 239-1234
Or FAX: (407) 239-3800

IAMFES
84TH
Annual Meeting
Orlando, Florida
July 6 – July 9

MAIL DIRECTLY TO:

HYATT REGENCY GRAND CYPRESS
C/O RESERVATIONS
1 GRAND CYPRESS BLVD.
ORLANDO, FL 32836-6734

ComingEvents

MARCH

·**4-5, HACCP Train the Trainer,** Toronto. The HACCP Train the Trainer program is designed to equip HACCP Team members in food processing workplaces with the knowledge and skills to be effective trainers in their own facilities. For further information, contact the Office of Open Learning at (519) 767-5000 or fax (519) 767-1114.

·**5-6, Food Science Course: Pest Management/Food Product Safety,** Rutgers University, New Brunswick, NJ. For further information, contact Keith Wilson, Office of Continuing Professional Education, Rutgers University-Cook College, P.O. Box 231, New Brunswick, NJ 08903-0231; (908) 932-9271.

·**10-12, North American Food Safety Educational Workshop – Food Service and Food Retailers,** in College Park, MD. This conference is intended for professionals interested in food safety related to grocery stores, convenience stores, and food service establishments including commercial, institutional, and military sectors. Emphasis will be given to challenges, barriers, and evaluation of training food service workers and the feasibility of applying HACCP to food service and retail. The cost of the workshop is $150.00 before February 1, 1997. For further information, contact Lisa Gordon, North Carolina State University, phone (919) 515-2956; fax (919) 515-7124; e-mail lisa@unity.ncsu.edu.

·**11-12, Workplace Safety Seminar,** Atlanta, GA. This seminar is designed to translate OSHA's complex regulatory requirements into understandable language that can be used in a workplace setting. For additional information or to enroll, contact AIB Worker Safety, 1213 Bakers Way, Manhattan, KS 66502, or call (913) 537-4750; fax (913) 537-1493.

·**17-19, Principles of Quality Assurance,** at AIB in Manhattan, KS. Included is a hands-on workshop to develop your own HACCP program where each participant develops a program and then reviews its strengths and weaknesses. Each participant will leave with the knowledge and basic understanding of HACCP gained by this exercise. For further information or to enroll, write: AIB, 1213 Bakers Way, Manhattan, KS 66502, or call (913) 537-4750; (800) 633-5137; or fax (913) 537-1493.

·**17-21, Aseptic Process and Packaging (Food Science Course),** Rutgers University, New Brunswick, NJ. For additional information, contact Keith Wilson, Office of Continuing Professional Education, Rutgers University-Cook College, P.O. Box 231, New Brunswick, NJ 08903-0231, or call (908) 932-9271.

·**18-19, Basic Food Microbiology Seminar,** at the Holiday Inn – Portland Airport, Portland, OR. In general, participants will be introduced to the characteristics of microorganisms (bacteria, yeast, and molds), how food is used as a growth medium by microorganisms to cause food spoilage, how to prevent food contamination and spoilage, the basics of foodborne illness, and the relationship of good manufacturing practices and personal hygiene to overall food safety. The concept of HACCP will also be introduced. The course is designed for individuals with limited microbiology or science backgrounds. For further information, contact Jack R. Brook, MS, RD, Instructor/Coordinator, Food Science Technology at (503) 667-7473 or fax (503) 667-7831.

·**18-21, Lipidex '97 Symposium & Tradefair,** in Antwerp, Belgium. This symposium programme is designed to be of benefit to a wide audience from the international oils and fats trade, with sessions that will appeal to traders, buyers and marketing executives, as well as those of interest to technical managers and delegates with operational responsibilities in production. For further information, contact Ms. Erika Vercauteren, The ANTWERP HILTON, Groenplaats, 2000 Antwerpen, Belgium, Telephone (+32) 3 204 8279; fax (+32) 3 204 8640.

·**24-28, Molds and Mycotoxins in Food,** Lincoln, NE. Cosponsored by the American Institute of Baking. For more information, contact the AACC Short Course Department, 3340 Pilot Knob Road, St. Paul, MN 55121-2097; phone (612) 454-7250; fax (612) 454-0766; e-mail: aacc@scisoc.org.

APRIL

·**7-8, American Institute of Baking Food Plant Pest Control Seminar,** in Manhattan, KS. The seminar is designed to increase awareness of pest control strategies and alternatives to the use of chemicals as the main control strategy for pests in the food industry. For additional information, contact AIB, 1213 Bakers Way, Manhattan, KS 66502 or call (913) 537-4750; fax (913) 537-1493.

·**8-9, Oregon Dairy Industries Annual Conference,** Eugene Hilton. For additional information, contact Lilly Smith, Oregon Dairy Industries, Food Science Dept., 100 Wiegand Hall, OSU, Corvallis, OR 97331-6602; phone (503) 745-5545; fax (503) 745-1018.

·**8-10, Pasta and Noodles: Raw Materials and Processing,** Fargo, ND. For more information, contact the AACC Short Course Department, 3340 Pilot Knob Road, St. Paul, MN 55121-2097; phone (612) 454-7250; fax (612) 454-0766; e-mail: aacc@scisoc.org.

·**9-11, Food Science Course: Applied Sensory Evaluation,** Rutgers University, New Brunswick, NJ. For further information, contact Keith Wilson, Office of Continuing Professional Education, Rutgers University-Cook College, P.O. Box 231, New Brunswick, NJ 08903-0231; (908) 932-9271.

·**14-17, Better Process Control School.** For information, contact The World Wide Web at http://www.foodsci.purdue.edu/ or Gwen Shoemaker, Food Science Department, 1160 Smith Hall, Purdue University, West Lafayette, IN 47907; phone (317) 494-8270; e-mail: shoemake@foodsci.purdue.edu.

·**15-17, FPI-HACCP (Food Science Course),** Rutgers University, New Brunswick, NJ. For additional information, contact Keith Wilson, Office of Continuing Professional Education, Rutgers University-Cook College, P.O. Box 231, New Brunswick, NJ 08903-0231, or call (908) 932-9271.

·**20-22, American Dairy Products Institute 1997 Annual Meeting and Dairy Products Marketing Conference,** at The Fairmont Hotel, at Grant Park, in Chicago, IL. All evaporated and dry milk processors, whey products manufacturers, cheese and allied industry representatives interested in the processing, marketing, and utilization of these products, government and university representatives, and end-product users, are invited to attend. For further information, contact Dr. Warren S. Clark, Jr., 130 N. Franklin St., Chicago, Il 60606; phone (312) 782-4888; (312) 782-5455; fax (312) 782-5299.

·**20-23, 48th Meeting of the Pacific Fisheries Technologists,** Astoria, OR. Topics will cover areas related to seafood processing, quality and safety. For more information, contact Michael Morrissey, fax (503) 325-2753; e-mail: moorimic@ccmailorst.edu.

·**28-30, Food Protection Workshop for Processors,** at the Holiday Inn Downtown/Convention Center, St. Louis, MO. This comprehensive 2 1/2 day seminar covers GMP, HACCP and SSOP programs. For further information, contact Vicki Bodrow, ASI Food Safety Consultants, Inc., 7625 Page Blvd., St. Louis, MO 63133; or phone (800) 477-0778.

·**29-May 1, Hazard Analysis and Developing Your HACCP Program,** Guelph. Hazard Analysis Critical Control Point is an internationally recognized process-oriented approach to food safety involving the entire food chain. While reference is made to the Food Safety Enhancement Program guidelines and forms, this program will be of benefit to all food companies interested in the economical and food safety benefits of adopting a HACCP system. For further information, contact the Office of Open Learning, Room 159, Johnston Hall, University of Guelph, Guelph, Ontario N1G 2WI or call (519) 767-5000; fax (519) 767-1114.

MAY

·**3-8, The 26th National Conference on Interstate Milk Shipments,** at the Hyatt Regency, San Francisco Airport. For further information, contact Leon Townsend, NCIMS Executive Secretary, 110 Tecumseh Trail, Frankfort, KY 40601. Telephone and/or fax (502) 695-0253.

·**5, Functional Foods & Wellness: A Research Update,** Guelph Food Technology Centre, Guelph, Ontario. In this unique networking opportunity, you'll share the results of leading scientists as they unlock the "wellness" secrets of ingredients and nutraceuticals for the functional foods of the future. For further information, phone (519) 767-5036; fax (519) 836-1281; e-mail: gftc@uoguelph.ca.

·**5-6, Symposium on Texture of Fermented Milk Products and Dairy Desserts,** in Vicenza, Italy. The objective of the seminar is the presentation and discussion of new information about the different factors affecting the texture of fermented milk and dairy desserts. Besides the key factors influencing the texture of products, an up-to-date will be given on the instrumental and sensory evaluation of texture. For further information, contact Symposium Secretariat, Istituto Sperimentale Lattiero-Caseario, Dr. Roberto Giangiacomo, Via A. Lombardo, 11, 20075 LODI-ITALY; phone +39-371-430990; fax +39-371-35579.

·**6-7, Sanitation and HACCP Workshop,** San Jose, CA. During this workshop the latest issues facing the food industry will be examined, including: management systems for product safety, principles of HACCP, and the need to maintain customer relations by establishing essential programs intended to meet their expections. For additional information, or to enroll, please contact AIB, 1213 Bakers Way, Manhattan, KS 66502; or phone (913) 537-4750; fax (913) 537-1493.

·**12-14, Premier International Conference on Food Preservation,** in Washington. A major emphasis will be placed on new technologies, global market trends and forecasts from both industrial and the consumer viewpoints. Participants will gain a comprehensive assessment of how the world's communities must proceed to ensure the safe trade and consumption of food. For more information, please contact Jennifer Winch at Intertech Conferences, 411 U.S. Route One, Portland, MA 04105; phone (207) 781-9800; fax (207) 781-2150; or e-mail: info@intertechusa.com.

·**13-14, Fourth Annual Cultured Dairy Products Symposium,** at the Wyndham Milwaukee Center Hotel in Milwaukee. Guest speakers from around the world will address topics on the manufacture and development of yogurt products, frozen yogurt, nonfat cultured products, cottage cheese, and new probiotic cultures. For additional information, contact Lisa Lecher or Dr. Bill Watrous at Chr. Hansen, Inc., by phone at (800) 247-8321; fax (414) 476-2313.

·19-22, **Purdue Aseptic Processing and Packaging Workshop.** For information, contact The World Wide Web at http://www.foodsci.purdue.edu/ or Gwen Shoemaker, Food Science Department, 1160 Smith Hall, Purdue University, West Lafayette, IN 47907; phone (317) 494-8270; e-mail: shoemake@foodsci.purdue.edu.

·20-24, **InterChinapack 97, International Exhibition for Packaging Machines and Processing Equipment,** will take place at the China International Exhibition Center in Beijing, China. The Düsseldorf Trade Fair Company is renowned as the organizer of interpack, the world's largest trade fair for packaging machinery and materials and confectionery machinery. For further information, contact Düsseldorf Trade Shows, New York, 70 West 36th St., Suite 605, New York, NY 10018; telephone (800) 232-3914; (212) 356-0407; fax (212) 356-0420.

·22-25, **ProPak Asia 97—The 7th International Food Processing & Packaging Technology Exhibition,** Queen Sirikit National Convention Centre, Bangkok, Thailand. ProPak Asia 97 is not just for food processing and packaging. Other important themes within the exhibition are canning & canmaking, pharmaceutical processing and packaging, brewing, and seafood. For further information, contact Overseas Exhibition Services Ltd., 11 Manchester Square London W1M 5AB, United Kingdom; Tel: +44 (0) 171 486 1951; fax +44 (0) 171 413 8277.

·27-28, **HACCP Train the Trainer,** Guelph. The HACCP Train the Trainer program is designed to equip HACCP team members in food processing workplaces with the knowledge and skills to be effective trainers in their own facilities. For further information, contact the Office of Open Learning at (519) 767-5000 or fax (519) 767-1114.

·28-30, **Food Process Automation Workshop.** For information, contact The World Wide Web at http://www.foodsci.purdue.edu/ or Gwen Shoemaker, Food Science Department, 1160 Smith Hall, Purdue University, West Lafayette, IN 47907; phone (317) 494-8270; e-mail: shoemake@foodsci.purdue.edu.

JUNE

·2-6, **Fundamentals of Workplace Safety, OSHA's 30-Hour Voluntary Compliance Program,** Manhattan, KS. You will learn to write, develop, and implement OSHA's required written programs. Impact the safety and health of your employees, reduce workers compensation cost, and increase productivity and profits. For further information contact, AIB, 1213 Bakers Way, Manhattan, KS 66502; phone (913) 537-4750; (800) 633-5137; fax (913) 537-1493.

·3-6, **Wet Milling,** Champaign, IL. For more information, contact the AACC Short Course Department, 3340 Pilot Knob Road, St. Paul, MN 55121-2097; phone (612) 454-7250; fax (612) 454-0766; e-mail: aacc@scisoc.org.

·4-10, **Food Microbiology and Safety: International Perspective,** at the University of Wisconsin - River Falls, River Falls, WI. The course consists of lectures, case studies and laboratory work to accomplish training in microbiological sampling, method validations, and quality assurance in food microbiology laboratory based on fundamentals of microbial ecology, risk assessment, and predictive microbiology. This course is designed for those who need to be familiar with current issues dealing with microbiological quality and safety of foods. For further information, contact The UWRF/Eijkman Foundation Food Microbiology course, Animal and Food Science Department, University of Wisconsin - River Falls, 410 S. 3rd St., River Falls, WI 54022; phone (715) 425-3150; fax (715) 425-3372.

·8-10, **Distribution & Logistics Conference,** "Scorecarding Supply Chain Management," at the Windsor Court Hotel in New Orleans, LA. Sponsored by the American Frozen Food Institute. For more information, contact Traci Carneal at (703) 821-0770.

·10-11, **Sanitation and HACCP Workshop,** Atlanta, GA. During this workshop the latest issues facing the food industry will be examined, including: management systems for product safety, principles of HACCP, the need to maintain customer relations by establishing essential programs intended to meet their expections. For additional information, or to enroll, please contact AIB, 1213 Bakers Way, Manhattan, KS 66502; or phone (913) 537-4750; fax (913) 537-1493.

·12, **Basics of Microbiology, Food Safety and Extended Shelf-Life,** Guelph Food Technology Centre, Guelph, Ontario. This one-day program will provide you with an understanding of: microbiological growth and factors which affect this growth. Understand pathogenic microorganisms and their control. Take steps to extend the shelf-life of your products and improve your company's profits. For further information, phone (519) 767-5036; fax (519) 836-1281; e-mail: gftc@uoguelph.ca.

·24-26, **Crystallization in Foods (Food Science Course),** Rutgers University, New Brunswick, NJ. For additional information, contact Keith Wilson, Office of Continuing Professional Education, Rutgers University-Cook College, P.O. Box 231, New Brunswick, NJ 08903-0231, or call (908) 932-9271.

JULY

·6-9, **IAMFES Annual Meeting,** in Orlando, FL at the Hyatt Regency Grand Cypress Hotel. Advancing food protection worldwide with over 200 presentations and posters on the latest issues and research on food safety. Registration materials available in this issue of *DFES* on page 124, or call (800) 369-6337; (515) 276-3344; fax (515) 276-8655.

• **11-18, 17th International Workshop on Rapid Methods and Automation in Microbiology XVII,** in Manhattan, KS. A symposium will occur on July 11 and 12. Contact Daniel Y.C. Fung, telephone (913) 532-5654; fax (913) 532-5681; e-mail: DANFUNG @KSU.KSU.EDU.

• **20-23, 9th Australian Food Microbiology Conference,** to be held in Sydney. All inquiries regarding submission of papers, registration, exhibition participation or sponsorship may be directed to the Conference Secretariat at GPO Box 2609, Sydney NSW 2001, phone (02) 241 1478; fax (02) 251 3552, e-mail: reply@ icmsaust.com.au.

• **21-25, Principles of Corn Tortilla and Chip Production,** in Manhattan, KS. The seminar is designed to teach the latest in process technologies and approaches to produce corn-based products. The curriculum includes labs and lectures relating to the functions and effects of ingredients and their variations, product evaluation, troubleshooting and problem-solving techniques. For additional information, contact AIB, 1213 Bakers Way, Manhattan, KS 66502 or call (913) 537-4750; fax (913) 537-1493; e-mail: www.aibonline.org.

AUGUST

• **4-8, Applied Baking Science Seminar,** in Manhattan, KS sponsored by American Institute of Baking. Emphasis is on familiarizing participants with common baking laboratory analytical equipment and understanding what the resulting data really means. For additional information, contact AIB, 1213 Bakers Way, Manhattan, KS 66502 or call (913) 537-4750; fax (913) 537-1493.

SEPTEMBER

• **9-10, Workplace Safety Seminar,** Philadelphia, PA. This seminar is designed to translate OSHA's complex regulatory requirements into understandable language that can be used in a workplace setting. For additional information or to enroll, contact AIB Worker Safety, 1213 Bakers Way, Manhattan, KS 66502, or call (913) 537-4750; fax (913) 537-1493.

OCTOBER

• **18-22, National Frozen Food Convention,** at Bally's Hotel in Las Vegas, NV. Co-sponsored by American Frozen Food Institute and National Frozen Food Association. For more information, contact Traci Carneal, AFFI at (703) 821-0770; or NFFA at (717) 657-8601.

• **22-24, Food Microbiology Symposium and Workshop,** at The University of Wisconsin - River Falls, River Falls, WI. The University of Wisconsin - River Falls will hold a symposium entitled "Current Concepts in Foodborne Pathogens and Rapid and Automated Methods in Food Microbiology." A Rapid Methods in Food Microbiology workshop designed to provide practical demonstrations and discussion of various tests and instruments available for rapid detection, isolation and characterization of foodborne pathogens and toxins as well as prediction of shelf-life and checking hygiene and sanitation in food processing facilities is also scheduled. For additional information contact: Dr. Purnendu C. Vasavada, Animal and Food Science Department, University of Wisconsin-River Falls, River Falls, WI 54022; phone (715) 425-3150; fax (715) 425-3785; Internet: Purnendu.C.Vasavada @uwrf.edu.

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This is Your Personal Invitation to Join

The International Association of Milk, Food and Environmental Sanitarians, founded in 1911, is a non-profit educational association of food protection professionals. The IAMFES is dedicated to the education and service of its members, specifically, as well as industry personnel in general. Through membership in the Association, IAMFES members are able to keep informed of the latest scientific, technical and practical developments in food protection. IAMFES provides its members with an information network and forum for professional improvement through its two scientific journals, educational annual meeting and interaction with other food safety professionals.

Who are IAMFES Members?

The Association is comprised of a diverse membership of over 3,200 from 75 nations. IAMFES members belong to all facets of the food protection arena. The main groups of Association members fall into three categories: Industry Personnel, Government Officials and Academia.

Why are They IAMFES Members?

The diversity of its membership indicates that IAMFES has something to offer everyone involved in food protection and public health.

Your Benefits as an IAMFES Member

Dairy, Food and Environmental Sanitation — Published monthly, this is the official journal of IAMFES. Its purpose is the disseminating of current information of interest to the general IAMFES membership. Each issue contains three to five informational applied research or general interest articles, industry news and events, association news, columns on food safety and environmental hazards to health, a food and dairy industry related products section, and a calendar of upcoming meetings, seminars and workshops. All regular IAMFES members receive this publication as part of their membership.

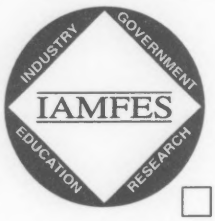
Journal of Food Protection — A refereed monthly publication of scientific research and authoritative review articles. Each issue contains 15 to 20 technical research manuscripts and one to five articles reporting a wide variety of microbiological research pertaining to food safety and quality. The *Journal of Food Protection* is internationally recognized as the leading publication in the food and dairy microbiology field. This journal is available to all individuals who request it with their membership.

The IAMFES Annual Meeting — Held in a different city each year, the IAMFES Annual Meeting is a unique educational event. Three days of technical sessions, scientific symposia and commercial exhibits provide members and other industry personnel with over 200 presentations on the most current topics in food protection. It offers the opportunity to discuss new technologies and innovations with leading authorities in various fields concerned with food safety. IAMFES members receive a substantially reduced registration fee.

To Find Out More...

To learn more about IAMFES and the **many** other benefits and opportunities available to you as a member, please call (515) 276-3344 or (800) 369-6337; fax (515) 276-8655.

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



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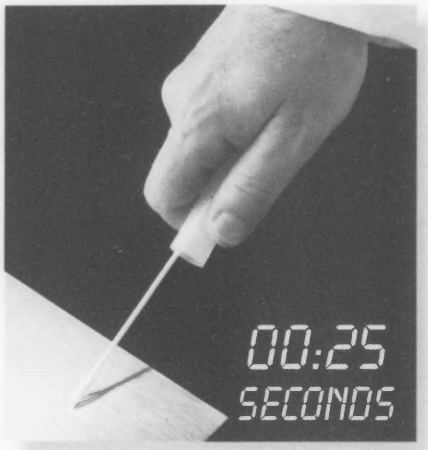

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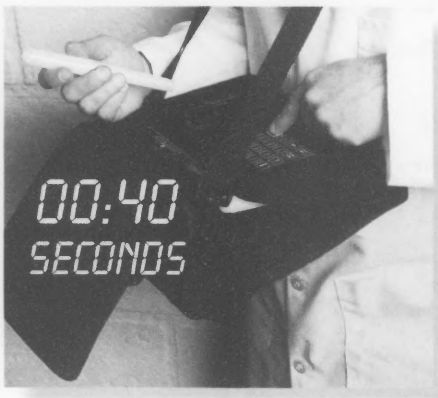

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