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Vol. 9 • No 2 • Pages 53-116

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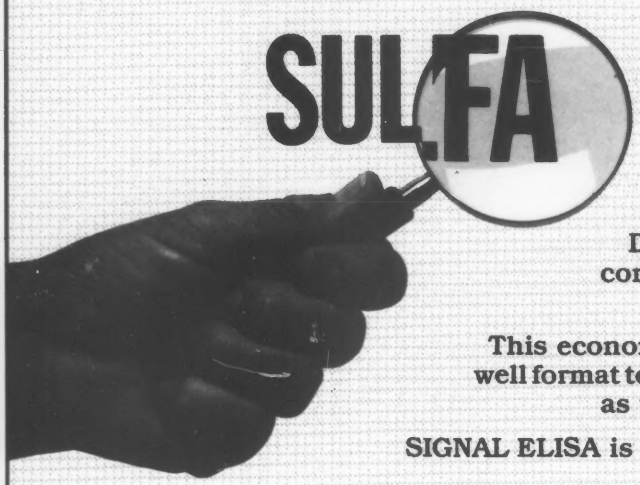

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Thoughts From the President . . .

By
Robert B. Gravani, Ph.D.

During the early months of the new year, most people in the northern part of our country are fighting cabin fever. I hope that your activities are providing personal and professional challenges and that you're continuing to do an excellent job of protecting public health.

As you know, American consumers are showing an increased concern about hazards in the food supply. A study called "Trends-Consumer Attitudes and the Supermarket, 1988" was conducted by the Food Marketing Institute (FMI), a well known association of food retailers and wholesalers in Washington, DC. This study was the seventeenth in a series of consumer attitude surveys begun by FMI in 1974. It emphasizes shopping behavior, attitudes, nutrition and food safety. The data for the study were based on telephone interviews with a national sample of 1,019 male and female supermarket shoppers.

One survey question in the area of food safety was:

> "As far as you personally are concerned, whom do you rely on most to be sure that the products you buy are safe - the federal government, the state government, consumer organizations, manufacturers, retailers or yourself as an individual?

The answer was very interesting and can be found in the table below.

Those Whom Shoppers Rely on to Ensure the Products they Buy are Safe[1]

	Total					
	1983	1984	1985	1986	1987**	1988***
	%	%	%	%	%	%
Yourself as an individual	46	48	38	48	45	45
Federal government	24	22	31	29	25	26
Consumer organizations	6	9	8	9	15	15
Manufacturers	13	11	7	8	9	7
State government	3	3	6	4	3	3
Retailers	5	5	6	2	5	3
Other (Vol.)	*	1	1	*	1	1
None (Vol.)	1	*	1	*	*	*
Not sure	2	1	2	*	2	2

*Less than 0.5 percent.
**Split sample; base = 498.
***Split sample; base = 511.
May not add up to 100 percent due to rounding.
[1]1988 Trends - Consumer Attitudes and the Supermarket, 1988, *The Food Marketing Institute, p. 4.*

Somewhat less than half of the respondents (45%) rely on themselves, while about a fourth (26%) rely on the federal government to ensure food safety. One question that comes to mind is, "Do most consumers have the knowledge and skills necessary to evaluate the safety of their food?" Some other national surveys have shown that consumer perceptions of food safety issues do not necessarily agree with the experts' assessments of the key issues. In addition to these public misperceptions, the scientific community does not always effectively communicate its views to consumers or policy makers. These two situations motivated some action! The Institute of Food Technologists invited representatives from a number of professional societies to meet in Washington, DC to discuss food safety issues, especially how the American public can best be protected from foodborne chemical and biological hazards.

On August 29-30, 1988, forty-one delegates (including three delegates from IAMFES), representing 18 professional societies, broke into small working groups and discussed five key areas of interest:

Microbiological hazards
Environmental contaminants
Naturally-occurring toxicants
Pesticide residues
Food and food additives

The summary of the discussion in these important areas was written into a report entitled, "Assessing the Optimal System for Ensuring Food Safety: A Scientific Consensus". The report represents a consensus of the many food related scientists who attended the workshop. The 25 page report concisely addresses each one of the subjects listed above and:

Expresses confidence in the safety of our food supply.
Mentions the frustration with public misconception of risk.
Calls for reaffirmation of federal leadership and cooperation with the states to assure uniform and consistent enforcement of food safety regulations.

Once all of the professional societies that participated in this food safety workshop endorse the report, the document will be shared with federal and state policy makers and the national and local media. This report represents a real opportunity for the concerned scientific community to make an important contribution to the field of food protection. Your IAMFES board has unanimously endorsed this important document.

On another very important issue, I would like to encourage you to look over the information on the two excellent candidates who are seeking election to the IAMFES executive board as Secretary. Drs. Robert Bracket (University of Georgia) and Michael Doyle (University of Wisconsin) are both highly qualified and dedicated IAMFES members.

Please take a few moments to look over their biographical sketches in this issue of the Journal, mark your ballot when it arrives by mail in early February and send it back to the Ames office. Here is your chance to determine the future leadership of IAMFES. Don't forget to vote!

Robert B. Gravani, IAMFES President
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Dairy, Food and Environmental Sanitation (SSN-2073-2866) is published monthly by the International Association of Milk, Food and Environmental Sanitarians, Inc., executive offices at PO Box 701, 502 E. Lincoln Way, Ames, IA 50010. Printed by Heuss Printing, Inc., 911 N. Second St., Ames, IA 50010. Second-class Postage paid at Ames, IA. Postmaster: Send address changes to IAMFES, 502 E. Lincoln Way, Ames, IA 50010-0701.

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Dairy, Food and Environmental Sanitation, Vol. 9, No. 2, Pages 61-64 (February 1989)

A Study of the Accuracy of Infra-Red Milk Component Analysis in DHIA Laboratories

by

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Published as paper No. 16,209 of the contributions series of the Minnesota Agricultural Experiment Station on research conducted under Project No. 18-73 supported by Hatch funds.

Abstract

An average of 28 Dairy Herd Improvement Association laboratories representing 51 infra-red instruments were provided with one set of 12 blind control milk samples each month over a six month period from January 1, 1988 - June 1, 1988. The control samples reflected a wide range in milk component levels and were analyzed for both fat and protein by each laboratory. The results of the infra-red analyses were submitted for statistical evaluation. Both mean difference and standard deviation of the difference between infra-red and control sample results were calculated and used as a measure of accuracy of infra-red analysis. The grand average of six monthly trials yielded values of 0.029% and 0.040% for these two statistics, respectively, for fat analyses, and 0.0003% and 0.034%, respectively, for protein analyses. Grand average values for each region taken separately were within Association of Official Analytical Chemists standards for both fat and protein analyses. No consistent regional differences in infra-red accuracy were noted.

Introduction

On January 1, 1988, DQCI Services, Inc. (DCQI) began providing raw milk control samples to a number of Dairy Herd Improvement Association (DHIA) laboratories over and above those located in the upper midwest. These laboratories and those already being served by DQCI were using infra-red instruments for the analysis of fat and protein in individual cow and pooled herd samples of milk. As a part of the overall DHIA monitoring effort, each laboratory receives and analyzes a blind set of 12 control samples once each month. The results of these tests are then submitted for statistical analysis, including a calculation of mean difference and standard deviation of the difference between infra-red and control sample results. These values provide a good measure of "accuracy" of infra-red testing, and the Association of Official Analytical Chemists (AOAC) has established operational standards based upon these statistics.

An average of 28 DHIA laboratories representing 51 infra-red instruments were served by this control program during January through June of 1988. The laboratories ranged across the United States and also included Puerto Rico. At the outset of the control effort, only a relatively few of these laboratories had calibrated their instruments on DCQI control samples. Doubtless more did so as the program progressed. Nevertheless, data from such a broad segment of the United States and for such a large number of instruments provide valuable insights into the potential to control electronic instruments through a centralized program.

Overall, DHIA component analysis takes in about one-half of the cows in the United States. A majority of the laboratories serving this program are represented by the data reported herein. At the same time, the data reflect excellent cross-sectional overviews of all regions of the country. To this point in time, no one has been able to evaluate a control effort covering such a broad area. Concern continues to be expressed over regional differences in milk composition to the extent that such differences might impact on analytical measurements. Although this study does not purport to evaluate this aspect directly, it does clearly indicate the potential to calibrate and to maintain calibration of infra-red instruments on milk samples emanating from one region of the country throughout the United States.

Material and Methods

Starting January 1, 1988, 26 (and ultimately an average 28) DHIA laboratories were provided with 12-sample sets of control samples from DQCI Services, Inc. These samples were used by the laboratories in their routine calibration and

monitoring programs. The samples represented a wide level of various milk components, they were unheated (raw) and preserved with a small amount of Bronopol preservative (2-bromo, 2-nitro propandiol) (D & F Control System, Inc., 1750 Folsom St., San Francisco, CA 94103).

Once each month, one set of 12 blind control samples were shipped to each laboratory for infra-red analysis in an on-going control effort. These samples were tested for both fat and protein and test results communicated to DQCI Services, Inc. The data were analyzed by computer, and accuracy of infra-red testing calculated as mean difference and standard deviation of the difference from control sample results. The information reported herein reflects findings of six monthly blind evaluations starting the first month (January, 1988) that the laboratories entered the program en masse and running through June, 1988.

Results are reported both as overall averages for all participating laboratories and also as regional averages. For the latter, the United States, was arbitrarily divided into six regions: (1) northeast, (2) southwest, (3) mid Atlantic, (4) upper midwest, (5) southwest, and (6) northwest.

It should be noted that some laboratories utilized more than one infra-red testing device and that the output of each instrument was evaluated. Hence, an average of 28 laboratories reflected an average of 51 infra-red units in total. Not every state nor every laboratory reported results every month, but by far the majority did so, and these facts are indicated in the data reported herein. In all cases, quality of test results are based upon standards established by the Association of Official Analytical Chemists (*1*).

Results and Discussion

Data in Table 1 indicate the results of the very first evaluation of blind samples analyzed by the DHIA laboratories participating in the control program at that time. They are of special interest because they reflect a large number of laboratories entering a totally new control sample program. Some few of the laboratories had previously calibrated their infra-red instruments on DQCI Services, Inc. samples, but most of them had not. As a result, these data serve as a control baseline against which future results may be compared. They also provide some insight into regional differences in milk supplies as such differences might influence accuracy of infra-red analyses. At the time of this trial, 26 DHIA Laboratories representing 49 infra-red instruments reported results.

Regional data in Table 1 reflect differences in initial status-control of infra-red instruments. Mean difference in fat analyses exceed AOAC standards in three instances, though in one case by only 0.005%. In no region was the average standard deviation of the difference of fat analyses above the standard. These two findings suggest that bias, though possibly present, certainly is not of great magnitude. Bias is reflected in mean (average) difference results. A positive value implies that the instrument(s) is reading higher than control results, a negative value indicates lower readings. The fact that no region exceeded on average the AOAC standard for standard deviation of the difference suggests good stability -- relatively small variations -- about the regression line. Considering: (1) the vastness of the area under study, (2) the obvious differences in feeds and feeding practices among certain regions and (3) the variety of technical issues that impact on analytical results (i.e. difference in calibration techniques, samples used for calibration, state of repair of instruments, etc.), these results appear to be surprisingly good. Coupled with the fact that all regions averaged well within AOAC standards for protein analyses and, on average, collectively fell at or under these standards for both fat and protein, suggests good control and relatively minor differences associated with regional influences.

Tables 2 and 3 provide data on the second and third monthly trials and indicate the changes in control of infra-red instruments occurring over that period of time. By the second blind evaluation (Table 2), only one region averaged higher than the AOAC standard, and then only slightly for the mean difference in fat analyses. The average was 0.059, against a standard of no greater than 0.050. All other regions averaged lower than the standards in both control statistics for both fat and protein. Grand average values likewise fell well below the standards.

By the third monthly trial, all regions were averaging well under the AOAC standards (see Table 3). Although not shown in the table, 7 of 54 instruments were found to exceed the standard for mean difference for fat only; two instruments exceeded this standard for both fat and protein. All other values for the remaining instruments and/or component fell within AOAC tolerances. Overall, these findings indicate very good control in a large number of laboratories (31 in this case, using 54 infra-red instruments) representing a very board geographical area.

The last trial included in this study, which took place in June of 1988, involved 24 labs and 47 instruments. Only one region, on average, exceeded the AOAC standard for mean difference, and then only for fat and only by .004%. The grand average values for mean differences and standard deviation of the differences for all regions for fat analyses were, respectively, 0.016% and 0.039%. For protein, the statistics were, respectively, 0.013% and 0.035%. AOAC standards suggest that these values should not exceed 0.05% and 0.06% for these two components.

Table 4 provides data reflecting grand average values for all regions/laboratories/instruments over six blind trials. In all cases, statistical values fall well under maximum values of AOAC standards.

In general, the results of this study suggest very good control of infra-red instruments in the great majority of DHIA laboratories. In addition, most laboratories in all regions of the country have been found to be operating within AOAC standards from the very first trial and have continued to do so throughout six months of evaluation. This fact suggests the possibility that regional differences in milk supplies likely do not account for major differences in test results of infra-red instruments calibrated and maintained on control samples emanating from one region. Further work is obviously necessary to evaluate that issue more definitively.

At the same time, it is apparent that a large number of laboratories/instruments can be brought within AOAC calibration standards very quickly. By the third month of this study, average critical statistical values in all regions of the United States were within the standards, with only a relatively few instruments outside of the control limits, and then for only one of the statistical standards for one component.

It is also necessary to point out that the standard most often breached (though in a relatively few instruments) was the mean difference in fat analyses. It is in the analysis of fat, at least compared to protein analyses, that a bias appears most problematical. Because other labs/instruments in the same region were operating well within control limits at the same time, it is not clear whether outliers reflected differences in composition of fat or were simply aberrations in instrument operation. In any event, DHIA laboratories have been found to be responsive to centralized control of infra-red instruments and to quickly adjust to breaches in control limits. In addition, DHIA analytical results in both fat and protein analyses fall well within control standards maintained in most dairy industry laboratories(*2, 3, 4*).

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TABLE 1. *Grand average and regional average mean difference and standard deviation of the difference of infra-red vs blind control sample results (first blind trial, January 1988).*[a]

			FAT		PROTEIN	
REGION:	No. of Labs	No. of Instruments	Mean Diff.	S.D. Diff.	Mean Diff.	S.D. Diff.
Northeast	3	5	.055	.052	.003	.037
Southeast	4	8	.072	.053	.003	.031
Mid Atlantic	4	12	.074	.032	-.024	.044
Upper Midwest	5	12	.024	.052	-.033	.030
Southwest	5	6	.042	.040	-.030	.031
Northwest	5	6	.031	.040	-.013	.033
Total:	26	49				
		Grand Avg:	.050	.044	-.018	.035
		AOAC Std:	.05	.06	.05	.06

[a]Each laboratory analyzed 12 blind control samples on each infra-red instrument in current use.

TABLE 2. *Grand average and regional average mean difference and standard deviation of the difference of infra-red vs blind control sample results (second blind trial, February 1988).*[a]

			FAT		PROTEIN	
REGION:	No. of Labs	No. of Instruments	Mean Diff.	S.D. Diff.	Mean Diff.	S.D. Diff.
Northeast	3	5	.025	.042	.023	.030
Southeast	4	9	.048	.049	.023	.033
Mid Atlantic	4	11	.059	.043	-.029	.042
Upper Midwest	5	12	.028	.034	.008	.034
Southwest	7	8	.030	.047	.035	.033
Northwest	7	8	.048	.040	-.013	.040
Total:	30	53				
		Grand Avg:	.040	.042	.008	.035
		AOAC Std:	.05	.06	.05	.06

[a]Each laboratory analyzed 12 blind control samples on each infra-red instrument in current use. These data reflect the second monthly trial conducted.

TABLE 3. *Grand average and regional average mean difference and standard deviation of the difference of infra-red vs blind control sample results (third blind trial, March 1988).*[a]

			FAT		PROTEIN	
REGION:	No. of Labs	No. of Instruments	Mean Diff.	S.D. Diff.	Mean Diff.	S.D. Diff.
Northeast	3	5	-.002	.030	.018	.035
Southeast	5	10	.032	.030	-.005	.033
Mid Atlantic	4	12	.021	.039	.032	.041
Upper Midwest	5	12	.009	.031	.009	.031
Southwest	7	7	.001	.038	-.005	.036
Northwest	7	8	.035	.039	.035	.033
Total:	31	54				
		Grand Avg:	.016	.035	.014	.035
		AOAC Std:	.05	.06	.05	.06

[a]Each laboratory analyzed 12 blind control samples on each infra-red instrument in current use. These data reflect the third monthly trial conducted.

TABLE 4. *Regional grand average and overall grand average mean difference and standard deviation of the difference of infra-red vs blind control sample results over six monthly trials (January - June, 1988).*

			FAT		PROTEIN	
REGION:	Avg. No. of Labs	Avg. No. of Instruments	Mean Diff.	S.D. Diff.	Mean Diff.	S.D. Diff.
Northeast	26	49	.050	.044	-.018	.035
Southeast	30	53	.040	.042	.008	.035
Mid Atlantic	31	54	.016	.035	.014	.035
Upper Midwest	30	53	.038	.034	-.017	.026
Southwest	28	49	.015	.047	-.002	.039
Northwest	24	47	.016	.039	.013	.035
Average	28	50.8	.029	.040	.0003	.034
AOAC standard:			.05	.06	.05	.06

Dairy, Food and Environmental Sanitation, Vol. 9, No. 2, Pages 65-67 (February 1989)

Myth: Wash Poultry Before Cooking

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Consumption of poultry in both restaurants and home has increased; at the same time there is also increased awareness of the need to provide a safe cooked product and to avoid cross-contamination from the raw bird to foods that will not be further cooked. The first step in most directions for preparing chicken or other poultry is to wash the raw bird (Berry and Templin, 1988). The practice is not research-based but appears to have begun when consumers killed and dressed their own poultry or bought New York dressed chickens and turkeys (i.e. birds that had been killed but not eviscerated). Given the current demonstrated high incidence of contamination of raw birds with salmonellae and campylobacters, is this good advice to reduce foodborne illness?

Would washing significantly reduce contamination of the carcass so that adequate cooking would be less important? Lillard (1988a) recently reported an evaluation of microbial removal when the whole body rinse method was used for sampling poultry carcasses. Large numbers of aerobic bacteria and Enterobaacteriaceae were removed with each of 10 successive rinses and even after 40 rinses on the one bird in that trial. However, there was less than a one log reduction in counts per mL of rinse water in both experiments. He concluded that washing will not significantly reduce the number of microorganisms. Earlier work has led to the same conclusions, which indicates that bacteria are probably trapped in surface irregularities as has been indicated for breast muscle samples (Lillard, 1988b). Failure in pilot tests to confirm the value of antimicrobial agents added to wash or rinse waters may be due to the same trapping effect. These salmonellae may still be transferred from skin to other surfaces (Carson et al., 1987).

If there is not evidence for any benefit from the practice of washing raw poultry before preparing it, are there any risks? Washing provides opportunity for contamination of other surfaces with the rinse water, such as sink, faucet, and counter surfaces. This was confirmed in a study using broilers which were contaminated with a readily identifiable strain of *E. coli* (Wit et al. 1979). Sixty families in the Netherlands were each given a prepared frozen broiler and swabs taken of work surfaces in the kitchen during and after preparation, including rinsing, stripping of the skin, cutting and/or seasoning. The grating of the sink was contaminated with *E. coli* K12 in 87% of the total samples; the raised border of the sink, 67%; and the faucet, 82%. Other objects which may not have been related to the rinsing were also contaminated. Bacteria frequently remained even after surfaces and utensils were rinsed or cleaned. The authors commented that there was less contamination from those preparation methods which needed few actions, such as grilling or baking. Harris et al. (1986) found a higher risk of campylobacteriosis for persons who scored low on his "cutting board scale."

The additional handling involved in the washing process may also increase hand contamination. If so, hand washing has been shown to be only partially effective in removing transient bacteria (Wit, 1985). Acuff et al. (1986) tested the effectiveness of a 15 second hand wash with bar soap with or without the use of a brush and then drying with paper towels. Fingernails frequently were still positive after two washings. Hands remained positive generally for one wash.

Direct evidence of an increased risk from washing poultry is lacking but several studies have found a positive association between preparation of raw poultry or other foods and illness from *C. jejuni* infections (Norkrans and Svedhem, 1982, and Hopkins and Scott, 1983). Although Deming et al. (1987) found a significant positive association between eating raw or undercooked chicken and illness, the illness was not associated with handling the raw product in this college student population.

The conclusion is that there is no benefit from washing dressed poultry before it is prepared for cooking. In contrast, the probable increased contamination of kitchen work surfaces, sink, and workers' hands make washing ready-to-cook poultry a practice not to be recommended.

All food handlers, both institutional and consumer, should be taught ways to reduce the potential for cross-contamination. Instruction should caution against the usual step of washing the broiler-fryer, roasting chicken, duck, or turkey. Other important preventive measures include putting packaging materials directly into the garbage container,

cleaning drips on work surfaces, using only paper towels and plastic or glass cutting boards, and thoroughly washing and then sanitizing utensils and work surfaces after use. Hands should be well scrubbed and a nail brush used. This is very important after handling raw poultry and meats and is a good practice before contact with any ingredient or food product. Although avoiding cross-contamination requires care, it is a necessary part of reducing the incidence of foodborne illness.

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Dairy, Food and Environmental Sanitation, Vol. 9, No. 2, Pages 68-74 (February 1989)

Pretreatment of Snack Food Bakery Wastes A Case Study[1]

by

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Abstract

Wastewater from snack food bakeries are typically high in BOD, COD, suspended solids, and oil and grease. The wastewater flows normally occur during washdown and clean-up. This usually means that flow equalization will be required to level out the peaks of flow and waste constituents.

Snack food bakeries discharging their waste into a municipal sewer system can utilize a large part of the municipal treatment capacity and normally have high sewer surcharges. In some case, the bakery waste causes the municipal plant to fail to meet effluent standards. When this occurs the bakery faces shutdown. This was the situation at a snack food bakery in South Carolina. The design and installation of a system was required to eliminate the surcharges and maintain discharge compliance.

This paper will explore the problems, characterization of the waste, process design, unit processes required, equipment installation, and operational results from this snack food bakery.

The pretreatment plant has been in operation for approximately two years. The paper will examine the operational problems and pitfalls that must be considered in designing a treatment system for a snack food bakery.

Sludge generated from the snack food bakery requires special attention for dewatering. The paper will also discuss three methods of dewatering the sludge from the installed treatment system.

Introduction

Bakery wastes can vary from one that mixes up dough and bakes it in an oven to make bread to one that prepares baked snack food or pastry. This paper will be directed to the latter type. Wastes from snack food bakeries are very difficult to handle because of high concentrations of sugar, oils and greases, flour, fruits, and cleaning compounds.

Waste Production

Wastes from a snack food bakery are produced by each unit operation in making the product. The unit operations consist of mixing, forming, frying, glazing, filling, and clean-up.

Mixing Dough. Ingredients are placed in large containers and mixed to make the dough for the snack food pastries. After mixing, the dough is removed leaving flour and dough particles in the containers, on large mixers, and on the floor around the mixing operation. The utensils and the surrounding area are washed down after each batch. The washings are directed into floor drains and become a part of the wastewater stream.

Forming. Snack foods are formed into unique shapes by specially designed machines. The machines are dry cleaned and washed down on a daily basis. The machines are washed and sterilized with chemicals on a weekly basis. The washings and chemicals are directed into floor drains and become a part of the wastewater stream.

Frying. Many snack foods are fried in large vats of cooking oil. As the product is conveyed out of the vat, grease drips from the conveyor and is flushed down the drain. Periodically, the vats are drained and the major portion of grease is reclaimed, but settled particles and a few gallons of grease remain in the fryer. The fryer is then flooded with water and sodium hydroxide and the temperature raised to boiling. The mixture of water, caustic, and now emulsified oil and grease is directed to the drain to become a part of the wastewater stream.

Glazing. Many snacks have a nice thick coat of sugar glaze on the outside. The sugar contributes the major portion of the dissolved organic load produced by the snack food bakery. The glaze is made by mixing dry powder sugar with water in a large vat. The glaze is pumped into a glazing machine. The glaze remaining in the vat is scraped out as much as possible in a dry clean and the remainder is washed down the drain. The glaze gradually builds up on the ma-

[1]*This paper was presented at the 1988 Food Processing Waste Conferemce October 31 - November 2, 1988 in Atlanta, Georgia. This conference was presented by Environmental, Health & Safety Division, Georgia Tech Research Institute.*

chines and conveyor. These are scraped and dry cleaned also, but the residue is washed down the drain.

Filling. Many of the snack food pastries are fruit filled. Fruit, sugar, and other ingredients are cooked to a thick consistency in large vats. The fruit fillings are pumped into a filling machine. The vats are then thoroughly cleaned by washing the remaining filling and fruit parts down the drain. The wastewater from this unit process is usually low in pH and takes the color of the filling being used at the particular time, i.e. red-strawberries, blue-blueberries, and pink-cherries. Machines and pumps that handle the fruit fillings must be periodically washed down. The washwater is directed down the drain.

Clean-Up. There is usually a once per week major cleanup. This produces a high hydraulic flow but relatively low strength wastewater. This washdown contains high concentrations of detergents and sanitizing chemicals.

Pretreatment - Case Study

The question of how to treat the wastewater from a snack food bakery is best answered by analysis of the wastewater characteristics, process schematic, equipment selection for unit processes, effluent quality, and operational considerations for an actual treatment system.

Wastewater Characteristics

The raw wastewater characteristics are highly variable. Table 1 shows typical high and low value of the constituents in the wastewater and a typical average used in designing the treatment system.

Process Schematic

The pretreatment process schematic consists of: equalization, primary clarification, pH adjustment, flocculation, dissolved air flotation, aerobic bio-towers, completely mixed activated sludge, and sludge dewatering. The process scheme is shown in block diagram in Figure 1.

Equalization. An equalization system is provided to assure both an average flow and composition of wastewater supplied to the downstream treatment processes. The equalized composition is probably more important in this case because of the wide range of variability of the constituents. To accomplish the desired equalization a two day detention time in the basin is provided. The basin is maintained at a minimum of one-half full to assure dilution of incoming constituents.

Table 1

Parameter	Low	High	Average (Design)
Flow	7500 GPD	15,000 GPD	15,000 GPD
BOD	7000 mg/l	18,000 mg/l	12,000 mg/l
TSS	3000 mg/l	15,000 mg/	8,000 mg/l
O & G	1500 mg/l	17,000 mg/l	6,400 mg/l
Temperature	20°C	32°C	25°C
pH	3	10	4
Tot. Nitrogen	120 mg/l	190 mg/l	160 mg/l
Tot. Phos.			40 mg/l

The equalization basin must be aerated to prevent the formation of septic odors and to maintain solid particles in suspension. As the tank is aerated, the contents begin to cool and free oil and grease separate and must be skimmed from the surface. A word of caution must be considered as the oils become a solid below 19°C. In the winter the grease will not flow and must be removed as a solid.

Primary Clarification. The primary clarifier, with a mechanical surface skimmer is provided to remove any free oil that passes from the equalization tank and to separate settleable solids from the liquid stream. In the case of a low daily flow a conical bottom hopper clarifier is provided for storage of settled material. The stored solids are blown down daily as dictated by the solid loading.

pH Adjustment. The equalized wastewater pH is normally acidic and requires the addition of caustic to raise the pH to 7.5. The pH adjustment tank has a detention time of 10 minutes and requires a mixer to intimately mix the wastewater with the chemicals required to adjust the pH. The pH is monitored by an automatic pH controller. The controller will operate a caustic feed pump to automatically vary the rate at which caustic is added based on demand.

Flocculation. A flocculation system is provided to flocculate fine suspended solids and emulsified oil and grease. Aluminum sulfate (alum) is fed into the influent of the flocculation chamber to coagulate the solids. A polymer is fed into the chamber to aid in flocculation and complete the solids separation process. The flocculation chamber has a detention time of fifteen (15) minutes and is equipped with a variable speed paddle type mixer.

Dissolved Air Flotation - Recycle Pressurization. A dissolved air flotation (DAF) system is a solids and oil and grease separation process in which dissolved air is introduced to enhance the natural tendency of separation of oil particles from water. A portion of clarified liquid is recycled and saturated with air to an elevated pressure. When the pressure is released the dissolved air comes out of solution and is mixed with the flocculated solids and oils and grease. Air leaves solution as tiny bubbles. The tiny bubbles attach themselves to solid particles which become more buoyant and float the particles to the surface where they are skimmed off.

When the wastewater leaves the DAF, it has the following average constituents: BOD - 7500 mg/l; TSS - 350 mg/l; Oil & Grease - 25 mg/l; pH - 5.5; and Temperature - near ambient.

Aerobic Bio-Tower. Up to this point in the process train the treatment has been by physical chemical means. Essentially all pollutants have been removed except the dissolved organics (basically sugar). The first step in the removal of the dissolved organics is an aerobic bio-tower filled with high surface area PVC media. The bio-tower is used to rough the BOD down to approximately 1200 mg/l (~85% reduction).

The bio-tower design organic loading is 150 lbs. BOD/1000 cu. ft. of media. To maintain proper sloughing of growth from the media surface a wetting rate of at least 0.5 gpm/square foot of tower area must be maintained. To

maintain this wetting rate it is necessary to recycle from the bottom of the tower at a rate of 6:1. Wastewater and recycle is distributed over the surface of the media by a rotary distributor. The depth of media in the tower is twenty eight (28) feet.

The biological system normally requires nutrients for cell production in the ratio of 100 parts of BOD to 5 parts of Nitrogen (N) to 1 part Phosphorous (P). We have found that this waste because of the high BOD concentration does not require as much nitrogen and phosphorous as normal. In fact, an excess of phosphorous causes a proliferation of undesirable organisms in the bio-tower. The more desirable ratio is 100 BOD:2.5N:0.2P. The wastewater is deficient in nitrogen so ammonium nitrate is added to the DAF effluent to maintain the desired ratio.

Because of the high organic level in the waste, organic acids are formed in the bio-tower which cause a drop in the pH of the recycled water. To prevent a continued drop of pH, the pH of the recycled water is adjusted to 8 by monitoring and feeding caustic as needed.

Completely Mixed Activated Sludge. A completely mixed reactor was selected to achieve a high rate of absorption of organics in a reasonable length of time. The activated sludge system consists of the aeration tank, aerobic sludge digester and a final clarifier. The system was designed using a BOD loading of 1200 mg/l, 4000 mg/l of MLVSS, 10 day sludge age, and approximately 26 hours of detention time. A medium bubble floor cover air diffusion system was selected to provide the desired oxygen level to oxidize the organics.

Sludge Dewatering. There are three types of sludges produced by this treatment system. The first sludge stream is generated by periodic blowdown of the primary clarifier. This sludge consists primarily of rapidly settling solid material such as flour and fruit particles. A second sludge stream is generated by the floating material from the DAF and consists of oil and grease and flocculated fine suspended solids. The third sludge stream is generated by the biological treatment units and sludge consists of biological solids which have been produced by the synthesis of solid cell mass (sludge) from organics in the waste stream. All three sludge streams are combined into an in-ground sludge holding tank. Total sludge production is approximately 7000 gallons per week.

A plate and frame filter press was selected as the method of dewatering the sludge. The high oil and grease content of the sludge makes it very difficult to dewater. Oil and grease

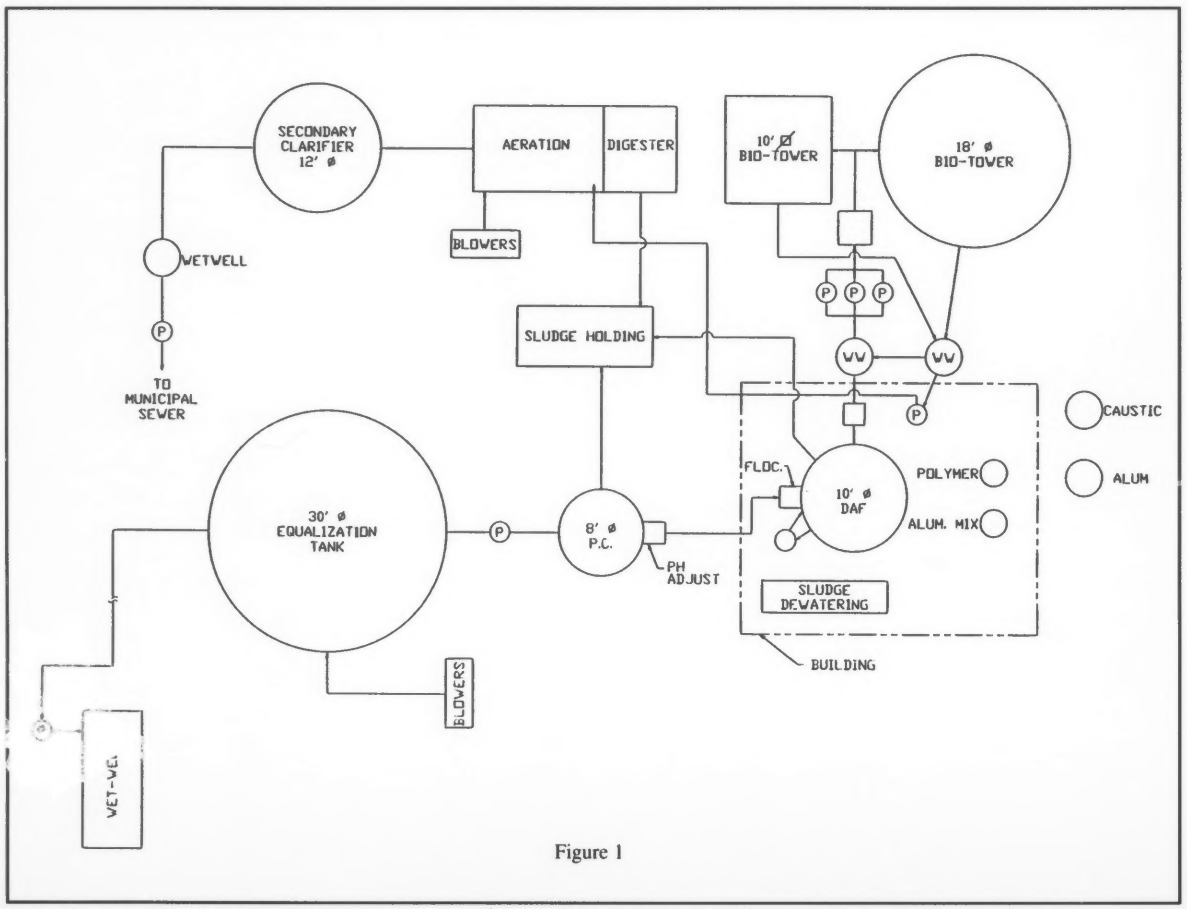

Figure 1

particles tend to collapse under pressure and blind filter media. To prevent blinding of the filter cloth it is necessary to precoat and body feed approximately one half pound of diatomaceous earth (DE) per gallon of sludge dewatered. Dewatered sludge with a solids content greater than 20% can be disposed of in a sanitary landfill.

Equipment Selection for Unit Processes

Wastewater is pumped by an air operated diaphragm pump from a receiving wetwell at the bakery. The diaphragm pump allows the pumping of low flows that contain solid material. The pumps are controlled by the liquid level in the wetwell. The force main discharges directly into the equalization basin.

The equalization basin is 30 feet in diameter by 15 feet high. The structure is fabricated of 304 stainless steel to withstand the wide range of pH. The basin is aerated by diffused aeration with air supplied by rotary positive blowers. Air is supplied at the rate of 20 scfm per 1000 cu. ft. of volume. This air volume is sufficient to maintain solids in suspension. An air operated diaphragm pump pumps wastewater from the bottom of the equalization tank at a constant rate into the primary clarifier.

The primary clarifier is eight (8) feet in diameter and is also fabricated of 304 stainless steel. The clarifier is equipped with a fiberglass peripheral weir and a mechanical skimmer mechanism. Sludge is concentrated in the conical bottom hopper. The sides of the hopper are angled at 60° off the horizontal to aid sludge concentration. Effluent from the primary clarifier flows by gravity into the pH adjustment tank which is welded to the side of the primary clarifier. An electric mixer in the pH adjustment tank provides an intimate mix of the clarified wastewater with the pH adjusting chemicals. The effluent from the pH adjustment tank flows by gravity into the flocculation tank which is located in a building. The slowly mixed flocculation tank is attached to the DAF unit. The flocculated wastewater flows by gravity into the DAF.

The DAF is a circular unit ten (10) feet in diameter. The DAF and its associated equipment is made of carbon steel painted with coal tar epoxy. The DAF is equipped with a top surface skimmer and a bottom sludge scraper. The drive mechanism has a variable speed drive. The variable speed drive is necessary because the thickness of the float can be controlled by the rate of withdrawal. A portion of the clarified liquid is collected and pumped by a centrifugal pump into a reservoir. The reservoir is a steel pressure tank. Air is injected into the tank along with the recycled water at a pressure of 60 psig. The tank is sized for sufficient detention time for the water to become saturated with air (approximately 10 min.). The water and air solution is released from the pressure tank through a spring loaded weir type diaphragm valve. The recycle water/air mixture is injected into the transfer line between the flocculation tank and mixing chamber in the center of the flotation tank. A thick layer of air and solids float to the surface and clarified liquid is withdrawn below the floating material.

The aerobic bio-tower consists of two units filled with oriented plastic block media. One of the towers is ten (10) feet square and twenty-six (26) feet high. The second tower is eighteen (18) feet in diameter and thirty-two (32) feet high. The wastewater and recycle is pumped to the top of the towers by centrifugal pumps where the flow is split based on the area and volume of media in each tower. As the wastewater trickles over the surface of the media, the biological growth which attaches to the media breaks down the dissolved organics to a level that they can be reasonably handled by an activated sludge process. As the wastewater leaves the bottom of the bio-tower a portion equal to the raw wastewater flow is pumped by an air operated diaphragm pump to the completely mixed activated sludge plant. The remainder of the flow from the bottom of the tower is mixed with DAF effluent and recycled to the tower.

The completely mixed activated sludge plant consists of an aeration tank twelve (12) feet wide, eleven (11) feet six (6) inches high and twenty-five (25) feet long and a twelve (12) foot diameter secondary clarifier with a mechanical skimmer and scraper. The aeration tank is divided into two compartments. One compartment is a completely mixed reactor that is aerated by a medium bubble aeration system. The second compartment is an aerobic digester which is also aerated by a medium bubble aeration system. Air is provided to the aeration system by rotary positive blowers. The tanks are mounted above grade on a concrete slab and are fabricated of carbon steel. The steel is protected against corrosion by coal tar epoxy on the interior and an epoxy enamel on the exterior. Greases and frothy material that collect on the surface of the aeration tank have wide variations in pH and will dissolve or soften some paints.

Five (5) different chemicals are fed at various points throughout the treatment system. The chemicals are caustic, alum, sulfuric acid, polymer and nutrients. Caustic is fed in a 50% solution from a bulk storage tank. The caustic storage tank is made of carbon steel and has a capacity of one and one-half times that of the tank truck used to bring liquid caustic to the site. Continuous monitoring of pH at various points allows the feeding of caustic at a variable rate as needed to maintain the pH. If dumping of a highly alkaline solution occurs and the pH rises above the desired set point, sulfuric acid is fed from the shipping drum to bring the pH down. In designing a system to store and feed 50% caustic, care must be taken to insulate and heat tanks because the caustic will freeze in the tank and lines at 55°F.

Alum and polymer are mixed from the dry form and fed as a liquid by pulse type diaphragm metering pumps. Nutrients are fed in the dry form directly into the DAF effluent by a volumetric dry chemical feeder.

Effluent Quality

Two (2) years of operation and testing have shown that the system can treat the wastewater to the level that it is acceptable for the municipal sewer system. When the system is operating with the design loadings and operational considerations addressed, the effluent from the pretreatment system will have less than 300 mg/1 BODG; 300 mg/1 TSS; and 10 mg/1 oil and grease. The pH normally runs in the 7

to 8 range. Unfortunately, the variable nature in the waste causes operational difficulties that affect the effluent quality. These operational considerations along with some solutions will be discussed in another section of this paper.

After the start-up procedure is completed the system averages 96% removal of BOD and suspended solids. Oil and grease removal averages better than 99% at all times.

Operational Considerations

The highly variable nature of the raw wastewater, high soluble organic content, high oil and grease content, critical pH control requirement, and multiple unit operations present numerous operational problems.

Variable Wastewater Constituents

When the constituents in the wastewater vary on a daily basis as shown in Table 1, a tremendous strain is placed upon each operational unit. A dump of oil in the bakery causes clogging of pipes and pumps, accelerates build up on the surface of the equalization tank and demands a change in the chemical feed rate for coagulating chemicals. A dump of cleaning solutions which are usually alkaline cause an immediate demand for pH adjusting chemicals. If the chemicals are not provided the whole biological system can be killed or retarded by a rapid excursion of the pH. A dump of sugar down the drain can probably be the most damaging because the biological systems have become acclimated to a relatively fixed organic load. When the concentrated organics reach the biological treatment units the normal result is a drop in effluent quality because of bleed through of dissolved organics. There is not an immediate correction that can be made, other than increasing air flow rate, to compensate for this change. Once the high organic level passes through the system, the effluent quality will return to the previous level.

The above points show that a close working relationship must be developed between the sanitation/maintenance people and the treatment plant operators. The sanitation people must understand how the things they do affect the treatment plant operation. For the sanitation person, it is easier to "wash it down the drain", but this can cause nightmares for the treatment plant operator. A simple dry clean step before washdown can save the treatment plant, maintain effluent quality, and reduce operating costs.

High Soluble Organic Content

The dissolved organics are sugars that pass unaffected through the physical/chemical system and into the biological system. The organics that leave the DAF are essentially all in the soluble form. The BOD leaving the DAF ranges between 5000 mg/l and 7500 mg/l. This level of organics causes the proliferation of many desirable and undesirable microorganisms in the aerobic bio-tower. These organisms grow very fast and if not controlled will actually clog the openings in the media and result in failure of the structural integrity of the media and/or the quality of effluent. If the correct structural media is selected, the greatest danger is a complete clogging of the openings in the media. Once the media openings are closed off by the growth of biomass there is no way to clean the tower except to remove the media blocks piece by piece and individually wash them out. This situation actually occurred in this bio-tower in March, 1988. The tower media is deep and it is not easy to see inside the media bed. The top layer of media is usually clean, but the lower layers can become clogged and the operator may not be aware of the situation until it is too late. Different methods of cleaning the tower were tried. The first and obvious method was to shock the tower with chlorine which failed and seemed to make bad matters worse because the surface of the biomass became stiff and leathery and made washing off more difficult. Another cleaning method was the use of caustic, but it gave similar results. Hydrogen peroxide gave promising results but because the tower was so clogged the hydrogen peroxide could not penetrate into the depths. In the final analysis the only way to open up the tower was to remove the media one piece at a time and clean it with a pressure wash. This procedure took two men about three weeks to accomplish. As the tower was being cleaned, samples of the bio-growth were collected and analyzed microscopically to determine the predominating microorganisms and to establish a baseline so that as the bio-tower was restarted a control could be established to prevent a recurrence of the clogging of the tower.

The biogrowth seemed to develop a tenacious attachment to the media which did not allow the normal sloughing from the media surface. The general feeling of microbiologists that analyzed the microbial growth is that the tower was clogged by a combination of filamentous organisms and filter clogging algae. When conditions exist that may allow the growth of filter clogging organisms careful precautions must be taken to know if the tower is beginning to build up growth so that corrective action can be taken **before** clogging occurs. About a month after the tower was put back on line the efficiency of BOD removal was 80-plus percent and there was an obvious growth on the media surface. At this time another microbiological study was made to determine if the same type of biota was beginning to grow.

The microbiological study of the biomass in the top three layers of media and underneath the media support indicated a healthy bio-tower. The organisms in greatest abundance were bacteria species including: Psudomonas, Alcaligenes, Flavo-bactrium, Micrococcus and other members of the Enterobacteriaceae family. Also found in the filter are the animal population of which the protozoa are predominant. In addition the higher animals include worms (nematodes), snails, larva, etc. The nematodes do not contribute directly to bio-degradation of organic materials in the tower, but they are indicative of healthy activity. The nematodes by their activity tend to break material up and cause more sloughing from the media surface. Some filamentous organisms and algae were observed to exist but not to a level of concern. Another very important item was observed under microscopic examination. The biomass contained an excessive amount of phosphate crystals. Test of wastewater samples indicated a level of 80 mg/l of

phosphate. It appears that the build-up of filter clogging algae is associated with excessive amounts of phosphorous which is available to these organisms. Also an excess of nitrogen contributes to the excessive algal growth but the effect is not as great and predominant as phosphate.

The first and easiest control initiated was to stop feeding phosphate nutrient and reduce the nitrogen feed rate by 50 percent. In addition a supplemental bioaugmentation additive is being utilized to help maintain a population of desirable organisms. Obviously, the bio-tower cannot be allowed to deteriorate to its former clogged state. As a preventative measure, we instituted a twice per week sampling of biomass and microscopic examination on site to search for certain indicator organisms. These indicator organisms are an excessive number of Anacystic algae, Fragalaria, Palmella and Chlorella. Cyclotella is an indicator organism of an advancing state of filter clogging. The media must be visually inspected for excessive build up. This potential build up must also be cross checked microscopically for the indicator organisms and filamentous growth. A nitrogen and phosphorous profile is being performed weekly and adjustments are made to limit these nutrients to the bio-tower. If the above controls fail to prevent excessive build up of bio-mass, the growth will be control-killed with hydrogen peroxide. This is a last resort measure as there will be a reduction in effluent quality after each kill of the tower.

Sludge Disposal

The high oil and grease content in the sludge from snack food bakeries make the sludge residues very difficult to dewater. The grease tends to blind filtering medium on mechanical dewatering units. A desirable method of final disposal would be to a rendering plant to make animal feed but the rendering plant cannot handle the high grease content. Three methods of sludge disposal are presently available at this treatment plant site.

The plate and frame filter press has proven to be an unacceptable alternative because of the high cost of filter aid and the operator attention required to run the system. The press will, however, turn out an acceptable sludge cake that can be finally disposed of in the local sanitary landfill. The press operation has been abandoned and the operators have reinstituted their former method of sludge disposal. This method of disposal includes pumping the sludge into a truck and hauling the liquid sludge to a municipal sewage treatment plant. This is an interim measure as it will not be allowed to continue because of overload on the municipal treatment plant.

A third method of sludge handling that is available are sludge drying beds and hauling to a sanitary landfill. A test drying bed was built to determine the viability of this method of drying snack food bakery sludges. Sludge placed in six (6) inch thick layers dried to a cake in ten (10) days. Excellent drying conditions existed. Most of the moisture was removed by evaporation as indicated by only 10% of the sample volume being collected as filtrate. There is ample land available and construction of the sludge drying beds will begin after January 1, 1989. The beds will be covered to prevent rainwater from rewetting the dried sludge. The cake is dry enough to be picked up by a front end loader and loaded on a dump truck for transport to the sanitary landfill.

Summary and Conclusions

Snack food bakery waste with its high soluble organics and high oil and grease content can be pretreated by a combined physical/chemical and aerobic biological system to a level acceptable for discharge into a municipal sanitary sewer system. Attention to operation of the processes and equipment is critical. A malfunction of one of the unit processes can disrupt and be detrimental to the function of the whole system. Experience, operator training, and the commitment of all involved are vital factors in producing a working, operable system producing consistent in spec results.

Acknowledgements

The help of Dr. William F. Pfeiffer, T.P. Associates International, Inc. in evaluation of the microbiology of the bio-tower is gratefully acknowledged.

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Dairy, Food and Environmental Sanitation, Vol. 9, No. 2, Pages 75-76 (February 1989)

Cleanability Requirements of Dairy Processing Equipment Meeting 3-A Sanitary Standards

by

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The objective of sanitary equipment design is to facilitate cleaning and sanitizing of dairy processing equipment as well as protection of the product. This means more than bright shiny stainless steel or other equally sanitary materials. Among other considerations, sanitary design of equipment means that the equipment is so designed that all product contact surfaces will be in contact with circulating cleaning solution in sufficient volume and velocity to effectively clean them. Cracks and crevices must be eliminated or fabricated so these voids will receive sufficient flow of cleaning solution into and out of them to remove soil. This is especially true of bearings, seals, valve seats, O-Ring grooves and gasketed surfaces. Product zones where proper flow cannot be established to remove dairy soil must be cleaned manually.

The equipment must be designed to provide adequate drainage of cleaning and sanitizing solutions as well as product. Properly designed covers, vents and shielding is often needed to protect the product from contamination, condensate, splash or air borne material. All equipment must be designed so that it can be easily disassembled by hand or common tools to evaluate the cleaning procedures used.

Why the stringent criteria? Dairy foods are perishable, are potential carriers of disease and spoilage organisms, and are of utmost importance in the diet. This is especially true for diets of infants and elderly persons.

There seems to be much confusion over the cleanability requirements of equipment bearing the 3-A Symbol and/or equipment meeting 3-A Sanitary Standards as they relate to mechanical cleaning versus manual cleaning. The objective of this article is to address these issues. Just because equipment bears the 3-A Symbol or is designed for mechanical cleaning does not always mean that it will be clean following mechanical cleaning. Parameters of time, temperature, cleaning solution type and concentration, flow velocity as well as soil type and load must be considered in establishing a mechanical cleaning regime. Once established the cleaning regime must be monitored constantly and carefully controlled. To effectively monitor the regime, it is necessary to disassemble the equipment periodically for direct observation for adequate cleaning.

Next we should review sanitary design principles applicable to dairy and food processing equipment. The first six principles apply to product contact surfaces and the last one to non-product contact surfaces.

1. Product contact surfaces must be fabricated from impervious, corrosion-resistant, non-toxic and non-absorbent materials.
2. Product contact surfaees must be smooth, non-porous and free of pits, folds and crevices, and have proper radii at junctions and in gasket grooves.
3. Product contact surfaces must be visible for inspection when assembled or be readily disassembled by hand or common tools for inspection, and it must be demonstrated that routine cleaning and sanitizing procedures are effective.
4. Product contact surfaces must be readily accessible for disassembly and manual cleaning, or if mechanical cleaning techniques are used, it must be demonstrated that routine cleaning and sanitizing procedures are effective.
5. All interior surfaces with product contact must be self-draining and contain no dead-ends.
6. Equipment must be designed to protect the contents from external contamination.
7. Non-product contact surfaces must be finished and constructed in such a manner to prevent harboring of soil, bacteria or vermin in or on the equipment as well as their entrapment around equipment, walls, floors or supports.

Prior to 1955, most mechanical cleaning was accomplished with existing product pumps. Fixed tanks or small portable tanks were used as solution tanks for the recircula-

tion procedure. Early applications were restricted to piping systems, and usually to long runs of permanently installed piping systems. The expanded use of mechanical cleaning procedures has provided for many changes in processing technology resulting in continuous and automated operations. Mechanical cleaning has been recognized as a reasonable concept and is being incorporated into appropriate 3-A Sanitary Standards or 3-A Accepted Practices as a design option.

Mechanical cleaning is defined in 3-A Sanitary Standards, Section B. "*Mechanical Cleaning or Mechanically Cleaned:* Shall denote cleaning, solely by circulation and/or flowing chemical detergent solutions and water rinses onto and over the surfaces to be cleaned, by mechanical means."

Although manual cleaning is not part of the definition section of 3-A documents, it is generally accepted as complete disassembly, pre-rinsing and by rinsing and/or brushing with solutions containing cleaning chemical(s) at required levels, followed by post rinse. The equipment is allowed to dry and is then reassembled, followed by application of sanitizing solution or hot water just prior to commencing processing.

The fabrication, or D section, of 3-A Sanitary Standards provides design criteria for mechanical cleaning and/or manual cleaning. The current, accepted verbiage for cleaning criterion is contained in three D sections.

"Appurtenances having product contact surfaces shall be easily removable for cleaning, or shall be readily cleanable in place."

"[Name of equipment] that are (is) to be mechanically cleaned shall be designed so that product contact surfaces of the [name of equipment], and all non-removable appurtenances thereto can be mechanically cleaned and are accessible for inspection.

"Product contact surfaces not designed to be mechanically cleaned shall be easily accessible for cleaning, and inspection either when in an assembled position or when removed. Removable parts shall be readily demountable."

In some of the older standards, mechanical and manual cleaning criteria are covered in one paragraph in the fabrication section.

"All product contact surfaces shall be easily accessible for cleaning, either when in the assembled position or when removed. Removable parts shall be readily demountable."

The equipment to be mechanically cleaned must meet the design criteria found in the appropriate 3-A Sanitary Standards or it must be manually cleaned. This means, although equipment may bear the 3-A Symbol or is certified by the manufacturer to meet 3-A Sanitary Standards, it is not necessarily cleanable by mechanical means. Cleanability can also be affected by installation. The question of mechanical cleaning therefore initially becomes a User-Fabricator decision. To repeat for emphasis, just because equipment is designed for mechanical cleaning does not always mean it will be clean following mechanical cleaning.

The question of clean-in-place (CIP) is something of another matter. The term clean-in-place is often incorrectly used interchangeably with mechanical cleaning. It is used incorrectly, if one considers CIP to mean mechanical cleaning with infrequent, or perhaps without ever, manual inspection for cleaning efficiency. There is not a definition of CIP found in 3-A Sanitary Standards. There is only one type of equipment and one system currently recognized by most sanitarians as acceptable for CIP cleaning: (1) permanently installed sanitary pipelines or (2) silo-type tanks. All other equipment designed to be mechanically cleaned needs periodic inspection and possible manual cleaning. This must be determined through manual disassembly and inspection. Frequency of visual inspections is initially a User-Fabricator decision subject to verification and/or re-evaluation by the User as experience dictates. There are certain pieces of equipment, such as manually operated plug valves, which must be cleaned manually.

The question of whether to CIP, mechanically clean or manually clean a piece of equipment or a system is one of much more than the equipment bearing the 3-A Symbol or meeting 3-A Sanitary Standards. With the exception mentioned above, processing equipment or systems must be evaluated with respect to design and installation, and followed by field experience as whether it can be CIP, mechanically cleaned or cleaned manually. It ultimately becomes the User's responsibility to make this determination and to verify the decision by field experience. The 3-A symbol gives no assurance a piece of equipment can be mechanically cleaned or that it is suitable for CIP cleaning.

Editors Note:

Information on the 3-A Sanitary Standards program is available from the:

Secretary, 3-A Sanitary Standards Committee, 6245 Executive Blvd., Rockville, MD 20852 301/984-1444.

Inquiries for authorization to use the registered 3-A Symbol should be directed to:

Secretary-Treasurer, 3-A Sanitary Standards Symbol Administrative Council, W 255 N477 Grandview Blvd., Waukesha, WI 53188 414/542-0200.

Complete sets of published 3-A Sanitary Standards and Accepted Practices are available from the:

International Association of Milk, Food and Environmental Sanitarians, Inc., PO Box 701, Ames, IA 50010 515/232-6699.

News

NEW...IAMFES TABLE TOP EXHIBIT HOURS

New expanded exhibit hours will be featured during the 76th IAMFES Annual Meting, August 13-17, 1989 in Kansas City, Missouri. The exhibit hall in the Hyatt Regency Crown Center will be open as follows:
Sunday, August 13:

Set up and Exhibitor Registration 9:00 am - 12 noon ONLY
Open 1:00 - 5:00 pm
Open 8:00 - 10:00 pm during the Wine and Cheese Reception directly following the opening session

Monday, August 14:

7:30 - 9:00 am coffee served in exhibit hall
10:00 - 1:15 lunch available in exhibit hall
3:00 - 4:00 during breaks

Tuesday, August 15:

7:15 - 8:15 am coffee served in exhibit hall
10:00 - 1:15 lunch available in exhibit hall
3:00 - 4:00 during breaks

Wednesday, August 16:

7:15 - 8:15 am coffee served in exhibit hall
10:00 - 1:15 lunch available in exhibit hall
TEAR DOWN 1:15

Up to three company representatives are allowed under the Table Top Exhibit Fee. Additional company representatives are available at regular registration rates.

For more information, contact IAMFES Advertising, PO Box 701, Ames, IA 50010, 515-232-6699, 800-525-5223, FAX 515-232-4736.

Safe Drinking Water Hotline

The U.S. Environmental Protection Agency has a telephone hotline to assist the public in understanding the EPA's drinking water regulations and programs developed in response to the Safe Drinking Water Act amendments of 1986. The hotline provides information on the availability of Safe Drinking Water documents and accepts requests for some Safe Drinking Water publications. The hotline is staffed by specialists who have technical backgrounds and a high degree of regulation and programmatic policy knowledge. Contact the Safe Drinking Water Hotline at (800) 426-4791, Monday through Friday, from 8:30 a.m. to 4:30 p.m.

Distinguished Order of Zerocrats Announce Induction of Four New Members

The Distinguished Order of Zerocrats have announced the induction of four industry leaders into the National Order. This announcement came at the annual Distinguished Order of Zerocrats Reception and Dinner, Saturday, October 8, held during the National Frozen Food Convention and Exposition in Chicago.

Sworn in were Steven A. McNeil, Campbell Soup Co., Camden, NJ; Jules Rose, Sloan's Supermarkets, New York City, NY; Robert Schwarze, National Food Brokers Association, Washington, DC; and, Edward J.R. Scott, United States Cold Storage, Inc., Sydney, Australia.

The Distinguished Order of Zerocrats is an organization developed to maintain the traditions and promote the advancement of the frozen food industry by providing and encouraging financial support to educational institutions and students; maintain historical memorabilia, and honor individuals who have contributed greatly to the frozen food industry.

For additional information, contact the National Frozen Food Association, PO Box 398, Hershey, PA 17033, (717) 534-1601, or the American Frozen Food Institute, 1764 Old Meadow Lane, Suite 350, McLean, VA 22102, (703) 821-0770.

BIP Plant Receives Environmental Award

The Industrial Waste Committee of the New Jersey Water Pollution Control Association has presented its 1988 Excellence in Wastewater Treatment Award to Busch Industrial Products Corporation. This Award specifically recognizes the innovative design and operation of the BIOTHANE anaerobic pretreatment system at the Old Bridge bakers yeast plant. BIOTHANE Corp. congratulates the folks at BIP and shares in the pride of applying state-of-the-art technology. The system offers the dual benefit of providing cost effective pretreatment for BIP while at the same time reducing loading to the local treatment authority.

Cheese Research and Technology Conference

March 29 and 30, 1989, the Center for Dairy Research at the University of Wisconsin-Madison hosts its Cheese Research and Technology Conference at the Holiday Inn East Towne, Madison, Wisconsin.

CDR's Cheese Research and Technology Conference has three main focal points: profitability in cheesemaking, considerations and opportunities for specialty cheesemaking and an update on dairy foods research at the U.S. dairy research centers.

The program will address some of the factors that influence the profitability of cheesemaking. Presentations by dairy and food scientists from both universities and industry will address topics on cheese yield, milk quality and composition, microbiological specifications, and starter media and enzymes. Attention will also be given to the current research results on the safety of heat-treated milk and an update and forecast on the use of ultrafiltered milk in cheesemaking.

A panel will evaluate the opportunities and considerations for entering into specialty cheese manufacturing. The panel will be comprised of specialty cheese market analysts and leaders in the specialty cheese manufacturing industry.

An overview of research in progress at the six dairy foods research centers will be presented. There will be a poster session describing research projects underway at the Center for Dairy Research.

For more information, write Sarah Quinones, Conference Coordinator, Center for Dairy Research, 1605 Linden Drive, Madison, WI 53706 or call 608/262-2217.

Lactose Intolerant? You Can Do Something

For the almost 30 million Americans who experience some degree of lactose intolerance, new research findings are spelling good taste and nutrition news.

Contrary to popular opinion, lactose intolerance is not an "all or nothing" phenomenon. Current studies indicate that this condition -- a difficulty in digesting "lactose," the major sugar present in milk -- can be controlled through easily achieved steps to manage the diet.

Approximately 20 percent of Americans reportedly have an inability to digest lactose. For some of these people, this inability can cause symptoms, including stomach cramps, bloating, discomfort and diarrhea after eating or drinking dairy foods. But recent studies at leading universities support the premise that many, if not most, of these individuals can learn to include dairy products in their diets without experiencing discomfort.

The findings hold special significance for certain ethnic groups, including Blacks, Asians and Hispanics, who experience a high incidence of the condition. Avoidance of dairy foods can jeopardize eating a balanced diet and, in turn, general health. Dairy foods contribute about three-fourths of the calcium present in the food supply. Dairy foods also are common sources for other essential nutrients, such as protein, riboflavin and magnesium.

By definition, lactose intolerance occurs because an individual does not produce a sufficient amount of the intestinal enzyme "lactase" to break down or "digest" the lactose that is consumed, resulting in the occurrence of intestinal discomfort.

"Some fermented products like yogurt actually gidest lactors through the active cultures they contain, and so these are more easily handled," says Dennis A. Savaiano, Ph.D., a leading researcher in the field and an associate professor at the University of Minnesota. "Also, eating dairy foods with meals slows down digestion, a positive factor for those who suffer discomfort."

"Some people -- especially those in affected ethnic groups -- may be eliminating dairy products simply because they've heard so much about the problem. In fact, it isn't surprising to find in our research some individuals who do not test clinically positive, but who firmly believe that they are experiencing symptoms of lactose intolerance," Savaiano reports.

Several practical approaches are available to lactose intolerant persons to regularly include dairy foods in their diets. According to Savaiano, one of the easiest ways is to consume small quantities of dairy foods as part of a meal or snack, rather than alone.

Savaiano and a panel of his peers, including researchers from Tufts University, Johns Hopkins Hospital, Baylor College of Medicine and Massachusetts Institute of Technology have compiled a variety of recommendations for lactose intolerant persons. They include this advice:

Eat dairy foods in small, frequent servings, comparatively speaking.

Pick dairy foods that are slowly digested and therefore better tolerated. Whole or chocolate milk may be better tolerated than reduced fat milk. Aged or ripened cheeses contain very little lactose. Ice cream and ice milk also are good choices.

Choose yogurt and frozen yogurt with active cultures (i.e., yogurt that has not been pasteurized *after* being made, but contains pasteurized milk as an ingredient).

Look for lactose-reduced products, available in many parts of the country. These include milk, ice cream, cottage cheese and American process cheese food slices.

Eat and drink dairy foods along with other foods, not in isolation.

Try gradually increasing the amount of lactose-containing foods in the diet over time. Tolerance can and often does improve.

Relax and don't anticipate problems. Stress never helps!

Additional tips are provided in National Dairy Council 's (NDC) brochure, "Getting Along With Milk:

For People With Lactose Intolerance," available from NDC and its affiliated Dairy Council units nationwide.

National Dairy Council conducts nutrition education and nutrition research programs as part of United Dairy Industry Association. UDIA and its member organizations and NDC-affiliated Dairy Council units create and coordinate a unified promotion program for the dairy industry.

National Mastitis Council

The 28th Annual Meeting of the National Mastitis Council will be held February 9-11, 1989 at the Hyatt Regency in downtown Tampa. The program will highlight mastitis prevention and quality milk production.

The General Session starts on Friday, February 10, at 11:00 a.m. It concludes at noon on Saturday, February 11. Committee meetings will be held on Thursday, February 9. Meetings are open to all registered attendees of the conference.

Friday's General Session will focus on milk quality. Topics include: the effect of mastitis on dairy products, chemical residues in milk, a report of national DHI SCC data, and milk testing. An update on stray voltage will also be presented.

Saturday begins with a session on "Mastitis Control". Presentations include new tests for mastitis pathogens, bulk tank culturing, and recent progress toward mastitis vaccines. The final session theme is "Milking Machines". Featured will be a milking machine research update, mastitis and the milking process, milking system analysis, and a review of U.S. standards.

The meeting will also feature a Technology Transfer Session. University and industry exhibitors will present data on mastitis and milk quality. A special seminar on "Robotics and Expert Systems" is also scheduled.

For additional information, contact Anne Saeman, National Mastitis Council, 1840 Wilson Blvd., Arlington, VA 22201, (703) 243-8268.

SAFE FOOD - Pesticide Residues No Major Problem, Says Medical Official

Food supplies today are safe despite public outcries about pesticide residues, said a Texas medical authority.

"Public outcries about unsafe food products due to pesticides are unwarranted," said Dr. Sanford Miller, dean of the Graduate School of Biomedical Sciences, University of Texas Health Science Center at San Antonio.

"The issue of chemicals in our food supply creates a lot of noise and drama--but has little content," Miller told participants of the Texas Vegetable Association convention.

"There isn't a single illness that has been associated with chemicals in food when those chemicals have been appropriately applied," Miller said. "On the other hand, 20 million to 40 million cases of food borne diseases are reported on a yearly basis.

"That's where I see the main problems with food safety -- with microbes or 'bugs' that develop with unsafe food handling and related practices.

"These naturally occurring materials are more difficult to determine than synthetics such as pesticides," he said, "because we know what makes up a synthetic. A case in point is basking in the hot summer sun; that's much more damaging than consuming certain pesticides."

Miller, who spent nine years in Washington, D.C. with the Food and Drug Administration, said that the FDA is doing a good job in sampling food products for pesticide residues and other contaminants. However, the agency has limited resources and needs more support from Congress and the President.

"Each year FDA samples some 250 food products on a regional basis for contamination," Miller said. "These products are checked and then prepared just as you would do in your home. This yearly sampling has detected minor pesticide contaminations (below the tolerance or allowable level), but these have been decreasing at a time when pesticide use has been increasing."

The medical official said that while long-term exposure to pesticide residues could present a problem, it's just not realistic.

"It's the same situation with numerous other products," he said. "Unless you consume large quantities on a daily basis, there won't be a problem."

Miller said that there is no evidence of increasing cancer rates that might stem from food contaminants or other materials. "It's (the evidence) just not there. Most cancer rates are coming down, people are living longer, and their quality of health is better."

Miller said that a major educational effort is needed to ensure the safe use of pesticides and new safety procedures. "You as producers have a responsibility to provide safe food for the public," he said. "That should be your goal."

Dr. Al Wagner, a food technologist with the Texas Agricultural Extension Service, echoed Miller's comments regarding pesticide residues in food products.

"It's refreshing to see someone of Dr. Miller's caliber take such a common-sense approach to the issue of pesticide residues in food," Wagner said. "So many people get all worked up about this issue, yet all the data and sampling show that there is no problem."

"Our main concern regarding food safety--which was the same voiced by Dr. Miller--is that of microbiological agents such as bacteria, yeasts and molds," Wagner said. For example, listeria is a bacteria that is currently presenting a lot of problems through its flu-like symptoms. It is found in food products that are improperly refrigerated or improperly cooked before use, he said.

"Dealing with these microbes is one of the main issues we are trying to address as far as food safety is concerned," Wagner said. "Of course, we are continuing

to emphasize the safe use of pesticides by producers of food products."

AOAC in Palm Beach for 102nd Annual Meeting

AOAC held its 1988 Annual International Meeting August 29-September 1 at the historic Breakers Hotel in lovely Palm Beach, Florida. This well attended meeting attracted about 1,000 professionals in the analytical science field.

President Robert Rund presided over the Opening Session on Monday morning. There he received the Presidential Plaque from the then President-elect, Odette L. Shotwell, and gave the Presidential Address.

After the keynote speech, "From Parochial to International," by Alex Williams, the Government Chemist of England, Dr. Frederick Kavanaugh, whose last position was at Eli Lilly & Company from 1953 to 1973, received the 1988 Harvey W. Wiley Award. Dr. Kavanaugh won the award for his contributions to the fields of analytical chemistry and microbiology, and for his significant contributions to the design of scientific instrumentation and methodology. At the meeting he spoke on "The Need for Accurate Assays and Competent Analysts." Many other prestigious AOAC awards were presented (details were given in previous press releases) including: the Collaborative Study of the Year, General Referee of the Year, Associate Referee Awards, Fellows of the AOAC, and the Wiley Scholarship.

The chartering of the new AOAC Central Regional Section was recognized. It covers the states of Michigan, Ohio, Indiana, Kentucky, West Virginia, and part of Pennsylvania. This brings the total number of AOAC regional sections to eight.

The technical program featured five symposia: a spotlight symposium on Biotechnology, and others on Laboratory Information Management Systems, Fertilizer Phosphate Evaluation and Analysis, Drug and Antibiotic Residues, and Pesticides in Foods.

Eighty-three exhibitors displayed their products in the Italiante exhibit halls of The Breakers and also held a standing room only workshop on new products for the modern laboratory.

Over 200 technical poster presentations focused on topics such as pesticides, disinfectants, foods, residues, microbiology, feeds, fertilizers, drugs, and hazardous substances in waste and the environment. The topic of the Regulatory Roundtable was "Safety: The New OSHA Regulations--Their Impact on Laboratory Safety and Issues Relating to Compliance." At the popular Open Forum, attendees discussed mutual concerns and interests.

The President's Reception on Sunday evening kicked off the social program. Held in the hotel's Beach Club overlooking the ocean, the reception honored outgoing President and Mrs. Robert Rund.

The beautiful Beach Club was also the site for the Surfside Supper. There, a delicious buffet, warm ocean breezes, music and dancing made for a very enjoyable evening.

The Meeting closed with its Business Meeting on Thursday, September 1, where Odette L. Shotewell received the Presidential gavel from Robert Rund.

Treating Home Water Quality Problems

Reddish slime in the water and stains on your laundry? Cloudy water? Water that smells or tastes funny?

Two new publications on water quality from the Texas Agricultural Extension Service give consumers some suggestions for dealing with these and other water impurities.

Water related problems are found primarily in homes serviced by a private water supply, although a few of them will also be found in water from municipal water supplies.

In some areas where impurities are not a concern, consumers would still like to improve the taste quality of their tap water.

The fact sheet "Home Water Quality Problems" (L-2279), describes the symptoms, probable causes and suggested treatments for common household water problems.

A new publication on "Home Water Treatment Systems" (L-2280), provides consumer information on the advantages, disadvantages and costs of various types of filters and reverse osmosis units for improving household water quality.

A single copy of each publication is free from county Extension offices or can be ordered by title and number by writing the Texas Agricultural Extension Service, 102 Reed McDonald, College Station, TX 77843-2112.

Microwave Technology in the Food Industry

The 35th Annual Food Technology Conference, co-sponsored by the University of Missouri and the Kansas City and St. Louis Sections of the IFT will be held March 21, 1989. Microwave technology will be highlighted.

The Conference will take place in the Memorial Union on the University of Missouri-Columbia Campus. For more information contact R. T. Marshall, 122 Eckles Hall, Columbia, MO 65211, phone 314/882-7355.

Free Compliance Guidebook

This new "Environmental Regulatory Compliance Guidebook" for end users of chemicals explains, in great detail, who must comply and how to comply with all of the environmental regulations now in effect. All facilities are covered, regardless of size or type, including manufacturers, offices, commercial buildings, schools, medical facilities, commercial establishments, institutions, etc.

The Guidebook explains each of the applicable laws including the:

*Occupations Health and Safety Act, Hazard Communication Standard (OSHA HCS)

*Comprehensive Environmental Response, Comprehensive and Liability Act (CERCLA)

*Superfund Amendments and Reauthorization Act (SARA)

*Emergency Planning and Community Right-to-Know Act

*Resource Conservation and Recovery Act (RCRA)

The Guidebook lists all pertinent compliance deadlines, as well as the specific responsibilities under each law. The penalties for non-compliance and where to get assistance are also provided.

To get your free copy, mail $1.00 for postage and handling to Fidelity Products Company, PO Box 155, Minneapolis, MN 55440-0155.

Northland Food Laboratory Plans Expansion of Present Testing Capabilities

In the near future, Northland Food Laboratory plans to expand its testing capabilities to extend to high performance liquid chromatography (HPLC) for complete Food, Dairy, Beverage and Water analysis.

HPLC, as it is called, serves several objectives:

1.To detect the presence of one or more ingredients or contaminates in a mixture (qualitative analysis)

2.To measure the amount of one or more ingredients or contaminates in a mixture (quantitative analysis)

3.To isolate and collect a single ingredient from a mixture for further analysis (preparative purification and isolation)

All of the above areas can be used by HPLC for quality control - Process/product evaluation, and analytical testing.

Some of the various types of products which can be tested are: Water, Milk, Dairy Products, Meat, Vegetables, Breads, Fruits, Ice Cream Mix, Hazardous Wastes, Various Foods, Grains, Snack Foods, and Environmental Samples.

These are just a few of the more common things which can be tested for using HPLC. Let us know what you are being requested to analyze for and we can most likely check for it.

We promise a very rapid turn around time and results which are extremely accurate using EPA, AOAC, and accepted methods of analysis. Northland Food Laboratory will be able to supply you with sample containers, instructions for taking samples, and established tolerances and EPA guidelines.

For more information, contact: Steven A. Kohl, Northland Food Laboratory, 1044 Parkview Road, Green Bay, WI 54304 414/336-7456.

Buyers Crave Craisins

Dried fruit is becoming a big business, especially in cereals, baked goods and dairy products. Consumers are buying a wider range of products containing fruit as they look for more nutritious food choices.

Enter CRAISINS brand sugar-infused, dried cranberries from Ocean Spray, sold in 25-pound bulk boxes. The product is the number one priority for the Ingredients Division at Ocean Spray.

"Berries are sugar-infused and then air-dried to produce a quality fruit ingredient at a reasonable cost for major food companies," said Rich O'Brian, National Sales Manager, Ingredients.

"Other fruit will not hold up as well to infusion and air drying," said O'Brian. "The cranberry has a strong cell structure needed for the process."

Initial response from customers has been tremendous. CRAISINS have already been presented in a major retail product -- a Tyson gourmet dinner that uses the dried cranberries in a stuffing for one of their new chicken entrees.

Future ideas for dried cranberries include adding natural fruit flavors, such as raspberry or strawberry, modifying sweetness and moisture content of the fruit and adjusting the size of individual prices to meet the needs of various industries.

For more information, contact: Creamer Dickson Basford, 1000 Turks Head Bldg., Providence RI 02903 401/456-1555.

DFISA Directory of Membership, Products & Services Published

Dairy and Food Industries Supply Association (DFISA) has published its 1988/89 Directory of Membership, Products & Services. "The Directory is available, free of charge, to the food and dairy processing community, government agencies, university food and science departments, state trade associations...literally anyone who requests one," said DFISA President Edward W. Rhawn, B-Bar-B, Inc.

"Updated biennially, the directory is an ideal information source and buyers guide for the dairy and food industry," said Rhawn. The directory contains an alphabetical listing of all DFISA members, a state listing and a listing by classified products and services.

To receive a copy of the directory, contact: Dairy and Food Industries Supply Association, 6245 Executive Boulevard, Rockville, MD 20852 301/984-1444.

Food Engineering Scholarship Program Seeks Applicants

Dairy and Food Industries Supply Association, (DFISA) and the DFISA Foundation have announced the 1989 Food Engineering Scholarship Program and invite all universities with established food engineering curriculums to participate.

The Scholarship program was established in 1983 to encourage deserving undergraduate students to further their education and pursue a career in food engineering. Two outstanding sophomore or junior university students are awarded the scholarships in the spring of each year.

The scholarships provide each student $1,500 to further their food engineering education. In addition, each student is awarded a $500 travel grant to attend Food & Dairy EXPO '89.

"DFISA's Food Engineering Scholarships were established as a memorial to food industry leaders Paul K. Girton and Gordon A. Houran, who in their lifetimes as industry members, made substantial contributions to the development and applications for the dairy and food processing industries," said Donald Arndtsen of Accurate Metering Systems and chairman of DFISA's Scholarship Committee.

For further information about the DFISA Foundation, contact the Foundation Secretary, 6245 Executive Blvd., Rockville, MD 20852-3938.

BISSC Announces 1989 Meeting Schedule

The Baking Industry Sanitation Standards Committee announces it schedule of meetings for 1989, as follows:

Friday, March 3, General Meeting and Office of Certification Meeting
Saturday, March 4, BISSC Board of Directors Meeting
Location Chicago Marriott Hotel
540 North Michigan Avenue
Chicago, IL 60611
Inquiries regarding these meetings should be addressed to Bonnie Sweetman, Secretary-Treasurer, at the BISSC headquarters office, 11 East Wacker Drive, Suite 600, Chicago, IL 60601 312/644-6610.

AIB Offers Basic Food Processing Sanitation Seminar

Managers and sanitarians involved in developing and maintaining today's food product safety programs will gain the essential elements needed at the American Institute of Baking's BASIC FOOD PROCESSING SANITATION course in Manhattan, Kansas, January 30-February 2, 1989.

"More than 20 different topics will cover important information on the most current and effective industry methods when dealing with food plant sanitation," said William Pursley, director of sanitation education. "Topics in the program include management principles, developing sanitation programs, quality assurance, pest identification and control, microbiology, molds and their control, chemistry of detergents and sanitizers, pesticides, and a how-to session in developing an effective training program."

Pursley added that participants will receive numerous handouts from seminar speakers as well as copies of AIB's Basic Sanitation Manual, Food Processing Consolidated Standards, forms, and workbooks. These make excellent reference material and provide a basis for further in-house training.

Ample time is allowed each day for interaction with speakers and other seminar participants. For further information, write to the Registrar, American Institute of Baking, 1213 Bakers Way, Manhattan, KS 66502 or call 913/537-4750 or 800/633-5137.

Seminar Discusses Sanitation for Warehousemen

Managers of a food warehouse have a responsibility of complying with all federal and state regulations governing the distribution and storage of foods as well as knowing the facts necessary to establish and maintain an effective sanitation program.

That is the information that will be covered in the American Institute of Baking's shortcourse on PRINCIPLES OF SANITATION FOR WAREHOUSEMEN in Manhattan, Kansas, March 6-7, 1989.

"As a manager of a warehouse, it is your obligation to understand the approved methods of pest control, pesticide use and application, as well as how to maintain a

clean and sanitary facility," commented William Pursley, director of sanitation education at AIB. "Besides being an obligation, it's the law. By knowing these laws and practicing their applications, it can mean new business and greater profits."

Participants will get a look at the major elements in a "top notch" sanitation program and how they can be adapted to fit their organization. A perspective of management's role and better understanding of the need for team effort and cooperative action by all employees will be emphasized. New insights into sanitation concepts and techniques will be presented.

For further information to include registration forms, write to the Registrar, American Institute of Baking, 1213 Bakers Way, Manhattan, KS 66502 or call 913/537-4750 or 800/633-5137.

Key Industry Leaders Announced as Chairmen For Conference on Personal Computers/Workstations in Process Control, April 18-20, 1989, McCormick Place, Chicago

Plans are moving steadily forward for (PC^2), the Conference and Exposition on Personal Computers/Workstations in Process Control, the first national event to focus exclusively on personal computers for monitoring and control.

The conference and exposition, produced by Kotch & Poliak of New York City, will be held April 18-20, 1989 at McCormick Place, Chicago.

Distinguished Chairmen Named for Conference

Five leaders in the process monitoring and control field have been named to lead case history program sessions as part of the concurrent conference. They are: Michael Stock, President and Chief Technical Officer of Artificial Intelligence Technologies; Dr. Douglas Boike, a Principal in the Technology Practice of Booz, Allen & Hamilton; James R. Hettenhaus, Vice President of Production and Engineering at International Bio-Synthetics; James J. Pinto, President of Action Instruments, Inc. and James E. Heston, President of Oracle, Inc.

"In today's environment, industry is recognizing that personal computers offer cost-effective hardware and software to be used in monitoring and control problems that were previously in the domain of large-scale proprietary distributed control systems," notes Rita Kotch of Kotch & Poliak, adding that this change in capability has opened the door to the application of advanced strategies to be used in smaller plants and processes."

Kotch & Poliak, event organizers, have a background of fifty years in the development and management of industrial expositions. For further information, contact Sandi Eberhard, Eberhard & Company, 708 Third Avenue, New York City, NY 10017. Telephone: 212/557-6950, Telex: 178103, Fax: 212/557-6971.

Supercritical Processing, Inc.

Supercritical Processing, Inc., a new company dedicated to the commercialization of supercritical fluid extractions, has been formed. The new company has purchased the assets of the Supercritical Processing Venture of Air Products and Chemicals, Inc., a Fortune 250 firm. Supercritical Processing, Inc. states it now has the largest supercritical plant in the U.S. that is available for custom and toll processing and contract R&D.

Supercritical Fluid Extraction is a novel technology that uses the unique properties of gases under high pressure to extract or separate compounds or mixtures. Supercritical fluid extraction can reduce energy costs while improving product quality and purity.

Supercritical Processing, Inc. will focus on the commercialization of this technology for the food and pharmaceutical industries where the attributes of supercritical fluid extraction are of special benefit. Using carbon dioxide (the "fizz" in carbonated beverages) in its supercritical state, provides the following benefits:

1. It is nontoxic and natural. There are no organic solvent residues to be handled.
2. It can extract thermally sensitive compounds without degradation. Supercritical extraction operates at lower temperatures than distillations. This is especially important for flavors, fragrances and certain pharmaceuticals.
3. It can provide one step extraction and fractionation. This means that supercritical fluid extraction can reduce the number of processing steps and improve product yield and quality.
4. It is an energy efficient process. Supercritical fluid extraction processes require less energy than many conventional separation processes.
5. It uses inexpensive solvents. Gases commonly used as supercritical fluids are much less expensive to purchase than many solvents currently used for extraction. In addition, there are no special disposal costs for spent solvents or residues.

For more information on Supercritical Processing, Inc. and its capabilities, contact either Zvi H. Weinman or Raymond J. Robey at: Supercritical Processing, Inc., 966 Postal Road, Allentown, PA 18103 215/266-9693, Telefax: 215/266-1482.

IFFA Sponsors Pacific RIM Conference April 26-29

The International Frozen Food Association (IFFA) announces that the 1989 International Frozen Food Conference will be held April 26-29, 1989 at the Hyatt Regency Waikiki in Honolulu, Hawaii.

The 1989 Conference will focus on issues impacting the international trade of frozen foods with countries around the Pacific Rim, such as the United States, Japan, Australia, New Zealand, Taiwan, Canada, the Philippines and South Korea.

Experienced traders in frozen raw materials and finished products, for both foodservice and retail sale, will share their experiences with buying and selling into the major markets.

According to IFFA President Bob Pederson, "The size of the various markets, their demographics, tariff barriers, import and export opportunities, legislative and regulatory requirements and transport availability will all be discussed by traders with day-to-day involvement in international trade."

The Conference will also focus on the emerging dominance of countries around the Pacific Rim in the international trade of frozen foods, and the threat facing the industry involving a reduction in availability of CFCs.

The International Frozen Food Conference is open to anyone involved in the trade of frozen products to and from the diverse Pacific Rim market.

For more information, contact the International Frozen Food Association, 1764 Old Meadow Lane, Suite 350, McLean, Virginia 22102 703/821-0770.

Food Service Interpretation Committee

The FDA Food Service Interpretation Committee is requesting issues and items for committee review during the IAMFES Annual Comference. Examples of agenda items for review include comments and recommendations on FDA's draft Unicode, questions on interpretation of local and state code requirements, items that are not code requirements but should be, and questions on the public health basis of code requirements.

Members are requested to submit issues in the following format: (1) Issue or problem; (2) Reason for submittal; (3) Suggested committee action; (4) Name, organization, and address. Sent to H.C. Emery, Chairman, IAMFES FDA Food Service Interpretations Committee, PO Box 1832, Frederick, MD 21701.

Food Service Code Interpretations

by
Homer Emery
Food Service Interpretations Committee

The purpose of this column is to provide a forum for IAMFES members to discuss and exchange information on the interpretation of food sanitation code requirements. Most environmental professionals agree on the goal of uniform and consistent application and interpretation of regulatory requirements. By exchanging information on how different local, state, regional, and federal agencies apply and interpret requirements IAMFES members will be able to better achieve this goal. This initial column will focus on training and certification of food service managers.

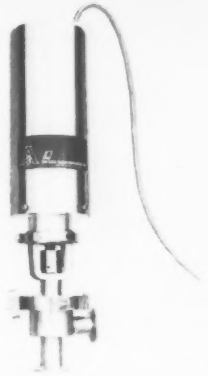
Education, training, and certification of food service managers is now required by many local and state health agency codes. FDA has endorsed manager training since 1976 and even provided local and state agencies with recommendations for a uniform national training and certification plan. FDAs initial plan outlined fourteen hours of classroom instruction and a one hour final examination.

Today, requirements for local and state training programs vary in the number of classroom hours required, requirements for attendance, type and length of examination, and recertification. We would like to receive information on local, state, and industry programs for training managers in food sanitation.

IAMFES members are requested to submit information in the following format: (1) name, agency/organization, address; (2) number of training hours required for certification; (3) attendance requirements; (4) modes of delivery (classroom, video, self study, cable TV, other); (5) subject areas required in training; (6) requirements for course materials; (7) length and type of final examination; (8) recertification requirements; (9) reciprocity with industry training programs and other agencies.

Send to: Food Service Interpretation Committee, PO Box 1832, Frederick, MD 21701. If you have a model code of manager and employee training or course materials you would like to share with other IAMFES members send them with your response. Next month this column will focus on the application and interpretation of code requirements for "effective hair restraints". If you have any questions on food code interpretations that you would like to see addressed in this column let the chairman know.

Industry Products



The 3 Valve System

Smooth separator operation depends on correct pressures in the feed and put puts from the separator. These three pressures, milk, cream and skim, are interdependent so that a change in one will cause a change in the other two.

For example, when changing from homogenized milk to clean skimming the volume flow to the separator can change by 10 percent. So as not to starve the homogenizer, the feed to the separator must be increased by 10 percent by opening the feed valve with continuous changes in pressures of both skim and cream. Establishing equilibrium and maintaining all three pressures with independent pressure loops using air valves is difficult sometimes resulting in violent pressure changes. The solution therefore is the use of a preprogrammed electronic valve cluster. **On-Line Instrumentation's** new 3 valve electronic system uses three electronic valves when they are preprogrammed for each change in the system. This eliminates oscillation instantly assuring stable flows in and out of the separators. This ensures minimum fat loss in skim, a constant fat content in the cream and the reduction of the fat loss during desludging. In addition, trouble free start up is achieved using preprogrammed valve positioning.

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New Chemical Safety Charts

Henkel Chemical Services Division (CSD) recently released new Chemical Safety Charts to customers in the Food and Beverage Industries. These seven color, 20" by 32" charts provide Food and Beverage plants with clear, concise information on proper use of **Henkel** cleaning and sanitation chemicals.

In order to make chemical safety easier to understand, the charts are in both English and Spanish and employ international symbols to represent Health Hazards, Chemical Handling Procedures, First Aid Recommendations and Emergency Procedures. Sanitation products are grouped into five chemical classifications and assigned a color and a **Henkel** Safety Code Number.

In conjunction with the Chemical Safety Charts, **Henkel** provides customers with a comprehensive approach to safety including training programs and the most up-to-date Material Safety Data Sheets in the chemical industry.

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Cooper Introduces New DM Series of Digital Panel-Mount Temperature Testers

Cooper Instrument Corporation has recently introduced its DM Series of Electro-therm digital, remote-reading panel mount thermometers, specifically designed for food equipment manufacturers and other commercial or industrial applications.

The new Electro-therm DM Series Panel meters are designed for inclusion in original equipment and for direct retrofitting of Vapor Tension mechanical thermometers commonly used in the food industry. Available for 12-24 V, AC or DC supply (DM120E), or for battery operation (DM120), the new units offer a large, easy-to-read LCD display, fast response time, a range of -40 to 120°F, +2°F accuracy and 0.1°F resolution.

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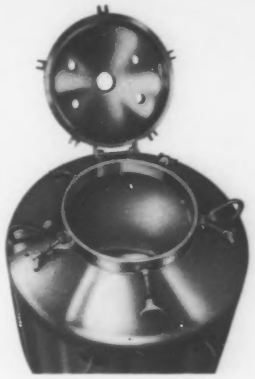

Walker Stainless Equipment Co., Inc. Offers Electro-Polished Stainless Steel Tanks

To maintain ingredient or blended product processing purity in the food, pharmaceutical, cosmetic, and healthcare industries, **Walker Stainless Equipment Co., Inc.** offers electro-polished stainless steel tanks.

Electro-polishing capabilities have been expanded by installation of a new 10,000 amp system, producing a highly-polished interior tank surface. Such surfaces are contamination-free, provide improved cleanability, and corrosion resistance.

This **Walker** specialized technology utilizes an acid bath and electrodes, similar to electroplating. However, electro-polishing acts in a reverse manner. Instead of applying metal, the acid and electric charge remove the surface grain structure, atom by atom. The result is a very shiny, brightened and smooth stainless steel surface. This surface is easier to clean, and contents will not normally adhere to sides, bottoms, or other electro-polished components. All tank surfaces are inspected for a uniform quality-controlled finish.

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Indoor - Outdoor Vertical Insect Electrocutor

Vandermolen Corporation has added a vertical hanging fly and bug killer to its line of insect electrocutors for commercial and farm use.

The new Model V484 is made of stainless steel and other noncorrosive materials. It is suitable for both indoor and outdoor use. Outdoor coverage area is up to 1 1/2 acres.

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Halpak PVC Shrink Bands Keep Dairy Freshness In - Samplers Out

Halpak Plastics, Inc. of Oceanside, New York announces the introduction of low cost PVC shrink bands for dairy products. **Halpak** reports that dairy companies are eager to use PVC shrink bands to protect their products because of their low cost and versatility.

Halpak PVC shrink bands eliminate spillage, reduce spoilage, are available plain or printed in up to six colors, can be perforated, keeps lids on during shipping, seals container for extra freshness, keeps sniffers out, available on rolls or cut bands, not affected by moisture, seamless, smart looking to enhance product appeal, and most important - PVC shrink bands are the ideal way to make any food and dairy container Tamper-Evident.

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VAC-SAF Sanitary System

BS&B Safety Systems has developed a new line of low pressure rupture disks designed to meet the stringent sanitary standards of 3A.

The two-way relief Rupture Disk Assembly consists of a VKB Rupture Disk and a KB-C Safety Head. The VKB Disk provides pressure relief for ultra low vacuum and positive pressure applications. The KB-C Safety Head features a quick disconnect sanitary fitting. This sanitary system is available in sizes 2" to 8" and pressures from 4" water column (vacuum) to maximum 200 psig (positive).

Standard materials are stainless steel.

For free brochure circle the reader service number.

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RGW-5 Type I Reagent Grade Water System

A point of use, wall mounted water purification system utilizing disposable carbon, deionization resin, and .2um final filtration cartridges. Produces 18 megohm, bacteria free reagent grade water at 2 liters per minute. Ultrafiltration accessory produces pyrogen free water. Unit features economical high ion exchange capacity cartridges for long life. Reusable, autoclavabale .2um final filter enhances the overall economics of the system. Complete catalog available from **Vangard International, Inc.** by circling the Reader Service Number.

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Specialized Software for Cheese and Milk Producers Announced for IBM AS/400 Family

Data Specialists, Inc., a provider of software products for cheese and milk producers announced a new program written specifically for the IBM Application System/400™ family, which was announced in June.

Called the Cheese and Milk Producers Systems (CHAMPS), the software is designed to provide a total plant management system for manufacturers of dairy products. CHAMPS was originally developed for IBM System/36 users, but it has been adapted to take advantage of the added function of IBM's new AS/400™.

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New Metering Pump Offers Contaminant-Free Operation

American Pump, Division of Osmonics, introduces a new air-operated diaphragm pump for metering fluids. The double-acting diaphragm pump is fabricated from a pure virgin PTFE Teflon block, ensuring contaminant-free operation. Unlike other metering pumps, American's pumps are not compression molded and require no additives or fillers, eliminating extractables that may leach into the fluid being pumped.

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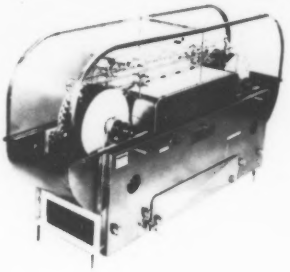

Plastic Fines and Other Contaminants Completely Removed with Versatile Container Cleaner

The Inverter Air Cleaner from **Standard Metal Products Company,** Franklin Park, Illinois, is an automatic container cleaning machine that uses multiple air-jet bl[illegible] gravity and vacuum to remove contaminants from any type of container (including plastic) prior to filling.

The Inverter Air Cleaner accommodates container diameters from 1 1/2 inches to 7 inches and container heights from 1 1/2 inches to 11 inches, using two simple hand-crank adjustment knobs located on the unit. This quick adjustment feature eliminates the amount of production downtime normally associated with container size changeovers.

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***Speakman** Eye/Face Wash Designed to Provide a Nine-by-Eight Inch Curtain of Aerated Water to Flush Away Contaminants*

Speakman's eye and face wash features quick opening, full flow ball valves which allow six outlets of water to form a 9" x 8" curtain of aerated water.

The gentle-acting bubbles created by aeration follow eye and facial contours and, therefore, eliminate harsh streams of water that drive particles or chemicals into the eye.

An auxiliary hand-held aerated spray has a self-closing squeeze valve and is attached by a 5' hose.

The unit is furnished complete with floor flange, stanchion, and a stainless steel push handle that releases streams of water to thoroughly cleanse the eyes and face.

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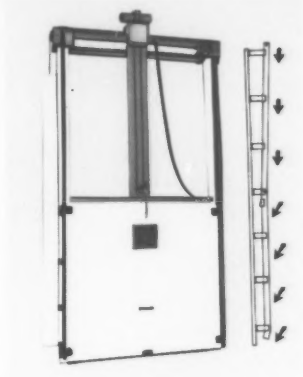

New Vertical Rise Door Offers Longer Seal Life and Easier Operation

ENVIRO Division of ASI Technologies, Inc., recently introduced a vertical rise cold storage door which features "down and in" closing action. This added benefit insures a positive gasket seal over the life of the door and easier operation during opening and closing.

Cam action design on the top and bottom provides the "down and in" motion. This design eliminates gasket drag during door travel for longer seal life and easier manual door operation.

Please circle No. 274
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New CITE^R Test for Beta-Lactams Accurate Results Faster and Easier Than Ever

IDEXX Corp., an international leader in biodetection technologies for health and food quality assurance, has developed a new test to detect beta-lactam antibiotics in milk. The test is being marketed under the company's CITE product line.

Testing for beta-lactam antibiotics is a quality control procedure for every load of milk. The CITE test will be used in processing plants and on dairy farms.

Until now, quality control testing for beta-lactams often meant having to deal with long tests, difficult color interpretations or complicated procedures and expensive equipment. The new CITE test solves these problems.

The CITE-Beta-Lactam Antibiotic Milk Test is specifically designed to speed up the testing process and make it easier to consistently meet industry quality standards. A choice of two protocols provides sensitivity equal to the B. stearothermophilus disc assay in 15 minutes at room temperature, or greater sensitivity in 10 minutes with a heat step. Either raw or homogenized milk samples can be used.

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on your Reader Service Card

Copesan Services offers Title III Information

Federal law now requires most employees be provided with information about hazardous materials used or stored in the workplace. **Copesan Services**, one of the nation's leading pest control and sanitation companies, is offering a free brochure that outlines how **Copesan** helps employers comply with employee reporting requirements.

For a copy of "Let Copesan Services Help You Out," circle the Reader Service Number listed.

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Self-Contained 4-Channel Data Logger Is USDA Approved for Cold Treatment Monitoring of Refrigerated Goods in Transit

New **Telatemp** portable TDL-400 4-channel transit data logger is USDA approved for cold temperature treatment monitoring and reporting of goods in transit or storage. It provides permanent time vs. temperature documentation printed hourly on removable plain paper tape of foods, produce, flowers, and other critical refrigerated temperature sensitive products, including chemicals, pharmaceuticals, film, epoxies, resins and electronics.

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BAC STAT Shelf Life Extender

NORDICA International, Inc., Sioux Falls, South Dakota introduces BAC STAT: a natural shelf life extender for foods. BAC STAT is all natural containing no artificial preservatives. It is bacteriostatic in action and most effective against gram negative psychrotrophic microorganisms which frequently spoil cottage cheese and many other food products. BAC STAT also suppresses spoilage by many yeasts and molds in sour cream, yogurt, salad dressings, soup bases and some bakery items.

BAC STAT is not a live culture; therefore, there is no added flavor or developed flavors. It is heat stable and is not inactivated by pasteurization temperatures. BAC STAT is available as both a skim milk based product and a non dairy version. Both preparations are wholly pasteurized and packaged in 30 pound units. BAC STAT benefits your products with extended shelf life and improved quality.

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Bugs Burger Bug Killers, Inc. Eliminates Pesticide Odors as Well as Pests!

"Bugs" Burger the industry's leader in 100% guaranteed pest elimination announces the introduction of its new PF2000 system.

The PF2000 system allows **"Bugs" Burger** to perform its Premium Pest Elimination Service without the pesticide odor.

The PF2000 system eliminates pests and leaves your premises with a light talc fragrance.

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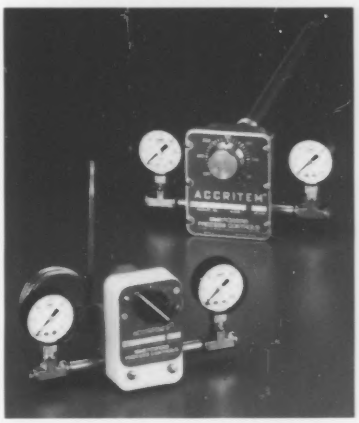

Powers Process Controls Accritem Blind Controllers Assure Fast, Accurate Response

Accritem non-indicating temperature controllers from **Power Process Controls**, are available with either rigid bimetallic or remote liquid-filled copper bulbs.

Both models permit placement of the sensing element in the gas or liquid to be controlled, providing precise, rapid response to changing temperatures.

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Affiliate News

Nebraska Association of Milk and Food Sanitarians (NAMFS) Next Meeting is Scheduled for April 13-14, 1989

The charter allowing Nebraska to become an affiliate of IAMFES was presented to Dr. A. Richard Brazis at the Awards Banquet in Tampa, Florida, August 3, 1988.

Nebraska Dept. of Agriculture Tests for Sulfamethazine:

In the past year there has been a lot of publicity about the presence of sulfamethazine (a possible carcinogen) in milk. The Dept. of Agriculture has initiated a program aimed at detecting the antibiotic in producer samples. So far the screening tests have not detected a composite sample of milk with a level above 10 ppb. HPLC confirmation will be used if needed.

New Standard Methods Due in 89:

The 16th edition of Standard Methods for the Examination of Dairy Products is scheduled for publication in 1989. The format will be much like the 15th edition. Several chapters will have major updates. Dr. Brazis will be a consensus reviewer for many chapters. If you have questions, comments, requested changes, etc. concerning the 15 edition, please let him know.

Speakers Needed:

We need and welcome speakers for the annual NAMFS meeting to be held April 13-14, 1989. If you are or have been working on a project and wish to share the information, contact Dirk Shoemaker at 3703 South 14th St, Lincoln, NE, 68502.

Relating to this topic, if there is particular information you would like to see presented at the meeting, inform Dirk. Every effort will be made to find speakers to meet your needs.

First Meeting:

The 1988 meeting of NAMFS was held at the Hilton Hotel on April 15 in conjunction with the first seminar sponsored by the group. The main business discussed included a proposed constitution and by-laws; filing of a federal tax number; opening a bank account; paying outstanding bills; finding a representative to the IAMFES meeting.

Listeria in Meats:

Testing for Listeria in meats is a new priority for USDA. The program at this time involves examining processed meats for Listeria. To date there has been one product recall. The program has the potential for making an impact on meat processors. At the present time, raw meats are not being examined.

Time-Saving Kits for Detecting Bacteria:

Test kits for utilizing gene probes or monoclonal antibodies for Salmonella, Listeria, and E. coli are presently available. Kits for detecting Campylobacter and Clostridium are in development. All kits are presently qualitative but will also be quantitative in the near future. These kits offer a great time-savings and are less labor intensive than conventional methods. Some are AOAC approved, others are not. If this is important to you check carefully before buying.

Samonella in Eggs:

Recent evidence suggests Salmonella organisms may be present in eggs. Even clean whole, unchecked, uncracked and odor free eggs. FDA is thus recommending the restriction or prohibition of foods which contain raw eggs. Other recommendations being made are: Refrigerate whole shell eggs below 45F. Never serve raw or uncooked eggs. Substitute pasteurized eggs for fresh eggs where possible and cook eggs immediately after they are cracked.

Mycotoxins:

Because of the drought throughout the Mid-West this year, finding aflatoxins in the feed and milk supply is a strong possibility in Nebraska. Aflatoxins in feed has already been found in many states while testing is just starting in Nebraska. Even if found, the problem shouldn't be as severe here as elsewhere. Irrigation systems are the primary reason. Whatever is found, look for this to be a major topic for the next few months.

Upcoming IAMFES Affiliate Meetings

1989

MARCH

1-2, VA Association of Sanitarians and Dairy Fieldmen, to be held at the Donaldson Brown Center, VA Tech., Blacksburg, VA. For more information, contact: Jenny Jones 703/961-5551.

21-23, Michigan Environmental Health Association, to be held at the Holiday Inn, Holidome & Conference Center, Ann Arbor, MI. For more information, contact: Ike Volkers, MDPH, 3500 N. Logan, Lansing, MI 48909 517/335-8268.

APRIL

5-7, Missouri Milk, Food and Environmental Health Association, to be held at the Ramada Inn, 1100 Vandiver Drive, Columbia, Missouri. For more information, contact: Gregg Fast, Mo. DOH, NE District, 250 E. Patton, Macon, MO 63552, 816/385-3125.

13-14, Nebraska Association of Milk & Food Sanitarians. For more information contact: Dirk Shoemaker, 3703 S. 14th St., Lincoln, NE 68502, 402/471-2176.

MAY

15-17, PA Association of Dairy Sanitarians and Dairy Laboratory Analysts, will hold its annual conference at Penn State University, University Park, PA. The person to contact for more information is: Sid Barnard, 8 Borland Lab, University Park, PA 16802 814/863-3915.

SEPTEMBER

19-21, New York State Association of Milk and Food Sanitarians, to be held in Buffalo, New York, at the Sheraton-Buffalo Airport Hotel. For more information, contact: Paul Dersam, 27 Sullivan Rd, Alden, NY 14004, 716/937-3432.

Dr. E. Spencer Garrett speaks on 'Regulatory Implications' at the GAFES Fall Meeting.

Members of the GAFES organization enjoy a 'Seafood Buffet' at the Fall Meeting: 'Seafood and Public Health'.

GAFES Fall Meeting Report

Seventy-seven persons attended the Fall meeting of the Georgia Association of Food and Environmental Sanitarians entitled: 'Seafood and Public Health'. The meeting was held on September 16, 1988 at the Snapfinger Woods Drive Holiday Inn in Decatur, Georgia.

The meeting brought together professionals from all facets of the Seafood Industry including speakers from the Food and Drug Administration and the National Marine Fisheries Service. Environmental impact on seafood was discussed at large during the morning session while quality control measures were discussed during the afternoon. It was pointed out that 90 percent of illnesses caused by seafoods are due to ciguratoxin, scrombotoxin and molluscan shellfish. Dr. E. Spencer Garrett of the National Marine Fisheries Service indicated that by 1990, a mandatory seafood inspection program based on HAACP will be presented to Congress.

Lunch at the Holiday Inn featured a 'seafood' buffet which was well received by symposium participants.

The GAFES organization currently is initiating plans for its 3rd annual meeting slated for February or March of 1989. For more information contact: Steven Petrides, 3651 Market St., Clarkston, GA 30021, 404/292-1979.

ADVANCE REGISTRATION FORM

IAMFES

76TH ANNUAL MEETING REGISTRATION
August 13-17, 1989
Hyatt Regency Crown Center
KANSAS CITY, MISSOURI

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On-site registration	$90	$119	$20	$_____

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MON., AUG. 15 10 a.m.-noon	Hallmark Center Tour	FREE	_____	-0-
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TUES., AUG. 16 10 a.m.-3 p.m.	Kansas City Sightseeing	$22.50 adults	_____	_____
		$12.50 children (under 12)	_____	_____
WED., AUG. 17 10:30 a.m.-noon	Candyland Tour	$5.50	_____	_____
WED., AUG. 17 Evening	IAMFES Awards Banquet & Reception	$25.00 adults	_____	_____
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IAMFES Secretary Candidates

Michael P. Doyle

Michael Doyle is a Professor of Food Microbiology at the University of Wisconsin-Madison, Food Research Institute. He is an active researcher in the area of foodborne bacterial pathogens and works closely with the food industry on issues related to the microbiological safety of foods. Prior to his academic appointment, he was a Senior Project Leader in Corporate Microbiology at Ralston Purina Company in St. Louis.

Mike is a graduate of the University of Wisconsin-Madison where he received his B.S. degree in Bacteriology, and M.S. and Ph.D. degrees in Food Microbiology.

He has been quite active in the International Association of Milk, Food and Environmental Sanitarians. He served from 1981-1986 as Associate Editor of the *Journal of Food Protection* as a member of the IAMFES Publications Committee. From 1984-87 he was a member of the Advisory Committee on Annual Meeting Program Content. He has been an invited symposium speaker at six national IAMFES meetings. He has also served on committees of the Wisconsin Association of Milk and Food Sanitarians as vice-chairman of the Committee on Education and as a member of the Program Committee. He has been a member of IAMFES since 1974.

Mike has served on several committees of many scientific organizations, and is presently Chair of the Food Microbiology Division of the American Society for Microbiology and a member of the Annual Meeting Program Committee of the Institute of Food Technologists. He often has served as a scientific advisor of the World Health Organization on issues related to the microbiological safety of foods and is presently a member of the U.S. National Advisory Committee on Microbiological Criteria for Foods.

He has published over 100 scientific papers and given more than 100 presentations at national and international scientific meetings. He has received several research awards from academic and national scientific organizations, has been elected a Fellow of the American Academy of Microbiology, and recently has been named Wisconsin Distinguished Professor of Food Microbiology and Toxicology by the University of Wisconsin Board of Regents.

Robert E. Brackett

Robert E. Brackett is a graduate of the University of Wisconsin where he received his B.S. degree in Bacteriology and M.S. and Ph.D. degrees in Food Science.

Bob is an Extension Food Safety Specialist/Assistant Professor in Extension Foods and Nutrition at North Carolina State University, Raleigh, North Carolina. His research interests include Microbial ecology of fruits and vegetables, effects of processing on growth and survival of psychrotrophic pathogens, appropriate methods for prevention and elimination of aflatoxins in peanut products, comparison of methods to quantify *Listeria monocytogenes* in foods.

His professional memberships and honors include: Institute of Food Technologists, Dixie Section IFT, International Association of Milk, Food and Environmental Sanitarians (member of the Journal of Food Protection Editorial Board, Developing Scientist Committee), Georgia Association of Food and Environmental Sanitarians (member of the Executive Committee, served as both Secretary and Vice-President), American Society for Microbiology, Southern Association of Agricultural Scientists, Sigma Xi (Scientific Research Society), Phi Tau Sigma (Food Science Honor Society), Phi Beta Delta (Honor Society for International Scholars).

Bob is the author or co-author of 75 research publications including: 33 refereed journals articles, 2 book chapters, 19 other technical and scientific articles and reports, and 21 abstracts.

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Questions or statements concerning any of the holders authorizations listed below, or the equipment fabricated, should be addressed to: Robert F. Wolf, Administrative Officer, 3-A Symbol Council, W255 N477 Grandview Blvd., Suite 100, Waukesha, Wisconsin 53188.

01-06 Storage Tanks for Milk and Milk Products

115 A-L Stainless Inc. (9/28/58)
(Not available in USA)
113 Park St., South
Peterborough, Ontario, Canada K9J 3R8

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

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

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

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

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

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

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

432 TCI-Superior Division, (11/9/84)
Mueller Canada Inc.
6500 Northwest Dr.
Mississauga, Ontario, Canada L4V 1K4

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

02-08 Pumps for Milk and Milk Products

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

325 Albin Pump, Inc. (12/19/79)
(Mfg. by Albin Motor, Sweden)
120 Interstate N. Pkwy. E. #208
Atlanta, Georgia 30339-2103

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

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

29R Cherry-Burrel Corp. (10/3/56)
(A Unit of AMCA Int'l., Inc.)
2400-6th St. SW, P.O. Box 3000
Cedar Rapids, Iowa 52406

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

377 Energy Service Co. (2/4/83)
B200 Walker Bldg., 734 15th St., NW
Washington, DC 20005

462 Enprotech Corporation (12/5/85)
335 Madison Avenue
New York, New York 10017

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

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

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

492 A. Gusmer Inc. (1/15/87)
Mfg. by Philip Hilge GmbH
27 North Avenue East
Cranford, New Jersey 07016

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

502 INOXPA, S.A. (4/27/87)
(not available in USA)
c/. Telers, 54
17820 Banyoles (Verona) Spain

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

373 Luwa Corporation (12/27/82)
(Mfg. by MAAG Gear, Switzerland)
P.O. Box 16348
Charlotte, North Carolina 28297-6348

319 MGI Pumps Inc. (3/21/79)
(Mfg. by SSP Pumps, England)
847 Industrial Dr.
Bensenville, Illinois 60106

148R Moyno Industrial Products (4/22/64)
of Robbins & Meyers, Inc.
1895 Jefferson St.
Springfield, Ohio 45506

400 Netzsch Incorporated (8/15/83)
119 Pickering Way

Exton, Pennsylvania 19341-1393

375 Niro Atomizer Food & Dairy Inc. (1/25/83)
(Mfg. by Pasilac, Denmark)
1600 County Road F
Hudson, Wisconsin 540I6

404 Packo Inox N.V. (8/24/83)
(Not available in USA)
Torhoutsesteenweg 154
B8210 Zedelgem (Belgium)

241 Puriti, S.A. de C.V. (9/12/72)
(Not available in USA)
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Industrial Puente de Vigas
Tlalnepantla, Mexico

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

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

332 Superior Stainless, Inc. (12/10/80)
6I1 Sugar Creek Rd.
Delavan, Wisconsin 53115

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

219 TCI-Superior Division, (2/15/72)
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6500 Northwest Dr.
Mississauga, Ontario, Canada L4V 1K4

26R Tri-Clover, Inc. (9/29/56)
920I Wilmot Road
Kenosha, Wisconsin 53141

175R Universal Cooperatives, Dairy (10/25/56)
Dairy Division
U.S. Hwy 33 East/Box 115
Goshen, Indiana 46526

471 VNE Corporation (4/27/86)
(Mfg. by Pumpen-Und Maschinebbau
West Germany)
1415 Johnson Street
Janesville, Wisconsin 53545

329 Valex Products Corp. (6/10/80)
6080 Leland Street
Ventura, California 93003

52R Viking Pump, Inc. (12/31/56)
A Unit of IDEX Corporation
406 State Street
Cedar Falls, Iowa 50613

5R Waukesha Pumps (5/6/56)
(A Unit of AMCA Int'l. Inc.)
1250 Lincoln Ave.
Waukesha, Wisconsin 53186

408 Westfalia Systemat (10/18/83)
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Elk Grove Village, Illinois 60007

517 Westmoor Ltd./Conde Dairy Equipment (9/23/87)
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West Hamilton Avenue
Sherrill, New York 13461

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

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Lake Mills, Wisconsin 53551

75 APV Gaulin, Inc. (9/26/57)
44 Garden St.
Everett, Massachusetts 02149

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

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

87 Cherry-Burrell Corp. (12/20/57)
(A Unit of AMCA Int'l., Inc.)
2400-6th St., SW, P.O. Box 3000
Cedar Rapids, Iowa 52406

486 Fowler Products Company (11/18/86)
150 Collins Industrial Blvd.
P.O. Box 1706
Athens, Georgia 30613-1706

309 Niro Atomizer Food & Dairy Inc. (7/19/78)
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1600 County Road F
Hudson, Wisconsin 54016

425 TCI-Superior Division (8/31/84)
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05-13 Stainless Steel Automotive Milk Transportation Tanks for Bulk Delivery and/or Farm Pick-up Service

379 Bar-Bell Fabricating Co., Inc. (3/15/83)
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Mauston, Wisconsin 53948

70R Brenner Tank, Inc. (8/5/57)
450 Arlington Ave., P.O. Box 670
Fond du Lac, Wisconsin 54935

45 The Heil Company (10/26/56)
1125 Congress Pkwy.
P.O. Box 160
Athens, Tennessee 37303-0160

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

66 Kari-Kool Transports, Inc. (5/29/57)
P.O. Box 538
Beaver Dam, Wisconsin 53916

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

513 Nova Fabricating Inc. (8/24/87)
Jct. I-94 & Co Road 9
P.O. Box 231
Avon, Minnesota 56310

85 Polar Tank Trailer, Inc. (12/20/57)
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521 R & D Stainless
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Republic, Missouri 65738

189 A & L Tougas, Ltee (10/3/66)
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Iberville, Quebec, Canada

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

437 West-Mark (11/30/84)
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Caledonia, Minnesota 55921

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100 South CP Avenue
Lake Mills, Wisconsin 53551

450 APV International Limited (8/22/85)
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Crawley
West Sussex RH10 2QB
England

484 APV Rosista, Inc. (10/22/86)
(08-17REV)
(08-17B)
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Rockford, Illinois 61109

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

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

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

245 Babson Brothers Company (2/12/73)
Dairy Systems Division
1400 West Gale
Galesville, Wisconsin 54630

443 Badger Meter, Inc. (5/1/85)
6116 East 15th Street
Tulsa, Oklahoma 74158

411 Capital Equipment Corp. (11/15/83)
2421 Darwin Road
Madison, Wisconsin 53704

82R Cherry-Burrell Corp. (12/11/57)
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2400-6th St. SW, P.O. Box 3000
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478 Ciprianai, Inc. (7/31/86)
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528 Dayco Products Inc. (3/16/88)
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376 Defontaine Inc. (1/25/83)
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563 A. J. Allen Circle
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1303 35th Street
Kenosha, Wisconsin 53140

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120 Interstate N. Parkway. E. #208
Atlanta, Georgia 30339-2103

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Foxboro, Massachusetts 02035

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P.O. Box 1199
Kenosha, Wisconsin 53141

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100 Pinnacle Way, Suite 165
Norcross, Georgia 30071

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(Mfg. by Lube Corp., Japan)
4040 Del Ray Ave. Unit 9
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454 Jensen Fittings Corp. (9/11/85)
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389 Lee Industries, Inc. (5/31/83)
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239 Lumaco, Inc. (6/30/72)
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391 Stork Food Machinery, Inc. (6/9/83)
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Delavan, Wisconsin 53115

357 Tanaco Products (4/16/82)
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Blaine, Washington 98230

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Ventura, California 93003

08-17F Tank Outlet Valve

539 Cipriani, Inc. (8/5/88)
(Mfg. by Fratelli Tassalini, Italy)
25201 La Paz Rd.
Laguna Hills, California 92653

531 G & H Products Corp. (5/31/88)
7600-57th Ave.
P.O. Box 1199
Kenosha, Wisconsin 53141

534 Lumaco (7/11/88)
9-11 East Broadway
Hackensack, New Jersey 07601

548 Valex Corp. (9/22/88)
6080 Leland St.
Ventura, California 93003

08-17G Rupture Discs

422 BS & B Safety Systems, Inc. (6/12/84)
7455 E. 46th St.
Tulsa, Oklahoma 74133

407 Continental Disc Corp. (10/14/83)
4103 Riverside NW
Kansas City, Missouri 64150

549 Valex Corp. (9/22/88)
6080 Leland St.
Ventura, California 93003

09-07 Instrument Fittings and Connections Used on Milk and Milk Products Equipment

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

321 Anderson Instrument Co., Inc. (6/14/79)
RD #1
Fultonville, New York 12072

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

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

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

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

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

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

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

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

444 Tuchenhagen North America, Inc. (6/17/85)
4119 Green Tree Road
Milwaukee, Wisconsin 53209

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

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

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

435 Sermia Equipment Limited (11/27/84)
(Not available in USA)
2511 Barbe Avenue
Chomedey, Laval, Quebec, Canada H7T 2A2

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

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

11-04 Plate-type Heat Exchangers for Milk and Milk Products

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

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

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

458 APV International Limited (10/15/85)
(Not available in USA)
P.O. Box 4, Manor Royal
Crawley
West Sussex RH10 2QB
England

17 Alfa-Laval Food & Dairy Co. (7/28/82)
(Div. of Alfa-Laval Inc.)
2115 Linwood Ave.
Fort Lee, New Jersey 07024

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

326 American Vicarb Corporation (2/4/80)
(Mfg. by Vicarb, France)
89 Pearce Avenue
Tonawanda, New York 14150

30 Cherry-Burrell Corp. (10/2/56)
(A Unit of AMCA Int'l. Inc.)
2400-6th St. SW, P.O. Box 3000
Cedar Rapids, Iowa 52406

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

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

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

360 Laffranchi Wholesale Co. (7/12/82)
P.O. Box 698
Ferndale, California 95536

414 Paul Meuller Co. (12/13/83)

P.O. Box 828
Springfield, Missouri 65801

491 On-Line Instrumentation, Inc. (1/2/87)
P.O. Box 541
Hopewell Junction, New York 12533

279 The Schlueter Company (8/30/76)
(Mfg. by Samuel Parker, New Zealand)
216 Center Ave.
Janesville, Wisconsin 53547

472 Schmidt-Bretten Inc. (5/7/86)
1612 Locust Avenue
Bohemia, New York 11716

426 TCI-Superior Division (8/31/84)
(Not available in USA)
Mueller Canada Inc.
6500 Northwest Dr.
Mississauga, Ontario, Canada L4V 1K4

12-05 Tubular Heat Exchangers for Milk and Milk Products

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

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

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

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

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

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

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

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

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

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

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

13-08 Farm Milk Cooling and Holding Tanks

49R A-L Stainless Inc. (12/5/56)
(Not available in USA)
113 Park St., South
Peterborough, Ontario, Canada K9J 3R8

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

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

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

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

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

254 AVP Anhydro, Inc. (1/7/74)
(Mfg. by Anhydro, Denmark)
165 John L. Dietsch Square
Attleboro Falls, Massachusetts 02763

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

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

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

311 GEA Food and Process Systems Corp. (8/28/79)
(Mfg. by Gebruder, West Germany)
8940 Route 108
Columbia, Maryland 21045

273 Niro Atomizer Food & Dairy, Inc. (5/20/76)
1600 County Rd F
Hudson, Wisconsin 54016

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

299 Stork Food Machinery, Inc. (11/17/77)
(Mfg. by Stork, Holland)
P.O. Box 1258/Airport Parkway
Gainesville, Georgia 30503

427 TCI-Superior Division (8/31/84)
(Not available in USA)
Mueller Canada Inc.
6500 Northwest Dr.
Mississauga, Ontario, Canada L4V 1K4

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

17-06 Fillers and Sealers of Single Service Containers for Milk and Milk Products

366 Autoprod, Inc. (9/15/82)
12 So. Denton Ave.
New Hyde Park, New York 11040

346 B-Bar-B, Inc. (10/21/81)
E. 10th & McBeth, P.O. Box 909
New Albany, New York 47150

192 Cherry-Burrell Corp. (1/3/67)
(A Unit of AMCA Int'l., Inc.)
2400-6th St. SW, P.O. Box 3000
Cedar Rapids, Iowa 52406

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

452 Combibloc, Inc. (9/4/85)
(Mfg. by Gasti, Germany)
4800 Roberts Rd.
Columbus, Ohio 43228

324 Conoffast (11/29/79)
(Mfg. by ERCA, France)
1600 Harvester Road
West Chicago, Illinois 60185

352 GMS Engineering (1/12/82)
1936 Sherwood St.
Clearwater, Florida 33515

488 Holmatic Inc. (12/22/86)
6691 Jimmy Carter Blvd.
Norcross, Georgia 30071

473 International Paper Company (6/12/86)
Extended Shelf Life Division
4020 Stirrup Creed Drive Bldg. 200
P.O. Box 13318
Research Triangle Park, North Carolina 27709

452 Jagenberg Inc. (9/3/85)
Freshwater Blvd.
P.O. Box 188
Enfield, Connecticut

516 Leifeld + Lemke USA (9/18/87)
(Mfg. by Leifeld + Lemke, West Germany)
25 Whitney Road
Mahwah, New Jersey 07430

220 Liquipak International, Inc. (4/24/71)
2285 University Ave.
St. Paul, Minnesota 55114

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

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

137 Pure-Pak, Inc. (10/17/62)
850 Ladd Road
Walled Lake, Michigan 48088

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

511 E. P. Remy (8/14/87)
(Mfg. by E. P. Remy, France)
2096 Gaither Road
Rockville, Maryland 20850

482 Serac Inc. (8/25/86)
1209 Capitol Drive
Addison, Illinois

351 Tetra Pak Inc. (1/7/82)
(Mfg. by A. B. Tetra, Italy)
889 Bridgeport Ave.
P.O. Box 807
Shelton, Connecticut 06484-0807

211 Twinpak, Inc. (Canada) (2/4/70)
(Not available in USA)
2225 Hymus
Dorval, Quebec, Canada H9P 1J8

19-03 Batch Continuous Freezers for Ice Cream, Ices, and Similarly Frozen Dairy Foods, as Amended

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

146 Cherry-Burrell Corp. (12/10/63)
(A Unit of AMCA Int'l., Inc.)
2400-6th St. SW, P.O. Box 3000
Cedar Rapids, Iowa 52406

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

401 Coldelite Corp. of America (8/22/82)
Robinson Rd. & Rt. 17 So.
Lodi, New Jersey 07644-3897

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

412 Sani Mark, Inc. (11/28/83)
2020 Production Drive
Indianapolis, Indiana 46241

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

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

262 A-L Stainless Inc. (11/11/74)
(Not available in USA)
113 Park St., South
Peterborough, Ontario, Canada K9J 3R8

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

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

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

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

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

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

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

460 Niro Atomizer Food & Dairy Inc. (11/4/85)
1600 County Road F
Hudson, Wisconsin 54016

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

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

536 Stainless Fabrication, Inc. (7/14/88)
620 N. Prince Lane
Springfield, Missouri 65802

434 TCI-Superior Division (11/9/84)
(Not available in USA)
Mueller Canada Inc.
6500 Northwest Dr.
Mississauga, Ontario, Canada L4V 1K4

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

23-01 Equipment for Packaging Frozen Desserts, Cottage Cheese, and Similar Milk Products, as Amended

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

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

222 Fort Howard Packaging Corporation (11/15/71)
P.O. Box 19130
Green Bay, Wisconsin 54307-9130

499 Holmatic Inc. (3/19/87)
6691 Jimmy Carter Blvd.
Norcross, Georgia 30071

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

447 Mateer-Burt Co., Inc. (7/22/85)
(Mfg. by Trustpak, England)
436 Devon Park Drive
Wayne, Pennsylvania 19087

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

24-01 Non-coil Type Batch Pasteurizers

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

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

402 Coldelite Corp. of America (8/22/83)
Robinson Rd. & Rt. 17 So.
Lodi, New Jersey 07644-3897

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

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

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

25-01 Non-coil Type Batch Processors for Milk and Milk Products

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

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

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

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

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

520 Stainless Fabrication, Inc. (12/8/87)
633 N. Prince Lane
Springfield, Missouri 65802

202 Walker Stainless Equip. Co., Inc. (9/24/68)
618 State St.
New Lisbon, Wisconsin 53950

26-02 Sifters for Dry Milk and Dry Milk Products

173 Blaw-Knox Food & Chemical Equip. Co. (9/20/65)
P.O. Box 1041
Buffalo, New York 14240

363 Kason Corp. (7/28/82)
1301 East Linden Ave.
Linden, New Jersey 07036

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

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

172 Sweco, Inc. (9/1/65)
8029 U.S. Hwy. 25
Florence, New York 41042

176 Sprout-Bauer Inc. (1/4/66)
(Subsidiary of Combustion Engineering)
Muncy, Pennsylvania 17756

27-01 Equipment for Packaging Dry Milk and Dry Milk Products

353 All-Fill, Inc. (3/2/82)
40 Great Valley Pkwy.
Malvern, Pennsylvania 19355

409 Mateer-Burt Co. (10/31/83)

436 Devon Park Dr.
Wayne, Pennsylvania 19087

476 Stone Container Corporation (7/17/86)
1881 West North Temple
Salt Lake City, Utah 84116-2097

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

28-01 Flow Meters for Milk and Milk Products

272 Accurate Metering Systems, Inc. (4/2/76)
(Mfg. by Diessel GmbH, Germany)
1651 Wilkening Court
Schaumburg, Illinois 60173

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

518 Bailey Controls Company (10/16/87)
29801 Euclid Avenue
Wickliffe, Ohio 44092

265 Electronic Flo-Meters, Inc. (3/10/75)
P.O. Box 38269
Dallas, Texas 75238

359 Emerson Elec. Co. (6/11/82)
Brooks Instrument Div.
P.O. Box 450, North 301
Statesboro, Georgia 30458

469 Endress + Hauser, Inc. (3/3/86)
2350 Endress Place
Greenwood, Indiana 46142

540 EXAC Corporation (8/12/88)
6410 Via Del Oro
San Jose, California 95119

226 Fischer & Porter Co. (12/9/71)
County Line Rd.
Warminster, Pennsylvania 18974

477 Flowdata Inc. (7/31/86)
15510 Wright Bros. Drive
Dallas, Texas 75244-2137

506 Flow Technology, Inc. (6/17/87)
4250 East Broadway Road
Phoenix, Arizona 85040

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

475 Hackman-MKT, Inc. (7/15/86)
100 Pinnacle Way, Suite 165
Norcross, Georgia 30071

512 Hoffer Flow Controls, Inc. (8/17/87)
149 Highway 26
Port Monmouth, New Jersey 07758

474 Hydril Production (6/30/86)
Technology Division
3300 North Belt East
P.O. Box 60458
Houston, Texas 77205-0458

399 E. Johnson Engineering & Sales (8/3/83)
11 N. Grant St.
Hinsdale, Illinois 60521

529 Krohne America, Inc. (5/18/88)
(Mfg. by Altometer, Holland)
One Intercontinental Way
Peabody, Massachusetts 01960

320 Max Machinery, Inc. (3/28/79)
1420 Healdburg Ave.
Healdburg, California 95448

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

490 Rosemount Inc. (1/8/87)
12001 Technology Dr.
Eden Prairie, Minnesota

493 Sarasota Automation Inc. (2/2/87)
1500 N. Washington Blvd.
Sarasota, Florida 33577

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

270 Taylor Instrument (2/9/76)
Combustion Engineering, Inc.
400 West Avenue, P.O. Box 110
Rochester, New York 14692

535 Tulsa Fluid Measurement, Inc. (7/12/88)
P.O. Box 35159
Tulsa, Oklahoma 74153-0159

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

29-00 Air Eliminators for Milk and Fluid Milk Products

340 Accurate Metering Systems, Inc. (6/2/81)
(Mfg. by Diessel GmbH. Germany)
1651 Wilkening Court
Schaumburg, Illinois 60173

485 Hackman-Mkt, Inc. (11/18/86)
100 Pinnacle Way, Suite 165
Norcross, GA 30071

436 Scherping Systems (11/27/84)
801 Kingsley Street
Winsted, Minnesota 55395

30-01 Farm Milk Storage Tanks

421 Paul Mueller Co. (4/17/84)
P.O. Box 828
Springfield, Missouri 65801

31-01 Scraped Surface Heat Exchangers, as Amended

290 APV Crepaco, INC. (6/15/77)
100 South CP Ave.
Lake Mills, Wisconsin 53551

274 Alfa-Laval, Inc. (6/25/76)
Contherm Div.
P.O. Box 352, 111 Parker St.
Newburyport, Massachusetts 01950

361 N.V. Terlet (7/12/82)
(U.S. Agent BFM Machinery, WI)
P.O. Box 62
7200 AB Zutphen

Netherlands

323 Cherry-Burrell Corp. (7/26/79)
(A Unit of AMCA Int'l., Inc.)
2400-6th St., SW, P.O. Box 3000
Cedar Rapids, Iowa 52406

496 FranRica Mfg. Corp. (2/23/87)
2807 South Highway 99
Stockton, California 95202

32-00 Uninsulated Tanks for Milk and Milk Products

397 APV Crepaco, INC. (6/21/83)
100 South CP Ave.
Lake Mills, Wisconsin 53551

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

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

354 C.E. Rogers Co. (3/3/82)
S. Hwy #65, P.O. Box 118
Mora, Minnesota 55051

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

433 TCI-Superior Division (11/9/84)
(Not available in USA)
Mueller Canada Inc.
6500 Northwest Dr.
Mississauga, Ontario, Canada L4V 1K4

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

33-00 Polished Metal Tubing for Dairy Products

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

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

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

368 Rodger Industries Inc. (10/7/82)
(Not available in USA)
P.O. Box 186, RR1
Blenheim, Ontario
Canada N0P 1A0

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

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

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

35-00 Continuous Blenders

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

417 Cherry-Burrell (2/7/84)
Anco/Votator Division
P.O. Box 35600
Louisville, Kentucky 40232

464 Dairy Service Mfg., Inc. (12/12/85)
4630 W. Florissant Ave.
St. Louis, Missouri 63115

415 Luwa Corporation (1/5/84)
P.O. Box 16348
Charlotte, North Carolina 28297-6348

526 Schugi Process Engineers (3/15/88)
(Mfg. by Lelystad, The Netherlands)
41 Tamarack Circle
Skillman, New Jersey 08558

36-00 Colloid Mills

293 Waukesha Pumps (8/25/77)
(A Unit of AMCA Int'l., Inc.)
1250 Lincoln Ave.
Waukesha, Wisconsin 53186

37-00 Pressure and Level Sensing Devices

318 Anderson Instrument Co., Inc. (4/9/79)
R.D. #1
Fultonville, New York 12072

481 Control Systems Design (8/14/86)
509 Gatehall Lane
Ballwin, Missouri 63011

405 Drexelbrook Engineering Co. (9/27/83)
205 Keith Valley Rd.
Horsham, Pennsylvania 19044

423 Dynisco (6/15/84)
Ten Oceana Way
Norwood, Massachusetts 02062

459 Endress + Hauser, Inc. (10/17/85)
2350 Endress Place
Greenwood, Indiana 46142

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

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

396 King Engineering Corp. (6/13/83)
P.O. Box 1228
Ann Arbor, Michigan 48106

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

419 Niro Atomizer Food & Dairy Inc. (4/2/84)
1600 County Road F
Hudson, Wisconsin 54016

523 Paper Machine Components, Inc. (1/3/88)

Miry Brook Road
Danbury, Connecticut 06810

554 Par Sonics, Inc. (11/30/88)
P.O. Box 1127
State College, Pennsylvania 16804

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

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

498 Statham Division of Solartron Transducers (3/5/87)
2230 Statham Blvd.
Oxnard, California 93033

285 Tank Mate Div/Monitor Mfg. Co. (12/7/76)
P.O. Box AL
Elburn, Illinois 60119

317 Taylor Instrument (2/26/79)
Combustion Engineering, Inc.
400 West Avenue
Rochester, New York 14692

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

525 Zantel Instrument (3/4/88)
12925 Alcosta Blvd., #8
San Ramon, California 94583

38-00 Cottage Cheese Vats (In Press)

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

385 Stoelting, Inc. (5/5/83)
P.O. Box 127
Kiel, Wisconsin 53042-0127

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

406 Chicago Conveyor Corporation (10/5/83)
330 LaLonde Avenue
Addison, Illinois 60101

504 General Resource Corporation (5/15/87)
201 3rd Street South
Hopkins, Minnesota 55343

381 Marriott Walker Corp. (4/12/83)
925 E. Maple Rd.
Birmingham, Michigan 48011

453 MikroPul Corporation (9/4/85)
10 Chatham Road
Summit, New Jersey 07901

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

Coming Events

1989

MARCH

• **1-2, Virginia Association of Sanitarians and Dairy Fieldman,** will be held at the Donaldson Brown Center, VA Tech., Blacksburg, VA. For more information, contact: Jenny Jones 703/961-5551.

• **6-7, Free Food, Feed, and Water Analysis Workshop** - Meat and Poultry Analysis will be held at Hach's Technical Training Center in Loveland, Colorado. To make your reservation or for more information, contact: Jackie Thomas, Hach Company, PO Box 389, Loveland, CO 80539 800/227-4224.

• **12-15, American Cultured Dairy Products Institute Annual Meeting and Conference/Cultures and Curds Clinic/International Cultured Dairy Products Evaluation Session,** Marriott River Center, San Antonio, Texas. For more information, contact Dr. C. Bronson Lane, ACDPI, PO Box 547813, Orlando, FL 32854-7813 407/628-1266.

• **13, Pesticide Applicator Certification Seminar,** Okumura Biological Institute, Clarion, Hotel, Sacramento, CA. Contact: George Okumura, 6669 14th St., Sacramento, CA 95831 916/421-8963.

• **13-16, UCD/FDA Better Process Control School,** University of California. Contact: Robert C. Pearl, Dept. of Food Science & Technology, University of California, Davis, CA 95616 916/752-0980

• **14-15, Pests Associated with Food Industry and Environmental Sanitation Seminar,** Okumura Biological Institute, Clarion Hotel, Sacramento, CA. Contact George Okumura, 6669 14th St., Sacramento, CA 95831 916/421-8963.

• **19-21, Innovations in the Aseptic Processing of Particulates** to be held in Indianapolis, For information, contact: James V. Chambers, Food Science Dept., Smith Hall, Purdue University, West Lafayette, IN 47907 317/494-8279.

• **20-24, Mid-West Workshop in Food Sanitation,** the Ohio State University, Dept. of Food Science & Nutrition, 2121 Fyffe Rd., Columbus, OH 43210-1097. Contact: David Dzurec 614/292-6281.

• **21-23, Michigan Environmental Health Association,** Holiday Inn, Holidome & Conference Center, Ann Arbor, MI. For more information, contact: Ike Volkers, MDPH, 3500 N. Logan, Lansing, MI 48908 517/335-8268.

• **28-30, Western Food Industry Conference** to be held at the University of California, Davis, CA. For more information, contact: Robert Pearl 916/752-0981 or Shirley Rexroat 916/752-2191.

• **29-30, The Center for Dairy Research at the University of Wisconsin-Madison will be holding its annual Cheese Research and Technology Conference** at the Holiday Inn East, Madison, WI. For more information, contact: Sarah Quinones 608/262-2217.

APRIL

• **5-7, Missouri Milk, Food and Environmental Health Association will hold its annual meeting** in Columbia at the Ramada Inn, 1100 Vandiver Drive. For more information concerning the conference, contact: Greg Fast, MO DOH, NE District, 250 E. Patton, Macon, MO 63552, 816/385-3125.

• **10-11, Pests Associated with Food Industry and Environmental Santiation Seminar,** Okumura Biological Institute, Holiday In, Elk Grove Village, IL. Contact: George Okumura, 6669 14th St., Sacramento, CA 95831 916/421-8963.

• **12, 38th Annual University of Maryland Ice Cream Conference.** For more information, contact: Dr. James T. Marshall, Dept. of Animal Sciences, University of Maryland, College Park, MD 20742 301/454-7843.

• **12-13, Advanced Course on Pest Recognition and Food Industry Problems,** Okumura Biological Institute, Holiday Inn, Elk Grove Village, Il. Contact: Geroge Okumura, 6669 14th St., Sacramento, CA 95831 916/421-8963.

• **12-14, California Environmental Health Association Annual Educational Symposium,** will be be held at the Red Lion Inn, Costa Mesa, California. For more information contact Donna Vilalta, Riverside County Environmental Health, 46209 Oasis Ave., Room 207, Indio, California 92201, 619/342-8875.

• **17-20, Better Process Control School** to be held at Purdue University. For information, contact: James V. Chambers, Food Science Dept., Smith Hall, Purdue University, West Lafayette, IN 47907 317/494-8279.

• **18-20, Special Problems in Milk Plants** will be held at the Holiday Inn-Emerald Beach, 1102 South Shoreline Blvd, Corpus Christi, TX. For more information, contact: Ms. Janie F. Park, TAMFES, PO Box 2363, Cedar Park, TX 78641-2363 512/458-7281.

• **26-29, International Frozen Food Association announces that the 1989 International Food Conference** will be held at the Hyatt Regency Waikiki in Honolulu, Hawaii. For more information, contact the International Frozen Food Association, 1764 Old Meadow Lane, Suite 350, McLean, VA 22102 703/821-0770.

MAY

• **15-17, PA Association of Dairy Sanitarians and Dairy Laboratory Analysts, will hold its annual conference** at Penn State University, University Park. For more information, contact: Sid Barnard, 8 Borland Lab, University Park, PA 16802 814/863-3915.

• **15-18, Aseptic Processing and Packaging Workshop.** Enrollment is limited to 40 for this class to be held at Purdue University. For information, contact: James V. Chambers,

Food Science Dept., Smith Hall, Purdue University, West Lafayette, IN 47907 317/494-8279.

• **16-18, Basic Pasteurization Course** will be held at the Holiday Inn, 1575 Regal Row, Dallas. TX. For more information, contact: Ms. Janie F. Park, TAMFES, PO Box 2363, Cedar Park, TX 78641-2363 512/458-7281.

JUNE

• **5, Pesticide Applicator Certification Seminar,** Okumura Biological Institute, Clarion Hotel, Sacramento, CA. Contact: Geroge Okumura, 6669 14th St., Sacramento, CA 95831 916/421-8963.

• **6, Fumigation Seminar 1989,** Okumura Biological Institute, Clarion Hotel, Sacramento, CA. Contact: Geroge Okumura, 6669 14th St., Sacramento, CA 95831 916/421-8963.

• **13-15, Hazardous Materials Management International Conference and Exhibition '89** will be held at the Atlantic City Convention Center, Atlantic City, New Jersey. For additional information, contact: Mary Jo McGuire, Group Show Director, Tower Conference Management Co., 800 Roosevelt Rd., Bldg E -- Suite 408, Glen Ellyn, IL 60137-5835 312/469-3373.

JULY

• **9-12, International Conference on Technical Innovations in Freezing and Refrigeration of Fruits and Vegetables.** For more information, contact: Robert C. Pearl, Food Science & Technology, University of California, Davis, CA 95616 916/752-0981.

AUGUST

• **14-18, Biotechnology: Principles and Processes** to be held at the Massachusetts Institute of Technology, Cambridge, Massachusetts. For more information, contact: Director of Summer Session, MIT, Room E19-356, Cambridge, MA 02139 or Anthony J. Sinskey, Dept. of Biology, MIT, Cambridge, MA 02139 617/253-6721.

SEPTEMBER

• **11, Pesticide Applicator Certification Seminar,** Okumura Biological Institute, Clarion Hotel, Sacramento, CA. Contact: George Okumura, 6669 14th St., Sacramento, CA 95831 916/421-8963.

• **12-14, Basic Pasteurization Course** to be held at Howard Johnson, 8887 Gateway West, El Paso. For more information, contact: Ms. Janie F. Park, TAMFES, PO Box 2363, Cedar Park, TX 78641-2363 512/458-7281.

• **19-21, New York Association of Milk and Food Sanitarians will hold its annual meeting** in Buffalo at the Sheraton-Buffalo Airport Hotel. For information concerning the meeting, contact: Paul Dersam, 27 Sullivan Rd., Alden, NY 14004, 716/937-3432.

• **27-29, Liquitec Expo '89.** For more information contact: Carolyn Mesce, Marketing Manager, Liquitec Expo Inc., PO Box 630, West Paterson, New Jersey 07424 201/256-0011.

OCTOBER

• **23-24, Pests Associated with Food Industry and Environmental Sanitation Seminar,** Okumura Biological Institute, Holiday Inn, Elk Grove Village, IL. Contact: George Okumura, 6669 14th St., Sacramento, CA 95831 916/421-8963.

• **25-26, Advanced Course on Pest Recognition and Food Industry Problems,** Okumura Biological Institute, Holiday Inn, Elk Grove Village, IL. Contact: George Okumura, 6669 14th St., Sacramento, CA 95831 916/421-8963.

NOVEMBER

• **11-15, Dairy and Food Industries Supply Assoc., Inc.** McCormick Place, Chicago, Illinois.

DECEMBER

• **4, Pesticide Applicator Certification Seminar,** Okumura Biological Institute, Clarion Hotel, Sacramento, CA. Contact: George Okumura, 6669 14th St., Sacramento, CA 95831 916/421-8963.

• **5-6, Pests Associated with Food Industry and Environmental Sanitation Seminar,** Okumura Biological Institute, Clarion Hotel, Sacramento, CA. Contact: George Okumura, 6669 14th St., Sacramento, CA 95831 916/421-8963.

• **7-8, Advanced Course on Pest Recognition and Food Industry Problems,** Okumura Biological Institute, Clarion Hotel, Sacramento, CA. Contact: George Okumura, 6669 14th St., Sacramento, CA 95831 916/421-8963.

1990

DECEMBER

• **12-18, American Society of Agricultural Engineers will be sponsoring the International Symposium on Agricultural and Food Processing Wastes.** For more information contact: Jon Hiler, American Society of Agricultural Engineers, 2950 Niles Road, St. Joseph, MO 49085 616/429-0300.

To insure that your meeting time is published, send announcements at least 90 days in advance to: K.R. Hathaway, Editor, IAMFES, PO Box 701, Ames, IA 50010.

From the Ames Office . . .

by
Kathy R.
Hathaway

In this issue, you'll find both the form for advanced meeting registration as well as hotel reservations for the 76th IAMFES Annual Meeting, August 13-17 in Kansas City at the Hyatt Regency Crown Center.

Advanced registration is a lower rate than "on site" registration. You are encouraged to submit your registration forms to the Ames office as soon as possible. For those non-members planning on attending the meeting, you will notice a special price with registration when you become an IAMFES member. As an IAMFES member you will receive 12 issues of DAIRY, FOOD AND ENVIRONMENTAL SANITATION.

Hotel room rates for the Hyatt Regency will be held until July 12, so please make your reservations EARLY.

Also in this issue, you will find the two candidates for the IAMFES Secretary, Michael P. Doyle, University of Wisconsin, Madison and Robert Brackett, University of Georgia. Your vote is important and is one of your rights and benefits as a member! Don't forget to cast your vote when you receive your ballot in the mail!

Until next time.

Kathy R. Hathaway
Executive Manager, IAMFES

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1. **DAIRY, FOOD & ENVIRONMENTAL SANITATION,** a monthly non-scientific magazine that keeps you up to date on your profession and your association.
2. **JOURNAL OF FOOD PROTECTION,** also monthly, on a scientific level, comprised of research and general interest manuscripts.
3. There are over 20 committees of which you can participate, from Food Equipment Sanitary Standards to Communicable Diseases Affecting Man.
4. As a member you are entitled to vote on important matters affecting your association, as well as voting for officers.
5. A Secretary is elected by the members each year and serves on the Executive Board of IAMFES, moving up in position each year to presidency. You as a member can run for office.
6. The Educational Conference of IAMFES is held each August in a selected city in the U.S. or Canada. As a member you receive a special discount on the registration fee.
7. Free Lending Library. As a member you may check out educational materials from the IAMFES Lending Library. These educational materials are available in slide series as well as VCR tapes. The IAMFES Lending Library is supported by the Foundation Fund through IAMFES Sustaining Members.
8. IAMFES Awards are presented yearly at the Annual Meeting Banquet in August. As a member you are eligible to nominate and be nominated for these prestigious awards.
9. As a student member, graduate students are encouraged to participate in the Developing Scientist Award. Papers are presented and judged during the Annual Meeting with five award winners.
10. The call is on us! A toll free number outside Iowa and inside the U.S. enables members to call the office at no charge, 800-525-5223. FAX 515-232-4736.

For further information about becoming a member of IAMFES fill in the card and mail today or call 1-800-525-5223. For Iowa and Canada call 515-232-6699.

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Reader requests for information are sent to the appropriate company. Follow-up on reader requests are the responsibility of the company advertising.

The Advertisements included herein are not necessarily endorsed by the International Association of Milk, Food and Environmental Sanitarians, Inc.

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104	117	130	143	156	169	182	195	208	221	234	247	260	273	286	299	312	325	338	351
105	118	131	144	157	170	183	196	209	222	235	248	261	274	287	300	313	326	339	352
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107	120	133	146	159	172	185	198	211	224	237	250	263	276	289	302	315	328	341	354
108	121	134	147	160	173	186	199	212	225	238	251	264	277	290	303	316	329	342	355
109	122	135	148	161	174	187	200	213	226	239	252	265	278	291	304	317	330	343	356
110	123	136	149	162	175	188	201	214	227	240	253	266	279	292	305	318	331	344	357
111	124	137	150	163	176	189	202	215	228	241	254	267	280	293	306	319	332	345	358
112	125	138	151	164	177	190	203	216	229	242	255	268	281	294	307	320	333	346	359
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