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ARTICLES

Phosphorus Reduction in Dairy Wastes by Conservation of Burst Rinses ............................................... 72
    William L. Wendorff, Sarah J. Westphal, and Jenny C. Y. Yau

HACCP Verification Procedures Made Easier by Quantitative Listeria Testing........................................ 76
    Barbara Ariel Kohn, Katherine Costello, and Alisa Brookins Phillips

Pasteurized Milk Sedimentation Defect — A History Lesson .............................................................. 81
    April J. Pontius, John E. Rushing, and Peggy M. Foegeding

ASSOCIATION NEWS

Sustaining Members ................................................................................................................................. 67
Off the Top From the President ............................................................................................................. 70
New IAMFES Members .......................................................................................................................... 87

DEPARTMENTS

Federal Register ........................................................................................................................................ 86
Updates .................................................................................................................................................... 88
News ....................................................................................................................................................... 90
Industry Products ................................................................................................................................. 94
Business Exchange ................................................................................................................................ 97
Coming Events ...................................................................................................................................... 126
Advertising Index ............................................................................................................................... 129

EXTRAS

3-A Holders' List .................................................................................................................................. 99
IAMFES 84th Annual Meeting Preview ............................................................................................... 118
IAMFES Booklet Order Form ............................................................................................................ 130
IAMFES Membership Application ....................................................................................................... 132

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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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Registration forms are available on pages 124 and 125.
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

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

1Means 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 681 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 1135-1 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.

February 1997 - Dairy, Food and Environmental Sanitation 73
TABLE 2. Total phosphorus and milk product recovered in burst rinses from 1135-liter processing tank

<table>
<thead>
<tr>
<th>Milk product</th>
<th>Milk product recovered (kg)</th>
<th>Total phosphorus recovered (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole milk</td>
<td>4.33</td>
<td>4.19</td>
</tr>
<tr>
<td>Skim milk</td>
<td>3.05</td>
<td>3.13</td>
</tr>
<tr>
<td>1% chocolate milk</td>
<td>3.59</td>
<td>3.67</td>
</tr>
<tr>
<td>18% cream</td>
<td>4.72</td>
<td>3.84</td>
</tr>
<tr>
<td>Ice cream mix</td>
<td>6.99</td>
<td>3.62</td>
</tr>
</tbody>
</table>

1Means of five replicates for each milk product.

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

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

1Means 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 cm² of surface area for whole milk whereas burst rinses from the tankers averaged 2.94 g of milk/100 cm². 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 cm² 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

<table>
<thead>
<tr>
<th>Product</th>
<th>Product loss in cleaning (g)</th>
<th>Product in burst rinse (g)</th>
<th>Reduction in product loss (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole milk</td>
<td>3.00</td>
<td>2.10</td>
<td>70.1</td>
</tr>
<tr>
<td>Skim milk</td>
<td>2.50</td>
<td>1.87</td>
<td>74.8</td>
</tr>
<tr>
<td>1% chocolate milk</td>
<td>3.97</td>
<td>2.49</td>
<td>62.7</td>
</tr>
<tr>
<td>Half and half</td>
<td>2.14</td>
<td>0.90</td>
<td>59.3</td>
</tr>
<tr>
<td>Heavy whipping cream</td>
<td>1.52</td>
<td>1.03</td>
<td>67.5</td>
</tr>
<tr>
<td>Ice cream mix</td>
<td>5.65</td>
<td>3.15</td>
<td>55.6</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Product</th>
<th>Total P loss in cleaning (mg)</th>
<th>Total P in burst rinse (mg)</th>
<th>Reduction in total P loss (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole milk</td>
<td>2.89</td>
<td>2.00</td>
<td>69.3</td>
</tr>
<tr>
<td>Skim milk</td>
<td>2.50</td>
<td>1.92</td>
<td>76.9</td>
</tr>
<tr>
<td>1% chocolate milk</td>
<td>4.06</td>
<td>2.53</td>
<td>62.5</td>
</tr>
<tr>
<td>Half and half</td>
<td>2.02</td>
<td>1.16</td>
<td>57.7</td>
</tr>
<tr>
<td>Heavy whipping cream</td>
<td>0.98</td>
<td>0.72</td>
<td>73.3</td>
</tr>
<tr>
<td>Ice cream mix</td>
<td>2.92</td>
<td>2.39</td>
<td>81.8</td>
</tr>
</tbody>
</table>

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.

ACKNOWLEDGMENTS

The authors express their appreciation to the dairy plants and personnel who assisted in the application of burst rinses in the tanker and processing tank studies. This research was supported in part by the College of Agriculture and Life Sciences.

REFERENCES


AUTHOR INFORMATION

*Department of Food Science, University of Wisconsin-Madison, Madison, WI 53706; telephone (608) 263-2015.
HACCP Verification
Procedures Made Easier by Quantitative Listeria Testing
Barbara Ariel Kohn,* Katherine Costello, and Alisa Brookins Phillips

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 identifying 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.
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 effectiveness 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, MD). 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).
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 cm². 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.,
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 sheer 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 sheer 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 sheer, where even rigorous sanitizing was not fully effective until a heat treatment was included. The automated sheer 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 ListetTest. As sanitizing procedures were applied, the number of *Listeria* spp. present, at first, decreased but 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 ListetTest, 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 ListetTest results is 24 h.

Both the speed and the quantitative nature of ListetTest 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 ListetTest's speed and sensitivity, which has already resulted in successful application to food testing (4).

**ACKNOWLEDGMENTS**

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**REFERENCES**


**AUTHOR INFORMATION**

*Vicam, 313 Pleasant Street, Watertown, MA 02172; telephone (617) 926-7045.*
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.

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
Pasturized 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.

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

<table>
<thead>
<tr>
<th>Heat treatment</th>
<th>Milk sample</th>
<th>None</th>
<th>6.6°C</th>
<th>7.1°C</th>
<th>7.6°C</th>
<th>Sediment appearance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>1d (5/5)</td>
<td>1d (5/5)</td>
<td>1d (5/5)</td>
<td>1d (5/5)</td>
<td>tan to dark tan; 50-90mm</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>1d (3/5)</td>
<td>1d (4/5)</td>
<td>1d (4/5)</td>
<td>1d (2/5)</td>
<td>initially white, then 5d (5/5) darkening by 2nd week; 25-35mm</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>1d (5/5)</td>
<td>1d (5/5)</td>
<td>1d (5/5)</td>
<td>1d (5/5)</td>
<td>tan to dark tan; 55-75mm</td>
</tr>
</tbody>
</table>

*Data presented are the day of observation and the ratio of the samples which showed sediment. The day of observation was the first day sediment was noted.

*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 1500x 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

<table>
<thead>
<tr>
<th>Sample</th>
<th>Centrifuged</th>
<th>Control (not centrifuged)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Centrifuged</td>
<td>Control (not centrifuged)</td>
</tr>
<tr>
<td>A1 - heated</td>
<td>day 4</td>
<td>day 1</td>
</tr>
<tr>
<td></td>
<td>2/3</td>
<td>3/3</td>
</tr>
<tr>
<td></td>
<td>6 mm</td>
<td>71 mm</td>
</tr>
<tr>
<td>A1 - unheated</td>
<td>day 2</td>
<td>day 1</td>
</tr>
<tr>
<td></td>
<td>1/3</td>
<td>3/3</td>
</tr>
<tr>
<td></td>
<td>day 3</td>
<td>55 mm</td>
</tr>
<tr>
<td></td>
<td>2/3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>day 4</td>
<td>3/3</td>
</tr>
<tr>
<td></td>
<td>11 mm</td>
<td></td>
</tr>
<tr>
<td>B1 - heated</td>
<td>day 7</td>
<td>day 1</td>
</tr>
<tr>
<td></td>
<td>0/3</td>
<td>3/3</td>
</tr>
<tr>
<td></td>
<td>40 mm</td>
<td></td>
</tr>
<tr>
<td>B1 - unheated</td>
<td>day 7</td>
<td>day 1</td>
</tr>
<tr>
<td></td>
<td>0/3</td>
<td>3/3</td>
</tr>
<tr>
<td></td>
<td>49 mm</td>
<td></td>
</tr>
<tr>
<td>C1 - heated</td>
<td>day 7</td>
<td>day 2</td>
</tr>
<tr>
<td></td>
<td>0/3</td>
<td>3/3</td>
</tr>
<tr>
<td></td>
<td>29 mm</td>
<td></td>
</tr>
<tr>
<td>C1 - unheated</td>
<td>day 7</td>
<td>day 1</td>
</tr>
<tr>
<td></td>
<td>0/3</td>
<td>1/3</td>
</tr>
<tr>
<td></td>
<td>day 2</td>
<td>3/3</td>
</tr>
<tr>
<td></td>
<td>31 mm</td>
<td></td>
</tr>
</tbody>
</table>

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. Psychrophilts 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).

REFERENCES

ACKNOWLEDGMENTS
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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 damper 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.
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 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.
AUSTRALIA
L. D’Arrietta
Environmental Health Services
Miami Q.

BELGIUM
De Zutter Lieven
University of Ghent, Merelbeke

CANADA
Linda Paron
Nestle Enterprises Ltd.
Scarborough, Ontario

FRANCE
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SOUTH AFRICA
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Sea Harvest Corp. (PTY) Ltd.
Saldanha, R. South

YUGOSLAVIA
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Veterinary Faculty, Beograd

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F & A Dairy, Newman

Glenn Lewis
F & A Dairy, Newman

COLORADO
Becky Corey
The Industrial Laboratories Co.
Denver

GEORGIA
Pamela Castleberry
Seaboard Farms of Elberton
Elberton

ILLINOIS
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Olmarc Packaging, Franklin Park
Gary Kuhlmann
Prairie Farms Dairy, Springfield

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MASSACHUSETTS
John Blachard
The Foxboro Company, Foxboro

MINNESOTA
Barbara Harter
Apple Valley

MICHIGAN
Linda Weller
The City of Detroit

MISSOURI
Collette Schultz Kaster
PSF, Milan

NEW JERSEY
Carmine Caapuccio
County of Bergen, Hackensack

NEW YORK
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Stewart’s Processing
Saratoga Springs

OHIO
Dawn Hentges
Bowling Green State University
Bowling Green

PENNSYLVANIA
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Winpak Portion Packaging
Bristol

TENNESSEE
Tomeka L. Fisher
University TN-Food Sci. & Tech.
Knoxville

WISCONSIN
Terry Lensmire
Land O Lakes, Inc., Kiel
UpDates

USDA Microbiologist Wins Presidential Award

Paina 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 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 wastewa
ter 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 wastewa
ter into a liquid manure system. "If you don't have and can't afford a liquid manure system, milk house wastewa
ter 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

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
News, continued

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."
Industry Products

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

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

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

The publishers do not warrant, either expressly or by implication, the factual accuracy of the products or descriptions herein, nor do they so warrant any views or opinions offered by the manufacturer of said articles and products.
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.

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.

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 ±0.001gm/cc (i.e. 0.1% for liquids with densities similar to water).

Solartron, Inc., Houston, TX
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, straightforward 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

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

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

Reader Service No. 153

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For testing all differential controls on H.T.S.T. pasteurizers
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The Crombie Company
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815-726-1683 (Voice & FAX)

*U.S. Pat. No. 4,380,166
**Adapters may be ordered separately - fit all previous models.

FDA DOCUMENTS
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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
Bold and capitalized words are charged as two words. Area code and phone number count as one word. All in-line business exchange ads must be paid in advance. $20.00 per ad minimum charge.

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.
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.
# 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.

<table>
<thead>
<tr>
<th>01-07 Storage Tanks for Milk and Milk Products</th>
<th>02-08 A1 Pumps for Milk and Milk Products</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2</strong> APV Crepaco, Inc. 100 South CP Avenue Lake Mills, Wisconsin 53551</td>
<td><strong>793</strong> Ampco Pumps Co. 4000 W. Burnham Street Milwaukee, Wisconsin 53215</td>
</tr>
<tr>
<td><strong>28</strong> Waukesha Cherry-Burrell (A United Dominion Company) 575 E. Mill Street Little Falls, New York 13365</td>
<td><strong>214R</strong> Ben H. Anderson Manufacturers Box A Morrisonville, Wisconsin 53571</td>
</tr>
<tr>
<td><strong>117</strong> DCI, Inc. P.O. Box 1227, 600 No. 54th Avenue St. Cloud, Minnesota 56301</td>
<td><strong>212R</strong> Babson Brothers Company Dairy Systems Division 1400 West Gale Galesville, Wisconsin 54630</td>
</tr>
<tr>
<td><strong>76</strong> Damrow Company 196 Western Avenue, P.O. Box 750 Fond du Lac, Wisconsin 54936-0750</td>
<td><strong>205R</strong> Boumatic 1919 S. Stoughton Road P.O. Box 8050 Madison, Wisconsin 53716</td>
</tr>
<tr>
<td><strong>127</strong> Paul Mueller Co. P.O. Box 828 Springfield, Missouri 65801</td>
<td><strong>739</strong> CSF Inox S.P.A. Strada per Bibbiano 7 - Montecchio E. (RE) Italy (U.S. Rep.: Sanchelima Intl. 1781-83 N.W. 93rd Avenue Miami, Florida 33172)</td>
</tr>
<tr>
<td><strong>440</strong> Scherping Systems 801 Kinglesy Street Winsted, Minnesota 55395</td>
<td><strong>709</strong> Conexiones Inoxidables 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)</td>
</tr>
<tr>
<td><strong>571</strong> Viatec Process Incorporated 500 Reed Street Belviding, Michigan 48809</td>
<td><strong>793</strong> Conexiones Inoxidables 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)</td>
</tr>
<tr>
<td><strong>31</strong> Walker Stainless Equipment Co., Inc. Elroy, Wisconsin 53929</td>
<td><strong>671</strong> Flowtech, Inc. 1900 Lake Park Drive Smyrna, Georgia 30080</td>
</tr>
</tbody>
</table>

**02-08 A1 Pumps for Milk and Milk Products**

| **63R** APV Fluid Handling–Americas 100 South CP Avenue Lake Mills, Wisconsin 53551 | **820** Drum Industries, Inc. 2501 Constant Comment Place Louisville, Kentucky 40299 (Mfg. by: Alfa Laval Pumps, LTD Eastbourne East Sussex England BN 23 6PQ) |
| **830** APV Fluid Handling–Americas 100 South CP Avenue Lake Mills, Wisconsin 53551-1799 | **671** Flowtech, Inc. 1900 Lake Park Drive Smyrna, Georgia 30080 |
| **858** APV Fluid Handling–Americas 100 South CP Avenue Lake Mills, Wisconsin 53551-1799 | **466** Fluid Metering, Inc. 29 Orchard Street Oyster Bay, New York 11771 |
| **636** Abel Pumps Corporation 79 North Industrial Park 511 North Avenue Sewickley, Pennsylvania 15143-2339 (Mfg: Abel Pumps Buchen, Germany) | |
828 Flux Pumps Corp.  
4430 Commerce Circle  
Atlanta, Georgia 30336  
(Mfg. by: Flux Geraete GmbH  
Talweg 12  
D75433 Maulbronn  
Germany)

306 Fristam Pumps, Inc.  
2410 Parview Road  
Middleton, Wisconsin 53562

4430 Commerce Circle  
Atlanta, Georgia 30336  
(Mfg. by: Flux Geraete GmbH  
Talweg 12  
D75433 Maulbronn  
Germany)

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

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

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

887 seepeX, Inc.  
1834 Valley Street  
Dayton, Ohio 45404  
(Mfg. by: seepeXer GmbH + Co.  
Scharnholzstrasse 344  
D-46240 Bottrop, Germany)

100 Dairy, Food and Environmental Sanitation – FEBRUARY 1997
567 Stainless Products, Inc.  
1649-72nd Avenue  
P.O. Box 169  
Somers, Wisconsin 53171  
(4/4/89)  

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

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

72R L.C. Thomsen Inc.  
1305-43rd Street  
Kenosha, Wisconsin 53140  
(8/14/57)  

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

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

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

52R Viking Pump, Inc.  
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)  
(12/31/56)  

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

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

379 Brenner Tank Mauston, Inc.  
N. 3760 Hwy. 12 & 16  
Mauston, Wisconsin 53948  
(3/15/83)  

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

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

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

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

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

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

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

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

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

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

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

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

390 American Lewa, Inc.  
132 Hopping Brook Road  
Holliston, Massachusetts 01746  
(Mfg. by: Lewa, Germany)  
(6/9/83)  

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

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

558 Niro Soavi S.p.A.  
43100 Parma (Italy)  
VIA M. Da Erba Edoar, 29/A  
(1/3/89)  

(Distributed in the U.S. by:  
Niro Hudson, Inc.  
1600 Country Road F  
Hudson, Wisconsin 54016)  
(8/25/95)  

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

847 Stork Food Machinery  
Airport Parkway  
Box 1258  
Gainesville, Georgia 30503  
(Mfg. by: Stork Amsterdam B.V.  
Ketelstraat 2  
021 JX Amsterdam  
The Netherlands)  
(12/29/57)  

847 Stork Food Machinery  
Airport Parkway  
Box 1258  
Gainesville, Georgia 30503  
(Mfg. by: Stork Amsterdam B.V.  
Ketelstraat 2  
021 JX Amsterdam  
The Netherlands)  
(12/29/57)  

87 Waukesha Cherry-Burrell  
(Fluid Handling Division)  
611 Sugar Creek Road  
Delavan, Wisconsin 53115  

FEBRUARY 1997 – Dairy, Food and Environmental Sanitation  101
10-03 Milk and Milk Products Filters Using Disposable Filter Media, as Amended

593 Filtration Systems
Div. of Mechanical Mfg. Corp.
10304 N.W. 50th Street
Sunrise, Florida 33351

704 Pall Trinity Micro Corp.
3643 State Route 281
Cortland, New York 13045-0930

720 R-P Products
Box 388, 407 Jefferson Street
Three Rivers, Michigan 49093

435 Semina International
771 Boul. Industriel
Blainville, Quebec Canada J7C 3V3
(U.S. Rep.: Edward W. Fox, Jr.
1201 W. Allen, No. 15
Bloomington, Iowa 47403)

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

880 AGC Engineering
8509 Quarry Road
Manassas, Virginia 22110

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

20 APV Heat Transfer Technologies
395 Fillmore Avenue
Tonawanda, New York 14150

120 Alfa-Laval, Agri, Inc.
11100 No. Congress Avenue
Kansas City, Missouri 64153

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

718 Babson Bros. Co.
Dairy Systems Div.
1400 West Gale Avenue
Galesville, Wisconsin 54630

30 Waukesha Cherry-Burrell
Process Equipment Division
P.O. Box 35600
Louisville, Kentucky 40232-5600

14 Chester-Jensen Co., Inc.
5th & Tilghman Sts., P.O. Box 908
Chester, Pennsylvania 19016

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

468 Niro, Inc. Evaporator Division
9165 Rumsey Road
Columbia, Maryland 21045-1991
(2/2/86)

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

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

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

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

279 The Schlueter Company
3410 Bell Street, P.O. Box 548
Janesville, Wisconsin 53547-0548
(Mfg. by: Samuel Parker, New Zealand)
(10/3/91)

650 Schmidt-Bretten, Inc.
380 E. Central Avenue
Bohemia, New York 11716

670 Flomax International, Ltd.
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
180-37th Street
Auburn, Washington 98001
(11/15/91)

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

610 Universal Dairy Equipment
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
2300 W. Marshall Drive
Grand Prairie, Texas 75051
(7/16/96)

438 APV Heat Transfer Tech.
395 Fillmore Avenue
Tonawanda, New York 14150
(12/10/84)

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

243 Babson Brothers Company
Dairy Systems Division
20903 West Gale Avenue
Galesville, Wisconsin 54630-0659

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

605 Waukesha Cherry-Burrell
Process Equipment Division
P.O. Box 35600
Louisville, Kentucky 40232-5600
(8/30/90)
<table>
<thead>
<tr>
<th>Company Name</th>
<th>Address</th>
<th>Phone</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chester-Jensen Co., Inc.</td>
<td>5th &amp; Tiglihan Sts., P.O. Box 908, Chester, Pennsylvania 19016</td>
<td>(6/6/58)</td>
<td></td>
</tr>
<tr>
<td>DASI Industries, Inc.</td>
<td>11200 Rockville Pike, Suite 300, Rockville, Maryland 20852</td>
<td>(3/17/95)</td>
<td>(Mfg. by: Sacome Incapsa 30001 Murcia Spain)</td>
</tr>
<tr>
<td>Efrem Corp.</td>
<td>11 Kitty Hawk Drive, Pittsford, New York 14534-1620</td>
<td>(12/27/90)</td>
<td></td>
</tr>
<tr>
<td>Enerquip, Inc.</td>
<td>611 North Road, P.O. Box 368, Medford, Wisconsin 54451</td>
<td>(2/24/93)</td>
<td></td>
</tr>
<tr>
<td>FMC Corporation-FranRica Systems</td>
<td>Stockton, California 95213-0127</td>
<td>(9/5/96)</td>
<td></td>
</tr>
<tr>
<td>Feldmeier Equipment, Inc.</td>
<td>6800 Town Line Road, P.O. Box 474, Syracuse, New York 13211</td>
<td>(1/28/85)</td>
<td></td>
</tr>
<tr>
<td>G &amp; H Products Corp.</td>
<td>P.O. Box 909, Pleasant Prairie, Wisconsin 53158-0909</td>
<td>(5/2/78)</td>
<td></td>
</tr>
<tr>
<td>Girton Manufacturing Co.</td>
<td>P.O. Box 900, Millville, Pennsylvania 17846</td>
<td>(1/31/71)</td>
<td></td>
</tr>
<tr>
<td>ITT Standard</td>
<td>175 Standard Parkway, P.O. Box 1102, Buffalo, New York 14240-1102</td>
<td>(1/4/91)</td>
<td></td>
</tr>
<tr>
<td>Kusel Equipment Co.</td>
<td>820 West Street, Watertown, Wisconsin 53094</td>
<td>(2/24/93)</td>
<td></td>
</tr>
<tr>
<td>Paul Mueller Co.</td>
<td>P.O. Box 828, Springfield, Missouri 65801</td>
<td>(6/28/72)</td>
<td></td>
</tr>
<tr>
<td>C. E. Rogers Co.</td>
<td>1895 Frontage Road, P.O. Box 118, Mora, Minnesota 55051</td>
<td>(3/31/64)</td>
<td></td>
</tr>
<tr>
<td>Scherping Systems</td>
<td>801 Kingsley Street, Winsted, Minnesota 55959</td>
<td>(6/8/88)</td>
<td></td>
</tr>
<tr>
<td>Stork Food Machinery, Inc.</td>
<td>P.O. Box 1258/Airport Parkway, Gainesville, Georgia 30503</td>
<td>(6/9/83)</td>
<td>(Mfg. by: Tetra Pak Stainless Equipment AB 925 E. Maple Road Birmingham, Michigan 48011)</td>
</tr>
<tr>
<td>Tetra Pak Processing Systems</td>
<td>P.O. Box 179, 8400 Lake View Parkway, Suite 500, Pleasant Prairie, Wisconsin 53158</td>
<td>(5/2/91)</td>
<td>(Mfg. by: Tetra Pak Stainless Equipment AB P.O. Box 64, Bruggaregatan 23, S-221 00 Lund, Sweden)</td>
</tr>
<tr>
<td>Thermotech/Div. of Fristam Pumps, Inc.</td>
<td>2410 Parview Road, Middleton, Wisconsin 53562</td>
<td>(2/8/91)</td>
<td></td>
</tr>
<tr>
<td>Yula Corporation</td>
<td>330 Bryant Avenue, Bronx, New York 10474</td>
<td>(6/4/91)</td>
<td></td>
</tr>
</tbody>
</table>

13-09 Farm Milk Cooling and Holding Tanks

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Address</th>
<th>Phone</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refinox S.A.</td>
<td>DE C.V.</td>
<td>(11/10/94)</td>
<td></td>
</tr>
<tr>
<td>U.S. Rep.: James Read</td>
<td>M. E. Stainless</td>
<td>601 High Plain Drive</td>
<td>Bel Air, Maryland 21014</td>
</tr>
<tr>
<td>Alfa Laval Agr, Inc.</td>
<td>11100 North Congress Avenue</td>
<td>Kansas City, Missouri 64153</td>
<td></td>
</tr>
<tr>
<td>Babson Brothers Company</td>
<td>Dairy Systems Division</td>
<td>P.O. Box 659, Galesville, Wisconsin 54630</td>
<td>(Mfg. by: Paul Mueller Co. 1600 West Phelps Street Springfield, Missouri 65801)</td>
</tr>
<tr>
<td>Dairy Equipment Co.</td>
<td>1919 S. Stoughton Road</td>
<td>Madison, Wisconsin 53716</td>
<td></td>
</tr>
<tr>
<td>Heavy Duty Products (Preston) Ltd.</td>
<td>1261 Industrial Road</td>
<td>Cambridge (Preston), Ontario, Canada N3H 4W3</td>
<td>(Not available in the U.S.A.)</td>
</tr>
<tr>
<td>Paul Mueller Co.</td>
<td>1600 W. Phelps, P.O. Box 828, Springfield, Missouri 65801</td>
<td>(7/3/56)</td>
<td></td>
</tr>
<tr>
<td>Universal Dairy Equipment</td>
<td>11100 N. Congress Avenue</td>
<td>Kansas City, Missouri 64153</td>
<td>(Mfg. by: Alfa Laval Agr Inc. Kansas City, Missouri 64153-1296)</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Address</th>
<th>Phone</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>APV Anhydro</td>
<td>182 Wales Avenue</td>
<td>New York 14150</td>
<td></td>
</tr>
<tr>
<td>Contherm, Inc.</td>
<td>P.O. Box 352, 111 Parker Street</td>
<td>Newburyport, Massachusetts 01950</td>
<td></td>
</tr>
<tr>
<td>Dedert Corporation</td>
<td>20000 Governors Drive</td>
<td>Olympia Fields, Illinois 60461</td>
<td></td>
</tr>
<tr>
<td>Marriott Walker Corp.</td>
<td>925 E. Maple Road</td>
<td>Birmingham, Michigan 48011</td>
<td></td>
</tr>
<tr>
<td>Niro Evaporators, Inc.</td>
<td>(Formerly Niro Atomizer Food and Dairy)</td>
<td>9165 Runsey Road</td>
<td>Columbia, Maryland 21045</td>
</tr>
<tr>
<td>Niro-Sterner, Inc.</td>
<td>421-6th Street South</td>
<td>Winsted, Minnesota 55395</td>
<td></td>
</tr>
<tr>
<td>C.E. Rogers Co.</td>
<td>P.O. Box 118</td>
<td>Mora, Minnesota 55051</td>
<td></td>
</tr>
<tr>
<td>Stork Food Machinery, Inc.</td>
<td>P.O. Box 1258/Airport Parkway, Gainesville, Georgia 30503</td>
<td>(9/6/66)</td>
<td></td>
</tr>
<tr>
<td>Niro-Stemer, Inc.</td>
<td>421-6th Street South</td>
<td>Winsted, Minnesota 55395</td>
<td></td>
</tr>
<tr>
<td>C.E. Rogers Co.</td>
<td>P.O. Box 118</td>
<td>Mora, Minnesota 55051</td>
<td></td>
</tr>
<tr>
<td>Stork Food Machinery, Inc.</td>
<td>P.O. Box 1258, Airport Parkway Gainesville, Georgia 30503</td>
<td>(11/16/77)</td>
<td></td>
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</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Address</th>
<th>Phone</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autoprod, Inc.</td>
<td>5355 115th Avenue N.</td>
<td>Clearwater, Florida 34620</td>
<td>(9/15/83)</td>
</tr>
<tr>
<td>Company Name</td>
<td>Address</td>
<td>Contact Information</td>
<td></td>
</tr>
<tr>
<td>--------------</td>
<td>---------</td>
<td>---------------------</td>
<td></td>
</tr>
<tr>
<td>Combibloc, Inc.</td>
<td>4800 Roberts Road, Columbus, Ohio 43228</td>
<td>Mfg. by: PKL Verpackungsystems, Germany</td>
<td></td>
</tr>
<tr>
<td>Evergreen Packaging</td>
<td>2400-6th Street S.W., P.O. Box 3000, Cedar Rapids, Iowa 52406</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BWI Fords Holmatic, Inc.</td>
<td>1750 Corporate Drive, Suite 700, Norcross, Georgia 30093</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hassia Verpackungsmaschinen GmbH</td>
<td>63691 Ranstadt 1/Hessen Germany</td>
<td>Hassia U.S.A., Inc. 39 Plymouth Street, Fairfield, New York 07007</td>
<td></td>
</tr>
<tr>
<td>International Paper Company</td>
<td>6238 Tri Ridge Boulevard, Loveland, Ohio 45140</td>
<td>Liquid Pkg. Division</td>
<td></td>
</tr>
<tr>
<td>Kvaliteitsproduktion AB</td>
<td>S-693 29 Degerfors, Sweden</td>
<td>(U.S. Rep.: Flowtech, Inc. 1900 Lake Park Drive, Ste. 345 Smyrna, Georgia 30080)</td>
<td></td>
</tr>
<tr>
<td>LEJDER-Maschinenbau GmbH &amp; Co. KG</td>
<td>Postfach 1252/Im Laab 3, 3033 Schwarzmstedt, Germany</td>
<td>(U.S. Rep.: Leider Machines N.A. Woodcock Mountain Drive, Washingtonville, New York 10992)</td>
<td></td>
</tr>
<tr>
<td>Milliken Packaging</td>
<td>White Stone, South Carolina 29353</td>
<td>(Mfg. by: Chubukikai, Japan)</td>
<td></td>
</tr>
<tr>
<td>Milliken Packaging</td>
<td>White Stone, South Carolina 29386</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elopak, Inc.</td>
<td>3000 South Hill Road, New Hudson, Michigan 48165</td>
<td>(10/17/62)</td>
<td></td>
</tr>
<tr>
<td>Purity Packaging Corp.</td>
<td>800 Kaderly Road, Columbus, Ohio 43228</td>
<td>(Mfg. by: Purity Packaging Corp. 25 Ayler Street, Peterborough, Ontario, Canada K9J 6Y8)</td>
<td></td>
</tr>
<tr>
<td>Septipack, Inc.</td>
<td>2313 Benson Mill Road, Sparks, Maryland 21159</td>
<td>(Mfg. by: ARG1 4, Avenue de l'Europe, ZAC des Hawks de Chatou, 78402 Chatou Cedex, France)</td>
<td></td>
</tr>
<tr>
<td>Serac, Inc.</td>
<td>300 Westgate Drive, Carol Stream, Illinois 60188</td>
<td>(8/25/86)</td>
<td></td>
</tr>
<tr>
<td>Shikoku Kakoki Co., Ltd.</td>
<td>No. 10-01 Nishinokawa Tarahachisu, Kitajima-Chi Itanogun, Tokushima, Japan (U.S. Rep.: Elopak, Inc. 3000 South Hill Road, New Hudson, Michigan 48165)</td>
<td>(6/8/92)</td>
<td></td>
</tr>
<tr>
<td>Tetra Pak, Inc.</td>
<td>909 Asbury Drive, Buffalo Grove, Illinois 60089</td>
<td>(Mfg. by: A. B. Tetra, Italy)</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Address</th>
<th>Contact Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>APV Crepaco, Inc.</td>
<td>100 South CP Avenue, Lake Mills, Wisconsin 53551</td>
<td></td>
</tr>
<tr>
<td>Waukesha Cherry-Burrell Corp.</td>
<td>7711 95th Street, P.O. Box 0902, Pleasant Prairie, Wisconsin 53158-0902</td>
<td>(Mfg. by: Tetra Laval Food Hoyer Denmark)</td>
</tr>
<tr>
<td>Tetra Laval Food Hoyer</td>
<td>1349 Inwood Avenue, Bronx, New York 10452</td>
<td></td>
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**22-05 Silo-type Storage Tanks for Milk and Milk Products**

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Address</th>
<th>Contact Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>APV Crepaco, Inc.</td>
<td>100 South CP Avenue, Lake Mills, Wisconsin 53551</td>
<td></td>
</tr>
<tr>
<td>Waukesha Cherry-Burrell Corp.</td>
<td>7711 95th Street, P.O. Box 0902, Pleasant Prairie, Wisconsin 53158-0902</td>
<td>(Mfg. by: Tetra Laval Food Hoyer Denmark)</td>
</tr>
<tr>
<td>Emery Thompson Machine &amp; Supply Co.</td>
<td>1349 Inwood Avenue, Bronx, New York 10452</td>
<td></td>
</tr>
</tbody>
</table>

**104 Dairy, Food and Environmental Sanitation – FEBRUARY 1997**
<table>
<thead>
<tr>
<th>Company Name</th>
<th>Address</th>
<th>Phone</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>APV Crepaco, Inc.</td>
<td>100 South CP Avenue, Lake Mills, Wisconsin 53551</td>
<td>(9/28/65)</td>
<td></td>
</tr>
<tr>
<td>Cryovac Division</td>
<td>W.R. Grace &amp; Co-Conn, P.O. Box 464, Duncan, South Carolina 29223-0464</td>
<td>(3/5/97)</td>
<td></td>
</tr>
<tr>
<td>Elmar Industries</td>
<td>200 Gould Avenue, P.O. Box 245, Buffalo, New York 14043-0245</td>
<td>(10/11/95)</td>
<td></td>
</tr>
<tr>
<td>Hayesan Manufacturing</td>
<td>225 Spartangreen Boulevard, Duncan, South Carolina 29334</td>
<td>(4/20/92)</td>
<td></td>
</tr>
<tr>
<td>Mateer-Burt Co., Inc.</td>
<td>434 Devon Park Drive, Wayne, Pennsylvania 19087</td>
<td>(7/22/85)</td>
<td></td>
</tr>
<tr>
<td>Phoenix Engineering &amp; Design Co.</td>
<td>4634 Case Drive, P.O. Box 1467, Janesville, Wisconsin 53546</td>
<td>(3/22/96)</td>
<td></td>
</tr>
<tr>
<td>Tetra Laval Food Hoyer, Inc.</td>
<td>201 Broad Street, Lake Geneva, Wisconsin 53147</td>
<td>(7/6/81)</td>
<td></td>
</tr>
<tr>
<td>Consolidated Biscuit Co.</td>
<td>312 Rader Road, McComb, Ohio 45858</td>
<td>(6/1/92)</td>
<td></td>
</tr>
<tr>
<td>Interbake Dairy Ingredients Div.</td>
<td>2821 Emerywood Parkway, Suite 210, Richmond, Virginia 23294</td>
<td>(7/10/91)</td>
<td></td>
</tr>
<tr>
<td>Jordan Manufacturing, Inc.</td>
<td>1688 County Road 192, Crossville, Alabama 35962</td>
<td>(2/23/94)</td>
<td></td>
</tr>
<tr>
<td>Osgood Industries, Inc.</td>
<td>601 Burbank Road, Oldsizmar, Florida 34677</td>
<td>(7/19/88)</td>
<td></td>
</tr>
<tr>
<td>Raplidak</td>
<td>1725 West 8th Street, Appleton, Wisconsin 54911</td>
<td>(3/5/92)</td>
<td></td>
</tr>
<tr>
<td>Raque Food Systems, Inc.</td>
<td>11002 Decimal Drive, Louisville, Kentucky 40299</td>
<td>(6/25/93)</td>
<td></td>
</tr>
<tr>
<td>Sweetheart Packaging</td>
<td>10100 Restertown Road, Owings Mills, Maryland 21117</td>
<td>(11/15/71)</td>
<td></td>
</tr>
<tr>
<td>World Cup Packaging Corporation</td>
<td>777 Progressive Lane, South Beloit, Illinois 61080</td>
<td>(9/20/96)</td>
<td></td>
</tr>
</tbody>
</table>

### 23-02 Equipment for Packaging Viscous Dairy Products

- **APV Crepaco, Inc.**
  - 100 South CP Avenue, Lake Mills, Wisconsin 53551
- **Cryovac Division**
  - W.R. Grace & Co-Conn, P.O. Box 464, Duncan, South Carolina 29223-0464
- **Elinar Industries**
  - 200 Gould Avenue, P.O. Box 245, Buffalo, New York 14043-0245
- **Hayssen Manufacturing**
  - 225 Spartangreen Boulevard, Duncan, South Carolina 29334
- **Mateer-Burt Co., Inc.**
  - 434 Devon Park Drive, Wayne, Pennsylvania 19087
- **Phoenix Engineering & Design Co.**
  - 4634 Case Drive, P.O. Box 1467, Janesville, Wisconsin 53546
- **Tetra Laval Food Hoyer, Inc.**
  - 201 Broad Street, Lake Geneva, Wisconsin 53147
- **Consolidated Biscuit Co.**
  - 312 Rader Road, McComb, Ohio 45858
- **Interbake Dairy Ingredients Div.**
  - 2821 Emerywood Parkway, Suite 210, Richmond, Virginia 23294
- **Jordan Manufacturing, Inc.**
  - 1688 County Road 192, Crossville, Alabama 35962
- **Osgood Industries, Inc.**
  - 601 Burbank Road, Oldsizmar, Florida 34677
- **Raplidak**
  - 1725 West 8th Street, Appleton, Wisconsin 54911
- **Raque Food Systems, Inc.**
  - 11002 Decimal Drive, Louisville, Kentucky 40299
- **Sweetheart Packaging**
  - 10100 Restertown Road, Owings Mills, Maryland 21117
- **World Cup Packaging Corporation**
  - 777 Progressive Lane, South Beloit, Illinois 61080

### 25-02 Non-coil Type Batch Pasteurizers for Milk and Milk Products

- **APV Crepaco, Inc.**
  - 100 South CP Avenue, Lake Mills, Wisconsin 53551
- **Waukesha Cherry-Burrell**
  - 575 E. Mill Street, Little Falls, New York 13365
- **DCI, Inc.**
  - P.O. Box 1227, 600 No. 54th Avenue, St. Cloud, Minnesota 56301
- **JayBee Precision, Inc.**
  - Kirk Pasture Road, P.O. Box 231, Bristol, New Hampshire 03222-0231
- **Paul Mueller Co.**
  - P.O. Box 828, Springfield, Missouri 65801
- **Walker Stainless Equipment**
  - 625 State Street, New Lisbon, Wisconsin 53950

### 26-03 Sifters for Dry Milk and Dry Milk Products

- **Andritz Sprout-Bauer**
  - 35 Sherman Street, Muncy, Pennsylvania 17756
- **Kason Corp.**
  - 67-71 East Willow Street, Millburn, New Jersey 07041
27-02 Equipment for Packaging Dry Milk and Dry Milk Products

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

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

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

625 Ishida Company, Ltd.
44, Sanno-Cho, Shogoin
Sakyo-Ku, Kyoto, Japan
(4/2/91)

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

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

497 Triangle Package Machinery Co.
6055 West Diversify Avenue
Chicago, Illinois 60635
(2/26/87)

28-03 Flow Meters for Milk and Milk Products

270 ABB Instrumentation, Inc.
P.O. Box 20550
Rochester, New York 14602-0550
(2/9/76)

272 Accurate Metering Systems, Inc.
1651 Wilkening Court
Schaumburg, Illinois 60173
(4/2/76)

253 Badger Meter, Inc.
4545 W. Brown Deer Road
P.O. Box 23099
Milwaukee, Wisconsin 53223
(1/2/74)

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

359 Brooks Instruments
Highway 301 North
Statesboro, Georgia 30458
(6/11/82)
683 SANIFAB
A Division of A&B Process Systems Corp.
P.O. Box 86
Stratford, Wisconsin 54484
(7/9/92)

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

852 Viacec, Inc.
500 Reed Street
Belding, Michigan 48809
(10/18/95)

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

33-01 Polished Metal Tubing for Dairy Products

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

812 A.T.I. s.r.l.
Viale Resegone 7
22036 Erba (Como)
Italy
(1/26/95)

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

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

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

308 Rath Manufacturing Co., Inc.
2505 Foster Avenue
Janesville, Wisconsin 53545
(6/20/78)

368 Rodger Industries Inc.
P.O. Box 186, R.R. 1
Blenheim, Ontario
Canada NOP 1A0
(Not available in the U.S.A.)
(10/7/82)

776 Siam Stainless Pipe
Fittings & Tubulars
Bangkok, Thailand
(U.S. Rep.: Kurt Orban Partners
Kurt Orban
450 Kings Road
Brisbane, California 94005)
(7/18/94)

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

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

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

34-02 Portable Bins

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

869 ADMIX, Inc.
23 Londonderry Road
Londonderry, New Hampshire 03053
(3/14/96)

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

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

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

825 GEI Processing, Inc.
Machines Collette
One Indian Lane East
Towaco, New Jersey 07082
(Mfg. by: Machines Collette N.V.
Keerbaan 70
B-2160 Wommelgem
Belgium)
(3/3/92)

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

642 Mondomix Howden B.V.
Reecweg 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)
(8/7/91)

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

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

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

36-00 Colloid Mills

808 Boston Shearpump, Inc.
P.O. Box 390161
Cambridge, Massachusetts 02139-9998
(12/16/94)

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

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

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

Dairy, Food and Environmental Sanitation - FEBRUARY 1997
<table>
<thead>
<tr>
<th>Company</th>
<th>Address</th>
<th>Phone Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABB Instrumentation, Inc.</td>
<td>1175 John Street, Rochester, New York 14602</td>
<td>(6/25/93)</td>
</tr>
<tr>
<td>Ametek/Mansfield &amp; Green Division</td>
<td>8600 Somerset Drive, Largo, Florida 34643</td>
<td>(10/13/89)</td>
</tr>
<tr>
<td>Ametek U.S. Gauge Division</td>
<td>820 Pennsylvania Boulevard, Feasterville, Pennsylvania 19053</td>
<td>(3/17/95)</td>
</tr>
<tr>
<td>Anderson Instrument Co., Inc.</td>
<td>156 Auriesville Road, Fultonville, New York 12072</td>
<td>(4/9/79)</td>
</tr>
<tr>
<td>Bindicator Company</td>
<td>1915 Dove Street, Port Huron, Michigan 48060</td>
<td>(11/20/91)</td>
</tr>
<tr>
<td>Chicago Stainless Equip.</td>
<td>511 Weston Ridge Drive, Naperville, Illinois 60563</td>
<td>(9/28/95)</td>
</tr>
<tr>
<td>Computer Instruments Corp.</td>
<td>1000 Shames Drive, Westbury, New York 11590</td>
<td>(4/3/92)</td>
</tr>
<tr>
<td>Bindicator Company</td>
<td>1915 Dove Street, Port Huron, Michigan 48060</td>
<td>(12/29/92)</td>
</tr>
<tr>
<td>DCT Instruments</td>
<td>1165 Chambers Road, Columbus, Ohio 43212</td>
<td>(4/13/95)</td>
</tr>
<tr>
<td>Delta Controls Corporation</td>
<td>585 Fortson Street, Shreveport, Louisiana 71107</td>
<td>(11/30/95)</td>
</tr>
<tr>
<td>Dresser Industries</td>
<td>Instrument Division, 250 East Main Street, Stratford, Connecticut 06617</td>
<td>(7/16/91)</td>
</tr>
<tr>
<td>Dresser Industries</td>
<td>Instrument Division, 210 Old Gate Lane, Milford, Connecticut 06460</td>
<td>(12/4/91)</td>
</tr>
<tr>
<td>Drexelbrook Engineering Co.</td>
<td>205 Keith Valley Road, Horsham, Pennsylvania 19044</td>
<td>(9/27/83)</td>
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<tr>
<td>Dwyer Instruments, Inc.</td>
<td>P.O. Box 37, Michigan City, Indiana 46360</td>
<td>(11/28/95)</td>
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<tr>
<td>Endress + Hauser, Inc.</td>
<td>2350 Endress Place, Greenwood, Indiana 46142</td>
<td>(10/17/85)</td>
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<tr>
<td>Eg &amp; G Flow Technology</td>
<td>4250 E. Broadway Road, Phoenix, Arizona 85040</td>
<td>(1/14/88)</td>
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<tr>
<td>Fisher-Rosemount Singapore</td>
<td>Private Limited, 1 Pandan Crescent, Singapore 0512</td>
<td>(5/14/96)</td>
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<tr>
<td>FMC Invalco, Inc.</td>
<td>12001 Technology Drive, Eden Prairie, Minnesota 55344</td>
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<td>ABB Instrumentation, Inc.</td>
<td>1175 John Street, Rochester, New York 14602</td>
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<td>Ametek/Mansfield &amp; Green Division</td>
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<td>12001 Technology Drive, Eden Prairie, Minnesota 55344</td>
<td>(12/6/85)</td>
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</table>
501 Lumenite Electronic Company
2331 N. 17th Avenue
Franklin Park, Illinois 60131

584 MTS Systems Corporation
Sensors Division
3001 Sheldon Drive
Cary, North Carolina 27513

595 Magnelot International
5300 Belmont Road
Downers Grove, Illinois 60515

627 Milltronics, Inc.
730 The Kingsway
Peterborough, Ontario
Canada K9J 7B1

597 NUOVA FIMA s.p.a.
Via C. Battisti 59
28045 - INVINIO (NO) Italy
(Not available in the U.S.A.)

563 PI Components Corp.
350 Loop 290 South
Brenham, Texas 77833

564 Princo Instruments, Inc.
1020 Industrial Highway
Southampton, Pennsylvania 18966-4095

815 Promag PM LTD
11552 Merchant Drive
Baton Rouge, Louisiana 70809

328 Rosemount, Inc.
12001 Technology Drive
Eden Prairie, Minnesota 55344

784 Sensotec, Inc.
1200 Chesapeake Avenue
Columbus, Ohio 43212-2288

515 Setra Systems, Inc.
45 Nagag Park
Acton, Massachusetts 01720

583 S. J. Controls, Inc.
2248 Obispo Avenue #203
Long Beach, California 90806

875 SOR
14685 W. 105th Street
Lenexa, Kansas 66215-5964

638 Span Instruments
P.O. Box 860709
Plano, Texas 75086-0709

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

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

765 Tri-Clover, Inc.
9201 Wilmot Road
Kenosha, Wisconsin 53141

754 Valmet Automation
30 Thomas Drive
Westbrook, Maine 04092

502 Dairy, Food and Environmental Sanitation — FEBRUARY 1997
### 44-01 Air Driven Diaphragm Pumps

<table>
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<th>Company</th>
<th>Contact Person</th>
<th>Address</th>
<th>Phone Number</th>
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<tr>
<td>713</td>
<td>Warren Rupp, Inc.</td>
<td>800 North Main Street, Mansfield, Ohio 44905</td>
<td>(2/5/93)</td>
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<tr>
<td>833</td>
<td>Wilden Pump &amp; Engr. Co.</td>
<td>22069 Van Buren Street, Grand Terrace, California 92315-5651</td>
<td>(6/22/95)</td>
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<tr>
<td>805</td>
<td>Tri-Clover</td>
<td>9201 Wilmont Road, Kenosha, Wisconsin 53141</td>
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### 45-00 Cross Flow Membrane Modules

<table>
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<th>Company</th>
<th>Contact Person</th>
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<tbody>
<tr>
<td>807</td>
<td>CeraMem Separations</td>
<td>12 Clematis Avenue, Waltham, Massachusetts 02154</td>
<td>(11/30/94)</td>
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<tr>
<td>813</td>
<td>Golden Technologies Co., Inc.</td>
<td>1697 Cole Boulevard, Suite 300, P.O. Box 4040, Golden, Colorado 80402</td>
<td>(2/2/95)</td>
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<tr>
<td>786</td>
<td>North Carolina SRT, Inc.</td>
<td>221 James Jackson Avenue, Cary, North Carolina 27513</td>
<td>(9/24/94)</td>
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### 46-00 (Refractometers and Optical Sensors)

<table>
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<th>Company</th>
<th>Contact Person</th>
<th>Address</th>
<th>Phone Number</th>
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</thead>
<tbody>
<tr>
<td>785</td>
<td>Bran &amp; Lubbe, Inc.</td>
<td>1025 Busch Parkway, Buffalo Grove, Illinois 60089</td>
<td>(9/2/94)</td>
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<tr>
<td>859</td>
<td>The Electron Machine Corp.</td>
<td>15820 CR 450 West, Umatilla, Florida 32784</td>
<td>(11/4/95)</td>
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<tr>
<td>800</td>
<td>Epsilon Industrial Inc.</td>
<td>2215 Grand Avenue Parkway, Austin, Texas 78728</td>
<td>(10/24/94)</td>
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<tr>
<td>783</td>
<td>James C. Camp</td>
<td>dba Advantec Process Systems, 95 WynGate Drive, Newnan, Georgia 30265</td>
<td>(9/2/94)</td>
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<tr>
<td>737</td>
<td>Katrina, Inc.</td>
<td>P.O. Box 418, 91 Western Maryland Parkway, Hagerstown, Maryland 21740</td>
<td>(6/17/93)</td>
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<tr>
<td>697</td>
<td>Liquid Solids Control, Inc.</td>
<td>P.O. Box 259, Farm Street, Upton, Massachusetts 01568</td>
<td>(10/21/92)</td>
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<tr>
<td>751</td>
<td>Maselli Misure S.P.A.</td>
<td>Via Baganza, 4/3, 43100 Parma, Italy</td>
<td>(1/20/94)</td>
</tr>
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</table>

### 47-00 Pumps for Cleaning & Sanitizing Solutions

<table>
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<th>Company</th>
<th>Contact Person</th>
<th>Address</th>
<th>Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>882</td>
<td>optek-Danulat Inc.</td>
<td>279 S. 17th Avenue, Suite 10, West Bend, Wisconsin 53095</td>
<td>(6/25/96)</td>
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<tr>
<td>767</td>
<td>Perstorp Analytical, Inc.</td>
<td>12101 Tech Road, Silver Spring, Maryland 20904</td>
<td>(6/6/94)</td>
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<tr>
<td>750</td>
<td>PT Papertech, Inc.</td>
<td>#204 - 2609 Westview Drive, North Vancouver, B.C. Canada V7N 4M2</td>
<td>(1/20/94)</td>
</tr>
<tr>
<td>817</td>
<td>Techtron Labs Inc.</td>
<td>555 Briarwood Court, Troy, Ohio 45373</td>
<td>(2/24/95)</td>
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### 50-00 Level Sensing Devices

<table>
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<th>Company</th>
<th>Contact Person</th>
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<th>Phone Number</th>
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<tr>
<td>705</td>
<td>Bindicator Company</td>
<td>1915 Dove Street, Port Huron, Michigan 48060</td>
<td>(12/29/92)</td>
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### 51-00 (Formerly 08-17R) Plug-Type Valves

<table>
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<tr>
<th>Company</th>
<th>Contact Person</th>
<th>Address</th>
<th>Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>787</td>
<td>Cipriani, Inc.</td>
<td>Tasselini S.P.A., 23195 LaCadena Drive, Suite 103, Laguna Hills, California 92653</td>
<td>(8/27/91)</td>
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<tr>
<td>772</td>
<td>G &amp; H Products</td>
<td>P.O. Box 909, Pleasant Prairie, Wisconsin 53158-0909</td>
<td>(6/10/57)</td>
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<td>780</td>
<td>L. C. Thomsen, Inc.</td>
<td>1303 - 43rd Street, Kenosha, Wisconsin 53140</td>
<td>(8/31/57)</td>
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<tr>
<td>239</td>
<td>LUMACO</td>
<td>9-11 East Broadway, Hackensack, New Jersey 07601</td>
<td>(6/3/72)</td>
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<tr>
<td>788</td>
<td>Puriti, S.A. De C. V.</td>
<td>Alfredo Nobel No. 39, Fracc. Ind. Pte. de Vigas, Talnapantheta, Mexico</td>
<td>(9/12/72)</td>
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</tbody>
</table>

### Footnotes

- Mfg. by: KWW Dusseldorf, Germany
- Mfg. by: Tohshin Seiko Co., Ltd. 42-2 Aza Shinmei Tazawa Ohkuma Watari-Cho, Watari-Gun, Miyagi 889-23 Japan
- Mfg. by: Bran & Lubbe Norderstdt GMbH [Germany]
- Mfg. by: Pointon Seiko Co., Ltd. 42-2 Aza Shinmei Tazawa Ohkuma Watari-Cho, Watari-Gun, Miyagi 889-23 Japan
- Mfg. by: Tech Control, Taipei, Taiwan
<table>
<thead>
<tr>
<th>Number</th>
<th>Company/Address/Location</th>
<th>Contact Information</th>
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<tbody>
<tr>
<td>271</td>
<td>The Foxboro Company</td>
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<td>790</td>
<td>Tri-Clover, Inc.</td>
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<td>759</td>
<td>VNE Corporation</td>
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<td>Ralet-Defay</td>
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<td>66, Boulevard Poincare</td>
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<td></td>
<td>1070 Brussels, Belgium</td>
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<td>484</td>
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<td>APV Crepaco</td>
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<td>552</td>
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<td>Babson Brothers Company</td>
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<td>Badger Meter, Inc.</td>
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<td>Kammer Valve, Inc.</td>
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<td>MTS Milchtechnik AG</td>
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<td>(U.S. Rep.: Alfa Technical Group, Inc.</td>
<td>4905 West Brook Hill Drive</td>
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<td>Syracuse, New York 13215)</td>
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<td>551</td>
<td>Puriti, S.A. de C.V.</td>
<td>(9/12/72)</td>
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<td>(U.S. Rep.: Waukesha Cherry-Burrell</td>
<td>611 Sugar Creek Road</td>
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<td>Delavan, Wisconsin 53115)</td>
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<td>149R</td>
<td>Q-Controls</td>
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<td>Subsidiary of Cesco Magnetics</td>
<td>93 Utility Court</td>
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<td></td>
<td>Rohnert Park, California 94928</td>
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<td>748</td>
<td>Richards Industries Valve Group</td>
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<td></td>
<td>Cincinnati, Ohio 45209-2381</td>
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<td>762</td>
<td>Stainless Products, Inc.</td>
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<td>806</td>
<td>Steri Technologies, Inc.</td>
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<td>857 Lincoln Avenue</td>
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<td></td>
<td>Bohemia, New York 11716</td>
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<td>(Mfg. by: Aseptomag AG</td>
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<td>Bachweg 3, Postfach 415</td>
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<td>CH-3401 Burgdorf</td>
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<td>Switzerland</td>
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<tr>
<td>804</td>
<td>Sudmo North America</td>
<td>(11/18/94)</td>
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<tr>
<td></td>
<td>4040 First Avenue S.E., Suite 500</td>
<td>Cedar Rapids, Iowa 52402</td>
</tr>
<tr>
<td></td>
<td>(Mfg. by: Sudmo Schleicher AG</td>
<td>Industriester 7 D-73469</td>
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<td>Reisburg, Germany)</td>
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</table>
54-00 A3 (Formerly 08-17B) Diaphragm-Type Valves

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

877 APV Crepaco, Inc.
100 South CP Avenue
Lake Mills, Wisconsin 53551-1799

615 AspecCo
1101 San Antonio Road, #301
Mountain View, California 94043

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

745 Cashco, Inc.
P.O. Box 6, Hwy. 140 West
Ellsworth, Kansas 67439-0006

617 Defontaine, Inc.
16720 W. Victor Road
New Berlin, Wisconsin 53151

856 Flowtech, Inc.
1900 Lake Park Drive, No. 345
Smyrna, Georgia 30080

637 Gemu Valves, Inc.
3800 Camp Creek Parkway
Bldg. 2400, Suite 102
Atlanta, Georgia 30331

5-00 (Formerly 08-17E) Inlet and Outlet Leak-Protector Plug Valve

34E Tri-Clover, Inc.
9201 Wilmot Road
Kenosha, Wisconsin 53140

57-00 A1 (Formerly 08-17F) Tank Outlet Valve

531 G & H Products Corp.
P.O. Box 909
Pleasant Prairie, Wisconsin 53158-0909

534 Lumaco
8-11 East Broadway
Hackensack, New Jersey 07601

643 Paul Mueller Company
1600 West Phelps
Springfield, Missouri 65801

58-00 (Formerly 08-17M) Vacuum Breakers and Check Valves

843 APV Crepaco, Inc.
100 South CP Avenue
Lake Mills, Wisconsin 53551

691 Defontaine of America, Inc.
16720 W. Victor Road
New Berlin, Wisconsin 53151

835 G & H Products Corp.
P.O. Box 909
Pleasant Prairie, Wisconsin 53158-0909

834 Stanfoss, Inc.
3906 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.
12850 Route 39
Sardinia, New York 14134

(3/17/95) (8/24/87)
(3/17/95) (8/24/87)
(1/13/86) (11/27/88)
(11/27/88) (2/10/87)
(1/13/86) (10/15/56)
(1/30/96) (5/31/88)
(5/31/88) (5/31/88)
(5/31/88) (6/30/72)
(12/20/56) (6/30/72)
(12/20/56) (7/11/95)
(8/31/88) (11/27/95)
(12/20/56) (3/17/95) (8/24/87)
(3/17/95) (8/24/87)
(8/31/88) (11/27/88)
(7/11/95) (2/10/87)
689 VNE Corporation
1149 Barberry Drive
Janesville, Wisconsin 53547
(8/17/92)

59-00 (Formally 08-17D) Automatic Positive Displacement Sampler
291 Accurate Metering Systems Inc.
(Mfg. by: Diessel, Germany)
1650 Wilkening Court
Schumburg, Illinois 60173
(6/22/77)

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

60-00 (Formally 08-17G) Rupture Discs
422 B & B Safety Systems, Inc.
7455 E. 46th Street
Tulsa, Oklahoma 74145-6379
(6/12/84)

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

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

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

61-00 (Formally 08-17I) Steam Injected Heaters
728 APV Unit Systems Inc.
395 Fillmore Avenue
Tonawanda, New York 14150
(4/14/93)

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

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

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

62-00 (Formally 08-17L) Hose Assemblies
795 Able Hose & Rubber, Inc.
2307 E. Hennepin Avenue
Minneapolis, Minnesota 55413
(9/14/94)

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

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

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

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

727 Pure Fit, Inc.
924 Marcon Boulevard
Allentown, Pennsylvania 18103
(4/14/93)

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

698 Sanitary Couplers, Inc.
696-698 Pleasant Valley Drive
Springsboro, Ohio 45066
(10/23/92)

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

63-00 (Formally 08-17R) Sanitary Fittings
470 Advance Fittings Corp.
218 West Centralia Street
Elkhorn, Wisconsin 53121
(3/30/86)

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

79R Alloy Products Corp.
1045 Perkins Avenue, P.O. Box 529
Waukesha, Wisconsin 53187
(11/23/57)

682 Andron Stainless, Ltd.
6170 Tomken Road
Mississauga, Ontario Canada L5T 1X7
(6/30/92)

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

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

621 Bradford Castmetal
P.O. Box 35
Elm Grove, Wisconsin 53122
(2/25/91)

688 Cajon Company
9760 Shepard Road
Macedonia, Ohio 44065
(8/4/92)

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

696 Conexiones Inoxidables
de Puebla S. A. de C. V.
Vicente Guerrero No. 112
Xicotepec de Juarez
Edo. Puebla, Mexico
(10/1/92)

728 Dayco Products, Inc.
1 Prestige Place
Miami, Florida 33142
(3/16/88)

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

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

67R G & H Products Corp.
P.O. Box 909
Pleasant Prairie, Wisconsin 53158-0909
(6/10/57)
<table>
<thead>
<tr>
<th>Company Name</th>
<th>Address</th>
<th>City, State ZIP Code</th>
<th>Contact Date</th>
</tr>
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<tbody>
<tr>
<td>Chicago Stainless Equipment</td>
<td>511 Weston Ridge Drive</td>
<td>Naperville, Illinois 60563</td>
<td>9/28/95</td>
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<tr>
<td>Diversy Lever Equipment</td>
<td>151 Harvey West Boulevard</td>
<td>Santa Cruz, California 95060</td>
<td>12/14/89</td>
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<tr>
<td>Burns Engineering, Inc.</td>
<td>10201 Bren Road, East Minnetonka, Minnesota 55343</td>
<td></td>
<td>2/5/79</td>
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<tr>
<td>EG &amp; G Berthold Laboratory Prof.</td>
<td>D-7547 Bad Wildbad 1, Germany</td>
<td>(U.S. Rep.: Berthold Systems, Inc. 101 Corporation Drive Aliquippa, Pennsylvania 15001-4863)</td>
<td>4/21/94</td>
</tr>
<tr>
<td>The Foxboro Company</td>
<td>33 Commercial Street</td>
<td>Foxboro, Massachusetts 02035</td>
<td>8/11/69</td>
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<tr>
<td>Claud S. Gordon Co.</td>
<td>5710 Kenosha Street</td>
<td>Richmond, Illinois 60071</td>
<td>2/27/90</td>
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<tr>
<td>Dove S.S., Inc.</td>
<td>2400 N.E. 2nd Street</td>
<td>Minneapolis, Minnesota 55418</td>
<td>1/29/96</td>
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<td>Ladar Equipment</td>
<td>213 Airport Drive Extension</td>
<td>Hopedale, Massachusetts 01747</td>
<td>2/25/91</td>
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<tr>
<td>Honeywell, Inc.</td>
<td>1100 Virginia Drive</td>
<td>Fort Washington, Pennsylvania 19034</td>
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<tr>
<td>Minco Products, Inc.</td>
<td>7300 Commerce Lane</td>
<td>Minneapolis, Minnesota 55432</td>
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<tr>
<td>Nelson-Jameson</td>
<td>2400 East 5th Street, P.O. Box 647</td>
<td>Marshfield, Wisconsin 54449</td>
<td>1/11/96</td>
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<tr>
<td>Pyromation, Incorporated</td>
<td>5211 Industrial Road</td>
<td>Fort Wayne, Indiana 46825</td>
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<td>RDF Corporation</td>
<td>23 Elm Avenue</td>
<td>Hudson, New Hampshire 03051</td>
<td>10/2/82</td>
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<td>Rosemount Analytical, Inc.</td>
<td>2400 Barranca Parkway</td>
<td>Irvine, California 92714</td>
<td>2/13/87</td>
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<td>Rosemount, Inc.</td>
<td>12001 Technology Drive</td>
<td>Eden Prairie, Minnesota 55344</td>
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<td>SensorTec, Inc.</td>
<td>16335-7 Lima Road</td>
<td>Huntsontown, Indiana 46748</td>
<td>5/18/93</td>
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<td>Smar International Corporation</td>
<td>7240 Brittemoor, Suite 118 Houston, Texas 77041</td>
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<td>Stork Food Machinery, Inc.</td>
<td>P.O. Box 1258/Airport Parkway</td>
<td>Gainesville, Georgia 30503</td>
<td>4/17/84</td>
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<td>TBI-Bailey Controls Company</td>
<td>2175 Lockheed Way</td>
<td>Carson City, Nevada 89706</td>
<td>12/3/96</td>
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<td>Texas Thermowell, Inc.</td>
<td>P.O. Box 1535 Hwy. 96 North</td>
<td>Silsbee, Texas 77656</td>
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<td>Tuchenhagen North America, Inc.</td>
<td>P.O. Box 1458</td>
<td>196 Western Avenue Fond du Lac, Wisconsin 54936-1458</td>
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<td>Valmet Automation</td>
<td>30 Thomas Drive</td>
<td>Westbrook, Maine 04092</td>
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<td>(Mfg. by: Valmet-Finland)</td>
<td>P.O. Box 237 SF-33101</td>
<td>Tampere, Finland</td>
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<td>Viatran Corp.</td>
<td>300 Industrial Drive</td>
<td>Grand Island, New York 14072</td>
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<td>Wahl Instruments, Inc.</td>
<td>5750 Hannum Avenue</td>
<td>Culver City, California 90231</td>
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<td>Weed Instrument Company, Inc.</td>
<td>707 Jeffrey Way</td>
<td>Round Rock, Texas 78664</td>
<td>12/28/87</td>
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<td>Zurich Industria E Comercio LTDA</td>
<td>R. Serra da Piedade, 183 Sao Paulo - SP - Brazil 03131-080</td>
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(not available in the U.S.A.)
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.
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
- 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

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, 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, Acetati 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 Sulphydryl Inhibitors on Aflatoxin B1, 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-B and EDTA
• Antimicrobial Activities of Lysozyme and Lactoferricin-B 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

FEBRUARY 1997 — Dairy, Food and Environmental Sanitation 121
• 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 NaN₃ 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
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)

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Credit Card payments may be sent via Fax today!
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*REGISTER BY MAY 30, 1997 TO AVOID LATE REGISTRATION FEES

REGISTRATION:
- Registration (Banquet included) $220 ($270 late)*
- Student Member $ 35 ($ 45 late)*
- One Day Registration (Circle: Mon/Tues/Wed) $110 ($135 late)*
- Spouse/Companion (Name): ____________ $ 35 ($ 35 late)*
- Children (14 & Under, Names): ____________ 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 (One 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
- AIRMAIL $ 22.50 per journal
- $ 95.00 per journal

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

SPOUSE/COMPANION EVENTS:
- 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

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Name on Card ______________________ Signature ______________________

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.

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

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

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Rental Car Information
For information on special rental car rates from Budget call (800) 772-3773. Please mention Rate Code: BCD #: U051950.
HOTEL RESERVATIONS

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

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Annual Meeting
Orlando, Florida
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SPECIAL ROOM RATES for this convention:
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Or FAX: (407) 239-3800
Coming Events

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 significance 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.

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.

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• 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: shoemaker@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) 782-5495; 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: mookerich@ccmailorst.edu.

• 28-30, Food Protection Workshop for Processors, at the Holiday Inn Downtown/Convention Center, St. Louis, MO. This comprehensive 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 2W1 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, NCMIS 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 Giangiulian, Via A. Lombardo, 11, 20075 LODI-ITALY; phone +39-371-430900; 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 expectations. 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](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 Processing Automation Workshop. For information, contact The World Wide Web at [http://www.foodsci.purdue.edu](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.

- 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.

**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 compensation 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, 5340 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.

**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. Pumendu 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: Pumendu.C.Vasavada@uwr.edu.
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