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HANDLING AND USE OF WHOLESALE DAIRY CASES IN TEXAS

TEXAS AGRICULTURAL MARKET
RESEARCH & DEVELOPMENT CENTER
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Handling and Use of Wholesale Dairy Cases in Texas

John P. Nichols

Robert E. Branson

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THE TEXAS AGRICULTURAL MARKET RESEARCH AND DEVELOPMENT CENTER

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Robert E. Branson
Coordinator

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HIGHLIGHTS

* Lost and stolen dairy delivery cases represent an increasingly important cost item to dairies in Texas. Losses for 1979 were estimated to exceed 1.9 million dollars.

* The purpose of this study was to focus on the retail level of the distribution system and examine dairy case handling practices, retailer attitudes and the problems surrounding use and storage of dairy cases.

* A survey of 43 retail firms in Dallas and Waco, Texas and numerous other industry organizations provided the basic data for the study.

* It was found that most retail firms keep few if any records on receipt or delivery of dairy cases themselves.

* Typical retail chain stores were found to have an average of 73 empty cases at any one time. Of these, thirty were stored outside.

* Retailer awareness of case loss problems was very low. Only six percent of the respondents indicated they thought it was an important problem.

* Insufficient secure storage at retail and inadequate record-keeping and inventory control by dairies were the most important factors influencing the case loss problem.

* The key management problem is to increase the awareness of retailers and drivers and to create an incentive for better handling procedures which could reduce losses.

* Alternative solutions are available but require the direct attention of dairies if they are to be implemented satisfactorily. These include educational and information programs, improved records of delivery and pick-up, and driver incentives. Security at both the retail level and the dairy plant should be improved in conjunction with these efforts.

* An industry-wide program designed to support research and development of handling methods is needed if improvements in materials, equipment and systems are to be found and implemented.

* A voluntary deposit system does not appear to be feasible. Mandatory deposit programs through legislation will need concerted industry-wide effort and evidence that all other approaches have been tried or are in force.

Introduction

Among the many problems facing wholesale food distributors, obtaining, handling and recovering reusable containers ranks high on the list. The dairy products industry has long used returnable containers at both the wholesale and retail level. While in recent years retail containers have, for the most part, been changed to non-returnables, dairy product distribution at the wholesale level continues to depend on well-constructed returnable plastic or metal containers.

Dairy product delivery cases are typically constructed of heavy duty plastic or metal. These cases are designed to accomodate the weight factors involved as well as the wet conditions inherent in typical dairy plant operations. As currently available, dairy cases are not designed to nest when empty, thus little or no space is saved in handling, storing or returning these cases to the plant. The fact the empty cases require significant space for storage, particularly at the retail level, creates many opportunities for case theft or loss through inadequate security in storage areas. Decreasing frequency of delivery to retailers and reduced merchandising responsibilities for drivers helps to exacerbate the problem since the result is a greater number of cases in the system at any one time.

The loss of cases has increased greatly in recent years. Dairy plant managers have recognized that this loss, if uncontrolled, will lead to higher operating costs and ultimately to increased consumer prices for dairy products. One recent study estimated the cost of lost or stolen dairy cases to be approximately 1.3 million dollars in Florida in 1977 (Mathis and Degner, 1977). This was equivalent to approximately one-half cent per gallon of dairy products produced. A 1979 update of that same study documented

that the problem continues to exist and that costs in Florida were increasing (Mathis and Degner, 1979). Nationally, the losses were estimated at 70 million dollars in 1977.

Using a factor of $0.006 per gallon from the Florida studies and production of dairy products in Texas, loss of cases are estimated at approximately $1.9 million dollars in Texas in 1979. Although identification of of the exact cost of lost or stolen cases is imprecise at best, it is agreed by most observers that the problem is serious in many areas and that some measures to control losses should be instituted.

Objectives

In 1980 the Dairy Products Institute of Texas asked the Texas Agricultural Market Research and Development Center to undertake a study of this problem. The study was to focus on the interface between the dairy delivery system and retail food outlets. More specifically the objectives were as follows:

1. To determine handling and storage procedures for dairy cases in retail food stores and volume of cases handled.
2. To determine pick-up and delivery practices for dairy cases at the retail store level.
3. To identify and rank sources of case loss at the retail store level and in the delivery and pick-up process.
4. To identify sources of case disappearance among institutional users of dairy products.

Findings from Florida Studies

The most comprehensive published study of the dairy case loss problem was done by Mathis and Degner in Florida in 1977. In that study all dairy processors in the state were surveyed as well as major retailers, case

manufacturers and trade associations across the country. Data collected were used to develop an estimate of the level of losses for Florida dairy processors.

Seven internal control measures were identified. Of these, case identification, case exchange programs and driver education were being used by more than 70 percent of the dairies interviewed. Case inventories and warnings on cases were used by 53 and 38 percent of the firms, respectively. Driver incentives were used by 21 percent of the firms while none were using a retailer incentive.

Additional control measures identified were case deposits, universal case plans, state inspectors, signs and fences, voluntary inside storage by retailers, public relations efforts, bulk delivery systems and case redesign. Of these, dairy processors favored case deposits the most as a control measure with case redesign second and public relations programs third. Retailers, as might be expected, disliked the deposit system but favored case redesign, warning signs, public relations and voluntary inside storage.

Recommendations from the study include both improved internal management practices and efforts aimed at increasing awareness among retailers and the general public. Dairy processors were encouraged to improve their own accounting and record-keeping systems to better identify and control the losses. Driver accountability was also suggested as a fruitful method of reducing case losses. Design of delivery routes with case collection problems in mind is another internal management approach suggested. Use of "case scouts" or individuals employed to locate and collect lost cases is another alternative. One-way cases, although expensive, were suggested for particular types of accounts where losses are greatest.

Legislative and regulatory measures including case deposit systems were also discussed. A mandatory case deposit system was not recommended because of management and cost problems associated with its enforcement. Voluntary deposit systems were deemed to be unworkable due to the highly competitive nature of the processed dairy products business in Florida.

The study confirmed the conventional wisdom that losses occur primarily at those points in the system where cases are left unsecured. Dairy processors indicated that they believed most of the losses were from stacks of empty cases behind supermarkets. Supermarkets were identified as having greater problems in this area than other types of retailers. Convenience stores were observed to store empty cases inside thus reducing greatly the opportunity for losses.

The findings of the Florida studies and observations of industry leaders suggest that instituting effective control measures depend on a careful assessment of delivery, handling and pickup procedures at the retail store level where control over the cases is the most difficult to exercise. The objectives of this study, as presented above, were developed with these considerations in mind.

Procedures:

To obtain data and information for this study, both dairy processors and retailers were interviewed. A small sample of dairies in the Dallas and Waco market areas were selected for initial contact to provide background information on typical dairy product delivery operations and the nature of problems associated with the handling and recovery of cases.

The primary data collection procedure was a focused in-depth survey of retail stores, restaurants and institutional users (Table 1). A sample of 32 retail food stores in Dallas and Waco was selected for personal

interview. The questionnaire consisted of two main components: 1) a survey of the opinions of managers regarding the handling and use of dairy and other returnable cases and 2) an inventory of the number, location and type of dairy cases physically on the premises at the time of the interviews. The questionnaire is summarized in Appendix A.

Table 1

Number of stores and other retail outlets included in sample, Dallas and Waco, Texas.

Market Area	Food Stores	Restaurants and Institutions	Total
Dallas	21	11	32
Waco	11	0	11
Total	32	11	43

A cross section of supermarket chainstores, independent supermarkets and convenience stores was identified using random sampling procedures. Since a balance was desired between stores having only single dairy supplies and those which were split accounts, this was determined on an *a priori* basis and used in the initial selection among chains which were to be sampled. Of the 32 stores, 16 were chainstore supermarkets, 7 were affiliated or independent supermarkets and 9 were convenience stores. Fifteen of the stores were split accounts while 17 were single account stores.

The sample of restaurants and institutional users was a directed sample selected in consultation with cooperating dairy processors. This was done to insure that a full range of types of users was included with the small sample size permitted by the resources available. Interviewing was conducted over a three month period from June through August 1980.

Earlier studies indicated that the accumulation of empty cases outside food stores is largely the result of variation in sales and deliveries throughout the week. Daily records of case delivery and pickup by account would permit better analysis of this consideration. Most dairy processing firms do not maintain records of the number of empty cases picked up from each retail account. Records were obtained from one cooperating dairy, however, which did collect this information and which permitted the analysis of day-to-day variation in the balance between the number of cases delivered and number picked up. These data were obtained and analyzed for a 9 week period in September and October of 1980. The data covered eight representative routes including 241 separate accounts. Since this dairy serves primarily independent and convenience foodstores, restaurants, schools and other institutions, the sample does not represent chainstore retailers.

In addition to interviews with dairies and retailers, numerous other industry groups and organizations were contacted. These include various state dairy associations, milk market order administrators and case manufacturers. From these contacts information was obtained with regard to similar problems and programs in other regions.

In the following section the results of the survey are presented. The analysis of case deliveries by the cooperating dairy is then discussed, followed by an examination of alternative strategies which could be pursued in reducing case losses. The last section presents a summary and the conclusions from the study.

Concerns of Dairy Plant Managers

Several major issues were revealed in discussions with dairy plant managers and other industry leaders. The loss of dairy cases was considered to be a significant problem by most of the managers contacted. Major differences of opinion exist, however, on the magnitude of problems in relation to the cost of implementing control measures. In most cases effective control measures require investment in security equipment (fences, gates, etc.), a change in recordkeeping systems requiring additional labor, or increased incentives to drivers or retailers to cause a shift in attitudes toward exercising better control over cases.

Finding and keeping dependable drivers is a significant problem for most dairies. The hours are long and the physical effort great compared to other employment alternatives. Many plant managers cited this as a reason for not pushing drivers harder on collection and accountability for dairy cases. They view the potential loss of drivers as a cost of implementing tighter controls. Since good drivers are not easy to find it is important to maintain a flexible working environment which may mean, in part, reduced pressure on problems such as accountability for dairy cases.

Instituting any control system was expected by plant managers to require significant investment in security around the plant premises and at retail stores. This would consist of both physical equipment such as fencing and increased labor to monitor gates, truck movements and the inventory of empty cases. In some plants where general security systems are in place they still may not be effective where incentives exist for drivers or other employees to exploit the system

internally. If a driver incentive program is employed then some means of maintaining control over empty cases within the premises may also be required.

It is also evident that a case deposit system requires a more sophisticated record keeping system than most dairy plants now have. If retailers are to be held accountable for cases not returned, then the records maintained by drivers and tabulated and collated in the accounting office will need to be greatly improved in most dairy plant operations. In addition, of course, a move to a deposit system would require increases in the security and control systems discussed above. Where deposit systems are required across the entire dairy industry, some public agency is designated to provide enforcement. This may represent an additional cost.

These concerns are widely held among plant managers interviewed. While none had conducted a specific cost analysis of proposed control measures, all had weighed the general costs and benefits in their mind. While the traditional decision has apparently been against more rigid, costly control measures, most managers were interested in new approaches which could be shown to be cost effective.

Survey of Retail Stores

The main focus of this research was the interface between the dairy and the retailer in the physical handling and control of dairy cases. The survey results are presented below in a manner which follows the logical movement of the dairy cases into and through the retail store.

Case Receipts:

Checking of deliveries is the first point at which managers exer-

cise control over most products entering the store. It was found that 59 percent of the respondents indicated that either the manager or assistant manager was responsible for checking deliveries (Table 2). One-quarter of the respondents indicated they had a back door or inventory control clerk assigned to this job. An additional 25 percent indicated that this task was done by any store employee who was available at the time.

Records of deliveries are usually confined to the product received, not containers or cases. Only 13 percent of the respondents indicated they checked and kept a record of the number of dairy cases received (Table 3). This was higher in single account stores than in those with split accounts.

The majority of deliveries are received by the retailer prior to noon. Sixty-five percent of the respondents indicated that their dairy deliveries arrive between 7 a.m. and noon, 35 percent in the afternoon. In general this pattern occurs because of the retailers preference. Since deliveries are usually preferred in the morning it places a premium on the drivers time during those hours and reduces the time available for sorting, stacking or picking up empty cases.

In the past, drivers were also often salesmen and merchandisers. This is no longer the case in the dairy industry. Most wholesale dairy deliveries are made by drivers who do not have any significant merchandising or sales responsibilities. Twenty percent of respondents in single account stores indicated that the drivers do merchandise. In split account stores a high percentage (80 percent) indicated that some drivers had a merchandising responsibility. In most of these, however, the merchandising activity was thought to be confined primarily

Table 2

Individual usually assigned to check and control deliveries received by retail stores, Dallas and Waco, Texas, 1980.

Individual	Share of Stores[1)]
	%
Manager or Assistant Manager	59
Department Manager	9
Back door or inventory control clerk	25
Anyone available	25

1) Total is greater than 100 percent because of multiple responses.

Table 3

Share of stores which keep records on the number of dairy cases received, Dallas and Waco, Texas, 1980.

Type of Store	Share of Stores keeping records
	%
Split account	7
Single account	18
Total	13

to processed dairy products such as cottage cheese, sour cream, etc.

Since drivers are primarily involved in delivery, and not in stocking or working the retail dairy display space, they do not have an opportunity to immediately recover cases or influence the way cases are handled or stored at the retail level. Since this appears to be a trend in the industry, it focuses greater attention on the need for alternative methods of control and accountability.

Location of cases in store

Respondents estimated that about 125 cases were on the premises at the time of the interview (Table 4). Chainstores averaged considerably higher at 277 cases. The majority of cases (54 percent) were thought to be filled with dairy products in the cooler. Forty percent of the cases were estimated to be empty and in the storage area while other store locations were mentioned for 6 percent of the cases. Share of empty and full cases were similar across type of store.

When the inventory was completed in chainstores it was found that the respondents estimates were generally accurate. An average 213 cases were found in the typical chainstore (Table 5). Of these, 182 (86 percent) were located inside and 140 (66 percent) were filled with product in the cooler. Twelve percent of the cases were empty in the rear of the store while 8 percent were scattered elsewhere inside. Of the 14 percent found outside about two-thirds (9 percent of total cases) were unsecured on a loading dock or on the ground.

A majority (56 percent) of chainstore managers indicated that empty cases were usually stacked outside in back of the store (Table 6). This was less frequent for affiliated and independent store managers.

Table 4

Respondents' estimates of number and location of dairy cases in retail stores, Dallas and Waco, 1980.

Location	Chainstores		Average for all stores	
	No.	Percent[1)]	No.	Percent[1)]
	(cases)	(%)	(cases)	(%)
Containing product in cooler	152	55	68	54
Empty in Storage area	107	39	50	40
Other	18	6	7	6
Total	277	100	125	100

1) Percent of cases.

Table 5

Inventory of dairy cases at retail chainstores, Dallas and Waco, 1980.

Location	Average number of cases	Share of Total
		%
Inside store		
Cooler (full)	140	66
Rear of store	25	12
Elsewhere	17	8
Subtotal	182	86
Outside store		
Loading dock		
Enclosed	11	5
Open	18	8
On ground	2	1
Subtotal	31	14
Total	213	100

Table 6

Store managers' opinions regarding where empty cases are usually stored, Dallas and Waco, 1980.

Location	Type of Store		
	Chain	Affiliated and Ind.	Convenience
		Percent	
Backroom	19	67	0
Cooler	0	0	100
Back Dock (enclosed)	25	0	0
Outside in back	56	33	0

Convenience store managers indicated that empty cases were always stored in the cooler.

In practice empty cases were found outside behind a majority of stores surveyed (Table 7). Chainstores were higher (57 percent) and convenience stores the lowest (12 percent). Sixty-two percent of the stores with split accounts were observed to have unsecured cases outside while it was only 17 percent for single account stores.

Retailers' Opinions

The perceptions of retail store managers relative to dairy case losses are a significant consideration in the analysis. Nineteen percent of the respondents indicated they thought case losses was a problem in their store while 44 percent answered no and 38 percent didn't know (Table 8). Among convenience store managers there were none that thought they had a problem.

When asked how important they thought the problem was in their store the majority indicated they considered it to be unimportant (Table 9). No respondents rated the problem as "very important" while a few, particularly in the affiliated and independent stores, rated it as "important." No convenience store manager interviewed considered it a problem.

The low level of concern among retail store managers is further indicated in that 50 percent had no opinion as to why a problem of case losses might occur (Table 10). Thirty-seven percent of the managers attributed the problem to outside, unsecured storage with a small number suggesting the more basic problems of insufficient storage space in the store. Three percent blamed driver negligence.

Table 7

Type of stores and type of dairy account where empty cases were found unsecured outside in back of premises, Dallas and Waco, 1980.

Type of Store	Share of Stores
	%
Chainstore	57
Affiliated and Independent	50
Convenience	12
Split account	62
Single account	17

Table 8

Store managers' opinions regarding losses of dairy cases in their store.

	Type of Store			
Response	Chain	Affiliated & Independent	Convenience	Total
	- - - Percent - - -			
Yes, a problem	25	29	0	19
No, not a problem	38	29	67	44
Don't know	38	43	33	38

Table 9

Store managers' opinions regarding importance of case loss problem in this store, by type of store, Dallas and Waco, 1980.

Response	Type of Store: Chain	Affiliated & Independent	Convenience	Total
		- - - Percent - - -		
Very Important	0	0	0	0
Important	6	14	0	6
Unimportant	94	86	100	94

Table 10

Store managers' opinions on the reasons for the loss of dairy cases, Dallas and Waco, 1980.

Reason	Type of Store: Chain	Affiliated & Independent	Convenience	Total
		- - - Percent - - -		
No problem	14	0	0	6
Outside storage	33	71	13	37
Insufficient storage	7	0	12	6
Driver negligence	7	0	0	3
Don't know	47	29	75	50

It is not always possible for drivers to pick up all available cases at each store each time a delivery is made. Some have suggested that because of this, cases are left in an unsecured location in or behind the store for a several day period until the driver has either room or time to make a pickup. Among the stores surveyed, managers indicated that drivers picked up all available cases "most of the time" (Table 11). However, only for about one-quarter of the stores were all of the cases picked up all of the time.

In addition to increasing the frequency of pickup, suggestions offered by store managers included instituting a charge for drivers for losing cases. Managers also observed that if drivers were involved in merchandising products the dairy would keep a better control over their cases. Once again, however, the largest majority had little to offer regarding possible changes in driver handling practices.

When asked what overall changes were needed or desirable in the handling of dairy cases, a large majority of store managers indicated "no change" (Table 12). Nine percent suggested the use of a deposit system, while a change to nesting or disposable cases and improved inside storage were also noted. More suggestions for change were received from the managers of affiliated and independent type stores which had earlier indicated a more significant level of concern for the problem.

Table 11

Store managers' opinions regarding the frequency of pickup of all empty cases by dairy delivery drivers, Dallas and Waco, 1980.

Response	Type of Store: Chain	Affiliated and Ind.	Conv.	Total
	Percent			
"All of the time"	19	17	67	24
"Some of the time"	75	83	33	72
"Part of the time"	6	0	0	4
	100	100	100	100

Table 12

Store managers' opinions regarding the need for, and type of, change in dairy case handling practices at the store level, Dallas and Waco, 1980.

Response	Type of Store: Chain	Affiliated and Ind.	Conv.	Total
	Percent			
No change needed	88	57	100	85
Use deposits	6	29	0	9
Change cases	6	0	0	3
Improve inside storage	0	14	0	3

Restaurant and Institutional Use

The managers of 11 restaurants and institutions were interviewed using a procedure similar to that employed for retail food stores. Given the small sample size, the data are not reported in tabular form.

Most restaurants and institutions receive frequent delivery of dairy products, but the quantity per delivery is generally lower than for most retail stores. Restaurants typically had only one supplier, averaging about 20 to 25 cases per delivery and four deliveries per week. Larger institutional users reported five to six deliveries per week averaging 40 cases each, while small accounts such as schools reported 5 to 10 cases per delivery with five deliveries per week.

In general, a very low level of awareness or concern was found among these managers regarding the storage or loss of dairy cases. While most restaurant managers exercise control over food products received, no records are kept on dairy cases. Deliveries are usually made through the back entrance where a receiving clerk or assistant manager checks the products received. Less than 10 percent of those interviewed indicated that the loss of dairy cases from their establishment might be important.

Empty dairy cases were found in unsecured areas outside 50 percent of the restaurants and institutions visited. This is more prevalent at smaller restaurants. Large institutional users often have enclosed receiving areas or a fenced-in area where some security is afforded.

The main conclusion from the interviews with these managers is that little attention is being given to the problem even though the opportunity for losses is frequently encountered. In a typical restaurant the number of cases available at any one time is relatively small so the problem of losses is not very visable. Larger institutional users would be more likely to recognize the problem if one existed and would be more likely to respond to some concerted control program if initiated by the dairy.

Analysis of Delivery and Pickup of Cases by Day of Week

The main contributing factor in the loss of dairy cases is the frequent exposure of the case in unsecured areas. The opportunity for loss increases as the number of empty cases exceeds storage capacity at the retail level. This is exacerbated by delivery schedules which make it inconvenient or impossible for all the cases to be picked up each time a delivery is made. In some instances delivery frequency has been reduced so that more cases accumulate in the store or restaurant. In other situations space is not available on the truck to conveniently handle empty cases until several stops have been made. This is a problem on days when larger than average quantities are being delivered to replenish retail stocks. The variation in deliveries by day of the week is therefore a factor which should be considered.

Data on pickup and delivery of cases by retail account is not easily obtained. Most dairies have an estimate of the number of cases delivered based on the quantity of product shown on the delivery record. Few dairies, however, keep an accurate record of the number of cases picked up from each account on a daily basis.

One firm contacted in the survey had recently instituted a system to collect such information for purposes of monitoring case losses. These data were provided for analysis as part of this project. The data consisted of daily records for 241 retail accounts on eight different routes. Routes were selected to be representative of all different types of retail accounts although the cooperating dairy focused mainly on the convenience store, restaurant and institutional market. Some independent supermarkets were included, but the sample is not representa-

tive of the large chainstore market. Daily records were obtained for a nine week period in the fall of 1980.

The largest share of total cases accounted for were delivered to convenience type food stores (Table 13). Losses averaged 1.24 percent over the nine week period for all accounts. Vending and snack food service accounts had the highest average losses while "other institutions" had the lowest with less than one percent.

Table 13

Case losses by type of retail account, 241 retail accounts, Dallas, Texas, nine week period, 1980.

Type of Retail Account	Share of Total Cases Delivered	Percent lost[1] (nine weeks)
	-- Percent --	
Food Stores[2]	73	1.09
Hotel and Restaurant	10	1.51
Schools	4	1.34
Other Institutions	8	0.74
Vending and Snack bar servicing	5	3.40
Total all accounts	100%	1.24

[1] Difference between total cases delivered and total picked up.

[2] Primarily convenience type food store.

Deliveries to food stores were the lowest on Wednesday while deliveries on the other four week days were nearly equal (Table 14). Most of the other types of accounts showed a higher delivery in midweek and lower on Monday and Friday.

For food stores the number of cases delivered was greater than the

number picked up on Monday, Wednesday and Friday (Table 15). Tuesday and Thursday deliveries averaged a positive balance. All other types of accounts had a negative balance on Wednesday and Friday with some showing a slight negative balance of Thursdays as well.

It could be hypothesized that the days on which larger than average deliveries were made, more empty cases would be left at the retail firm due to limited space in the truck. This would yield a negative relationship in Table 15.

Comparing the occurrence of negative balances in picking up cases with the days on which large average deliveries were made does not reveal a consistent pattern except in the case of restaurants.

Table 14

Average number of cases delivered by day of week and type of account.

Type of Account	Day of week				
	Monday	Tuesday	Wednesday	Thursday	Friday
	-- number of cases --				
Food Stores	37.8	38.1	26.9	38.3	38.5
Hotel and Restaurant	3.1	3.0	6.2	2.3	4.1
Schools	11.4	13.9	12.1	17.0	10.1
Other Institutions	12.0	38.1	14.5	30.6	14.6
Vending and snack	6.5	10.7	8.8	9.2	7.8
Average	14.5	22.0	9.6	18.6	18.9

Table 15

Average percentage difference between number of cases delivered and number picked up by day of week and type of account, Dallas, 1980.

Type of Account	Day of Week				
	Monday	Tuesday	Wednesday	Thursday	Friday
	-- percent[1] --				
Food Stores	(2.85)	1.26	(1.45)	0.61	(3.53)
Hotel and Restaurant	3.06	1.95	(6.48)	2.56	(6.15)
Schools	3.10	(3.74)	(3.08)	(1.48)	(2.03)
Other Institutions	(0.27)	0.28	(3.40)	(0.75)	(0.81)
Vending and snack	(4.52)	0.00	(5.32)	(0.76)	(7.02)
Total	(1.89)	0.94	(4.32)	0.40	(3.70)

[1] percentage is given in parenthesis where number of cases delivered is greater than number picked up.

In some situations this could be the result of an increased number of stops being made on the first day of the week. Even if average size of delivery is not greater, the total number of cases on the truck may be increased, thus restricting flexibility in picking up empty cases.

These data suggest that the number of cases delivered relative to the number picked up varies with day of the week. The pattern is not consistent across all types of retail outlets due to the difference in their demand for and use of dairy products. To the extent that more cases are delivered than picked up on any given day, it suggests that some empty cases are occasionally being left at the retailer. When this occurs the opportunity exists for cases to be left in unsecured areas and therefore more vulnerable to loss.

Alternatives for Reducing Delivery Case Losses

Because of the sizable case losses experienced by a majority of the dairy processing plants contacted during the study, some means of reducing losses is of importance. It is not unusual for processors to typically have to replace a third or more of the plant's shipping case inventory each year. Losses due to case damage or breakage are relatively minor. Outright case loss is the major problem. A question, at the outset, existed as to whether case purchases reflected largely the growth of milk sales in response to population increase in major Texas cities. Such proved not to be the case. Losses also were found to be large within closed as well as open distribution systems.

The principal cause of case losses appears to be from storage outside the stores to which deliveries are made.

Our findings indicate that a chain food store, on the average, had about 213 cases when visited. Fourteen percent, or approximately thirty (30) cases were empties sitting outside, usually at the rear of the store, mostly unsecured in any way. Those cases, assumed stacked five high would occupy a space of about seven feet in length and no more than a foot and a half in width. Height would total near six feet.

The average experience was about forty (40) to forty-five (45) empty cases inside the store, making a total of seventy (70) to seventy-five (75) empty cases that required some storage arrangement. Approximately one-hundred and forty (140) cases were still filled, and in the cooler or else in back-up to milk displays. Therefore the key problem is how to manage the average of seventy (70) to seventy-five (75) empty cases to reduce or avoid losses.

If the elimination of dairy case losses had a simple solution it would have been reached long before now. Two factors stand between dairy processors and the resolution of this problem -- uncertainty of responses to alternative plans and the uncertainties of probable costs.

Ten alternatives are considered in the section. Noted are the respective advantages and disadvantages of each.

1. Driver education
2. Store manager education
3. In-store storage pens
4. Outside of store storage pens
5. Nesting cases
6. Delivery carts
7. One-way cases
8. Deposit system for drivers
9. Deposit system for stores by individual processors
10. Mandatory deposit system under legislative authorization

Driver Education

A driver education program's purpose is to obtain more effort by route-men to pick up and return delivery cases from food stores and other customers. Advantages are a low cost of implementation and a minimum investment cost to operate such a program. Periodic route salesmen training sessions plus educational leaflets or other materials are the primary components. Some added expense may be involved in checking route-men's performance upon their return from daily runs, but inventorying of returned, damaged or spoiled merchandise is normally required anyway at the truck loading dock.

Disadvantages revolve around two implicit assumptions which are often not valid. One assumes that the driver always has room on the truck to

carry returning cases. The other is that case disappearance is solely or predominantly caused by route-man negligence.

Dairy processors indicated that daily deliveries, particularly to supermarkets, are uneven, being heaviest toward the end of the week to accommodate higher end-of-week retail sales. Case returns space on trucks is limited on heavy delivery days, thereby pushing returns several days in arrears.

Since such a large volume of milk moves through supermarkets, case losses in this system represent a large portion of the problem. These stores often have limited back-room storage space. Therefore, delivery cases tend to be placed outside on the truck delivery dock as the path of least resistance. To the extent that there is outside storage of delivery cases, where they are susceptible to being picked up by passers-by, damaged or misplaced, case returns are out of the drivers' control.

Store managers interviewed were often vague as to how many empty dairy cases typically were on hand or even where they were located since often no specific storage space is designated. The subject is a low priority consideration. Nearly unanimous was the store managers' opinion that no case loss existed, or if so it was minor. Three out of four store managers were unaware that any problem existed (Table 8). Furthermore, half of the chain store managers and a third of the affiliated chain or independent store managers reported that cases were generally stored outside the store.

Store Education

Given the low priority most supermarket managers attach to the dairy delivery case problem, an education program would be justifiable. Yet no formalized program was evident for the Dallas and Waco market areas. Store managers, with some exceptions, are sensitive to business problems. Therefore, store level education merits more attention. Because of store personnel

turnover, however, continued periodic program presentations would be required.

Advantages again are a relatively low cost for educational materials. Added would be the expense of personnel time to present programs. Part-time personnel could be obtained that might reduce costs. Visits to individual stores and/or central meetings with several stores and chains could be held, which would incur costs for luncheon or dinner programs. Thus costs would usually exceed that for the driver education approach.

Disadvantages arise from ineffectiveness attributable to inadequate follow-through by other in-store staff members. Nor does it resolve the back-room storage space limitation that pushes cases onto outside store docks or yard space.

In-Store Case Storage Pen

Dairy delivery cases when full are held in a designated cooler room that is part of the foodstore back-room layout. When emptied, the cases lose their space priority. That logically leads to the question of finding them a priority space. Two alternatives suggest themselves. A painted space could be designated for an empty case holding area similar to that used in many stores for returnable soft drink containers. Another is to build a pen as a more defined storage area. Pens could be no more than a wooden frame covered with mesh wire on the sides and front with a door opening but no door. The back would be against a wall and not require wire covering. It could be made on a sled or pallet platform that would allow it to be moved with changes in back-room layouts.

Advantages are that a pen provides a designated storage space. Encroachment of the space for other uses is somewhat lessened. Cost would be mostly a one time investment and might even be shared with the food chains

to obtain interest in case protection. Pens of two or three varying sizes could be centrally prefabricated into panels to reduce costs, delivered to the stores and assembled using slip pins in pre-attached door hinges. Manufacturing costs have been estimated to be about $100 to $150 per unit depending on size and quality of materials. Dallas had 308 chain supermarkets according to the recent Editors and Publishers Market Data Guide. Pen costs for these stores would approximate $45,000, but that would be shared by all the processors serving the market, and thus represent a very small investment by each.

Possible disadvantages lie in sharing pen space with other dairies, but that should be manageable. More important perhaps is the problem of finding an agreeable location for the pen. Secondly, is the agreement on the pen size. Also, there is the question of who will maintain the pens in good physical condition. And finally, back-room space itself is a severe limitation at some stores, which would force any case holding system at such stores to the outside loading dock or rear of the store.

Outside Storage Pens

An outside pen would generally have to be more sturdily constructed, with heavier wire than in-store units. Furthermore, all sides and the top should be closed to prevent unauthorized entry. The cost of these units are estimated to approach $150 to $200 each, but these may only be needed at some of the older stores.

The disadvantages of the outside pen are its added cost, greater vulnerability to case pilferage and lesser convenience to store personnel for handling cases. And, of course, the pen would need to be locked. Assuming that a fourth of the supermarkets required outside units in Dallas, the total

cost at $200 each would be $15,400. That, combined with the cost of $34,650 for inside pens at the other three-fourths of the stores, would total about $50,000, again a small figure compared to present expenses of delivery case losses.

Nesting Dairy Delivery Cases

Dairy delivery case makers are well aware of the case losses experienced by dairy processors. It has led at least one manufacturer to design a nesting case, on the assumption that since nesting cases take less room there would be a greater likelihood of their being kept inside the stores and more cases could be loaded on returning delivery trucks. That would help accommodate the larger returns after each weekend's heavy store sales.

A case designed by the Nestier Company, in Cincinnati, Ohio, reduces stacking space. Turned one way the case is self-stacking (position used when loaded with products) and turned the other way it partially nests, saving 44 percent in space requirements, Figures 1 and 2.

Nesting cases are of a durable, heavier weight and would cost about $3.80 each. That is about one dollar more than the light weight standard delivery case most dairy processors use. Two in-line pieces of equipment are necessary to use the case; a destacker (rated at 40 cases per minute), and an orienter unit for putting cases in the self-stacking position for the filler machines. The first costs about $30,000 and the second around $10,000. Modification of the stacker and other case handling equipment, because channels have to be slightly widened for these cases, involves another $6,000 to $8,000 one time cost, thus, the total system costs are near $50,000. The added cost of one dollar each for the heavier weight case makes start-up cost $150,000 (assuming a stock of 100,000 cases). If two filling lines are used, the cost becomes $200,000.

If case losses are reduced by an amount equivalent to 15 percent of the processor's case stock, the savings of the new system is $42,000 per year (assuming a stock of 100,000 cases and replacement cost of $2.80 per case). Therefore the new system would pay for itself (conversion cost plus one dollar extra case cost) in about five years, on a two line system. This is exclusive of interest costs on the increased capital investment. However, neither does this estimate take into account other savings the system might generate. Among these are --

1. Increased truck capacity to return empties on heavy delivery days because empties will nest.
2. Greater ease of handling return cases, a factor which may reduce labor cost and allow some route expansion per driver.
3. Less case storage space required at the processing plant for both returned and cleaned cases. Processors with expanding markets would have reduced need for new or extra plant construction.

Caution is advised, however, that a detailed cost-benefit analysis be made as part of any serious consideration of such a system.

Delivery Carts

Another system that could potentially reduce case losses is to follow the example of bakeries and cold drink distributors who use a delivery rack or cart that is left at the supermarket. Empty cases are placed back in the cart ready for return to the processing plant.

One such system was developed by a bottling company in Austin, Texas. It now is used also in Fort Worth and possibly other cities. Delivery carts were designed and made by a firm in New Braunfels, Texas, to deliver and return cartons for the 2 liter plastic bottles. The plastic delivery case

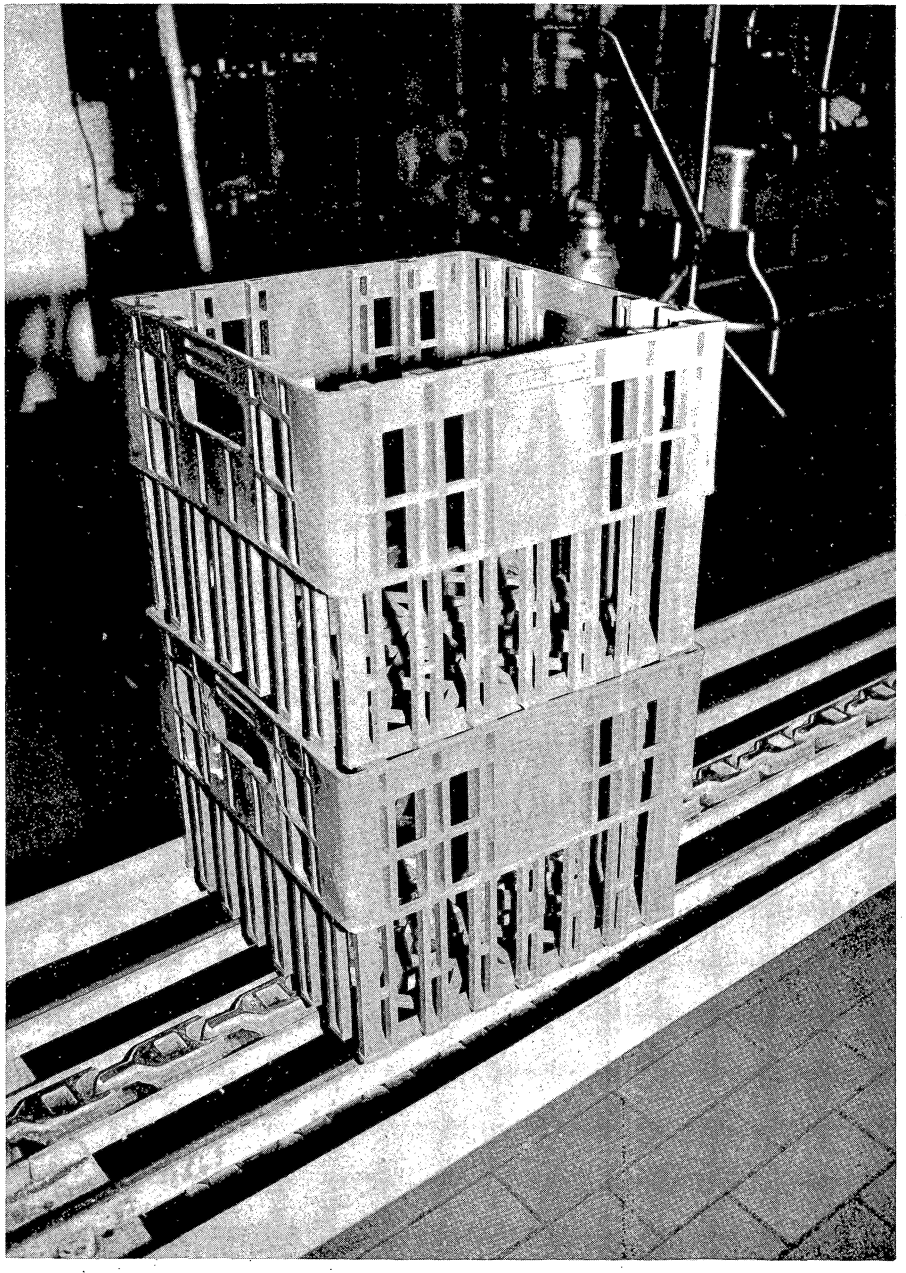

Figure 1

Nesting dairy delivery cases in de-nested, or regular, position.

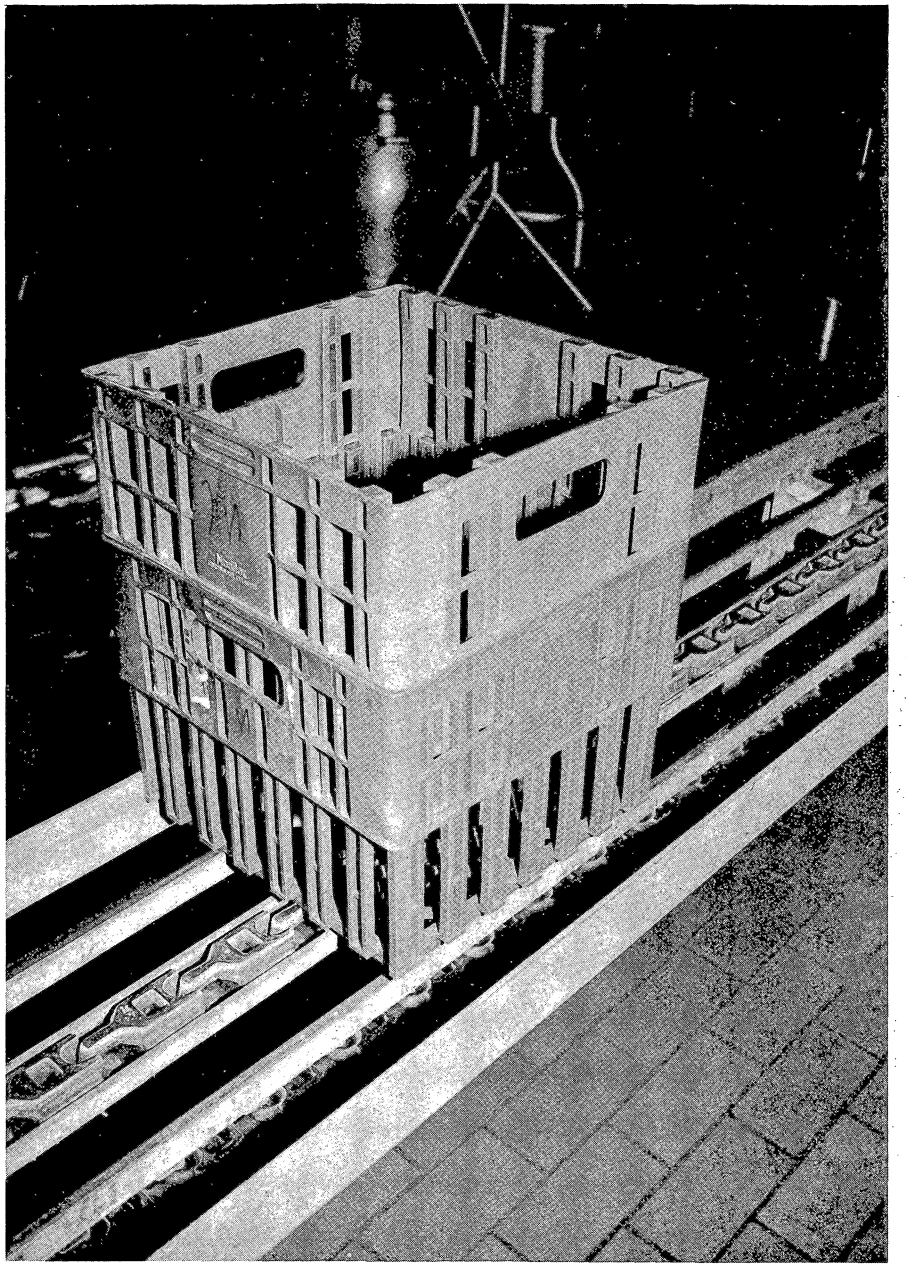

Figure 2

Two nesting dairy cases in nesting position providing 44% space saving.

Figure 3

Storage of cold drink delivery cases in returnable carts in food store back room area. Also view of palletization of products which is increasing.

Figure 4

Returnable carts loaded with cold drink empty cases.

for the bottles reportedly costs about three dollars. The metal delivery carts have four wheels on a bottom platform and the upper structure may be made of angle-iron or a tubular metal, (Figures 3 and 4). The carts, which have been in use for about 5 years, have performed well. Occasional damage is repaired by spot welding.

Two major advantages have accrued from the carts. Trucks are loaded and unloaded in much less time. Therefore, one driver can make more deliveries and pick-ups per day. Secondly, the stores keep the carts inside, and move them as needed, but they serve as a focal point to place empty delivery cases (Figure 4). It must be recognized, however, that a deposit system on the cases for cold drinks encourages this.

A cart for dairy use could be designed to hold 30 to 40 cases, and be about the same size as the one shown here. A supermarket delivery of 150 cases of dairy products would require 5 carts per delivery. Assuming an eight year cart life at the reported $150 per cart, the annual cost would be $18.75, excluding interest on investment. An estimated repair cost of $5 per year and $10 for cleaning would bring the annualized cost to $33.75 per cart, or 64 cents per week. Four trips per week
4 x 30 cases = 120 cases x 4 gallons = 480 gallons of milk. That is equivalent to 0.13 cents per gallon. Assuming that double the number of carts is needed for the float, cost is raised to 0.26 cents per gallon. Current case losses are adding up to a cost of about one-half cent per delivered gallon. This illustration is preliminary and a full cost-benefit analysis should be completed before a final decision is made.

Advantages of the system would center around reduced case losses because of better ease of inside storage and reduced labor cost in making deliveries and accumulating return cases.

Disadvantages arise from costs, if any, of adaptation of the system to refrigerated trucks. Cold drinks delivered in carts are hauled in trailer trucks. Also, dairy plant receiving and loading rooms would require some adaptation for carts.

A further limitation is that no research record is available relative to the reduction in case losses that can be expected. Like the nested case system, the cart system should receive extensive preliminary testing before being adopted.

Bottled drink manufacturers charge food chains a deposit on the delivery cases as well as on the delivery cart. The delivery cart was not adopted to reduce case losses but rather to increase route efficiency. Case losses by the cold drink distributor were very minimal. No periodic reordering was necessary to replace delivery case losses.

One-Way Cases

The concensus of the industry thus far is that the unit cost of one-way delivery cases is too large to make it a feasible substitute. Flimsy shipping containers are reported to cause product container damage that negates any potential savings. Heavy corregated shipping boxes, on the contrary, protect the product but are too costly to afford for one-way use in most instances.

Incentives or Charges to Drivers

Two approaches to case deposits have been tried. One is to charge route-men for missing cases. An alternative is to give a monetary incentive for returning cases. Advantages are that the driver is motivated to get cases back, although it can lead to picking up cases belonging to other distributors. It should cause the route driver to keep store personnel aware

of the need to get cases returned. A disadvantage is the potential dissatisfaction among drivers and possible increased employee turnover since case losses are not entirely the drivers' fault. The loss stems largely from outside storage of cases and is, therefore, mainly a store based problem.

Case Deposits by Stores

This system, used by cold drink bottlers, has performed satisfactorily for the industry. Since it involves consumer deposits as well, it is more involved than dairy case deposits would be. The bottled drink system was formed for returnable bottles, so it was already in place.

Advantages come from the low cost to the distributor aside from extra bookkeeping. Also, bottlers have a strong consumer market brand demand for their products and stores are not in a position usually to refuse to handle products where a deposit is required. Milk is not considered to have as high a degree of brand allegiance. Therefore, a chain could simply switch to a processor that did not require a deposit.

The main disadvantages to milk processors of a voluntary deposit system would be the threat of losing customers to one that did not require a case deposit. Most industry observers hold the view that a deposit system needs to be uniformly followed by all marketers so that customers will not be lost and cases will not be pirated from one plant to another. Legislation has been suggested as a means of organizing and enforcing a uniform system. However, for any such system to work, dairies will need to increase their level of inventory management, record-keeping and control with respect to wholesale delivery cases.

Conclusions

The problem of lost and stolen dairy cases continues to be a significant problem in Texas. Losses for 1979 were conservatively estimated at 1.9 million dollars annually. Other studies have identified the magnitude of the problem and suggested measures for control. The purpose of this study was to focus on the problem of handling cases at the retail level and explore the attitudes of retailers toward these problems. A survey of 43 retail store, restaurant and institutional managers was the primary data collection method used for the study.

The most significant factor involved in the loss of dairy cases is that the opportunity for such losses is created at the store level. This includes both inadequately secure storage and incomplete or nonexistant record-keeping relative to the number of cases delivered and returned. There is a great deal of variation among retailers with the most important difference being associated with the policies of retail chains. Only a few of the larger chains have an effective policy of requiring inside, secure storage of empty dairy cases. This was obviously correlated with those chains which have larger, newer stores where storage space was planned considering modern delivery conditions.

Most retailers do not consider case losses a problem. Since retail firms are not bearing the cost of case losses directly, this attitude is understandable. However, in most instances they were not even aware that a significant number of cases could be lost from their store.

Two areas are identified in which changes could be made to reduce case losses: improved storage and increased awareness of the problem. Increasing secure storage space is potentially a high cost solution. The use of stackable dairy cases could result in better utilization of existing storage space

but has cost considerations for the dairy. Secure storage areas in stores could also be encouraged and the use of delivery carts might also be implemented. These alternatives need careful study and testing.

The key management problem is to change the attitudes of both drivers and retailers. Educational programs for each represent a place to start, but these alone will not be successful. Incentives must be created which will encourage better, more secure handling of empty dairy cases. These incentives, however, will have to be accompanied by a greatly improved system of inventory and control of empty cases. Drivers cannot be held accountable for empty cases if retailers and dairies do not provide some security to avoid loss. The costs of instituting improved inventory, record-keeping and security of cases around the dairy plant is significant and for some dairies it may approach the current cost of lost cases.

If a deposit system on cases is instituted at the retail level it also must be accompanied by the same kind of improved record-keeping and control. Voluntary deposits have generally not been successful because of the highly competitive nature of the dairy industry at the manufacturing and wholesale level. Mandatory deposit systems enforced through legislation will require the same additional control efforts by dairies that in the past they have not been able to justify. In other words, a mandatory deposit system by itself cannot exist without additional record-keeping, inventory control and possibly government involvement for monitoring purposes. If these activities could not be justified in the past, it is not clear that the imposition of a mandatory deposit system alone will make them any more cost effective.

Several activities should be considered by dairy processors, both individually and collectively. One is to initiate a continuing education program for drivers and retailers. This could include the use of posters and brief information sessions designed to acquaint them with the magnitude of

the problem and its costs. In conjunction with this, delivery routes should be reviewed individually to determine if there is a chronic problem where empty cases exceed the truck's capacity on certain days of the week.

Beyond this, an industry-wide effort should be launched to support the development of technology designed to reduce the problem. This might include stackable or non-returnable cases or portable storage facilities. Some progress has been made in this area with shipping cartons and other devices. Improvements in equipment design, handling methods and materials will have to be made, however, before the problem will be significantly resolved. An industry-wide effort could provide the initiative to encourage equipment manufacturers and others in their search for better, more convenient or more secure handling systems for dairy products.

A deposit system has worked for other industries facing similar problems. In most cases, however, it is combined with a strong brand image and generally industry-wide adoption. For this to work in the dairy industry, a significant amount of cooperation would be required. It is suggested that improvements in record-keeping, inventory control and security in storage be instituted for most dairies prior to the launching of any deposit system. For a mandatory deposit system under authority of law to work, the other managerial and educational efforts must be put in place and highly visible to all those who would be affected.

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