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June 2002

## Nebraska Specialty Cheese Plant 2002

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**Nebraska Specialty Cheese Plant  
2002**

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Lincoln, Nebraska 68583-0928**

**Funded by  
ADA/Dairy Council of Nebraska  
8205 F Street  
Omaha, NE 68127**

# Nebraska Specialty Cheese Plant

## Equipment Requirements and Costs

### Introduction and Methodology

Vendors specializing in cheese processing equipment, both new and used, were identified and contacted. They were asked to supply as much information as they could on equipment requirements and costs associated with a “complete” cheese plant in very small (4,000 pounds raw milk/day), small (16,000 pounds raw milk/day), and medium-small (32,000 pounds raw milk/day) plant sizes. It was anticipated that these vendors would be better able to recommend equipment and provide costs for complete cheese making systems (plants) that could function efficiently to produce specialty cheese products. This is opposed to a more “piece meal” approach of putting together equipment components from various vendors (even though this can be done by combining vendor information). Vendor contact information is given in Table 1

Because of the unknown frame before any equipment would be purchased and installed, and because of unknown specifications on type and volume of cheese (or cheeses) to be produced, most vendors were reluctant, or found it difficult, to provide detailed equipment requirements or costs information. It was emphasized to them that we were seeking “ballpark” or budget-type cost information for consideration by those interested in an on-farm specialty cheese plant. Despite this, some very good (and detailed) used equipment requirements and costs were obtained. Most vendors included reconditioned equipment when available to minimize costs.

Also for this same reason, vendors were not willing to supply comments or suggestions on plant size or plant/equipment layout requirements. Approximate plant size requirements (which are required because building construction is a major factor in project cost budget estimation) were determined from various sources.

Table 1 contains the Vendor Contact information. Table 2 contains a Equipment Requirements and Costs Information Received from Vendors Specializing in Dairy Equipment Supply and Sales. It is broken down into principal required equipment categories for the three plant sizes requested. It is difficult to compare quotes from individual vendors directly due to the varying specifications of the item specified. For instance, the Kusel Equipment Co. make-vat quotes include all required accessories including curd cutters, hoops and presses. Most make-vats quoted are self-contained for curd separation and preparation and are sized to hold one day’s worth starting raw milk quantity. The Sprinkman quote features smaller round end cheese vats (which are then refilled for additional processing batches as required) and equally expensive curd drain tables to which the curdled milk is transferred for whey draining and curd processing.

Most make-vat quotes include a U.S. legal pasteurization controls package that is required in most states and adds significantly to the equipment cost (at least \$5000 per vat). Vendors indicated that there is no clear plant size where a continuous HTST (High Temperature Short Time) make-vat system would be recommended. However, for the very small plants the less complex, self-contained pasteurizing vat would be more desirable and less costly to install.

## Equipment Suppliers, Options and Costs

Ullmer's Dairy Equipment, Inc provides extensive USED equipment options and costs for very small, to small cheese plants. The Ullmer's information is broken down and organized below to provide a good estimate of equipment cost estimates for two plant sizes

### **Ullmer's Dairy Equipment, Inc.**

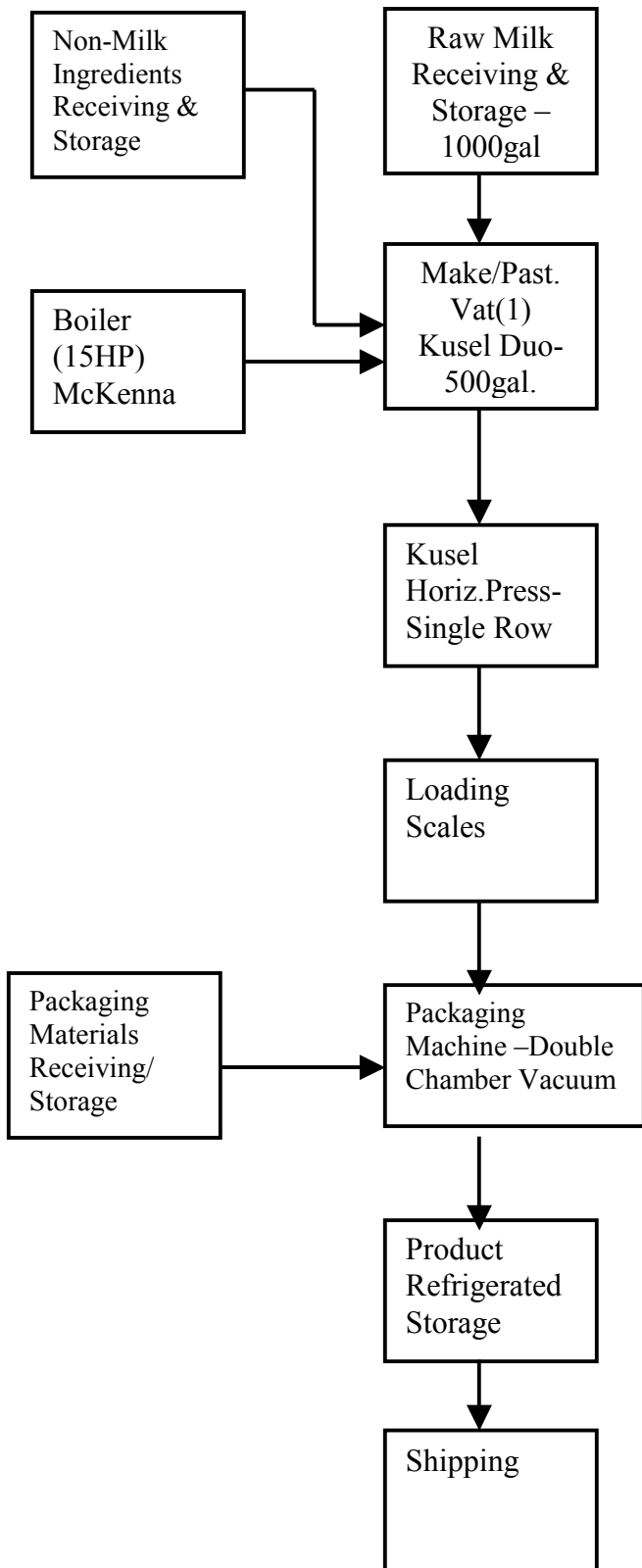
	<b>Equipment/Item - USED</b>	<b>Cost: 4000 lb raw milk/day plant</b>	<b>Cost: 30,000 lb raw milk/day plant</b>
1.	500 gallon Cheese Vat & Agitator– reconditioned	\$15,000	
2.	2 – 15,000 lb Cheese Vat w/agitators - reconditioned		\$30,000
3.	Accessories, including paddles, forkers, knives	\$3,200	\$4,800
4.	Batch Pasteurizer w/U.S. Legal Pasteurization cont.	\$14,000	
5.	20,000 lb/hr HTST Pasteurizing System w/controls		\$25,000
6.	Press - Single Row, - reconditioned	\$2,200	
7.	Press – Kusel A-Frame, six row		\$6,000
8.	Cheese Hoops, 10 x 40lb (used) + 20 x 20lb (new)	\$2,500	\$5,500
9.	Single/Double vacuum packaging chamber	\$3,000	\$6,500
10.	1 – Set scales/printer	\$3,000	\$3,000
11.	1 – 1000 gallon refrigerated storage tank	\$2,500	
12.	1 – 6000 gallon refrigerated storage tank		\$14,000
13.	1 – Westfalia raw milk cream/whey separator	\$12,000	\$15,000
14.	Whey & Cream holding tanks	\$1,500	\$4,000
15.	1 – Damrow curd mill - reconditioned		\$10,000
16.	C.O.P. wash sink w/motor, hoop washer		\$15,000
17.	Cheese Cutters	\$1,500	\$5,000
18.	Air compressor and refrigeration compressors	\$3,000	\$18,000
19.	Tank truck unloading/washing equipment		\$20,000
20.	Lab equipment/supplies	\$1,200	\$2,000
21.	Boiler – 30 hp w/feedwater pump - used	<u>\$7,500</u>	<u>\$11,000(50HP)</u>
	Cost of identified required equipment:	\$73,100	\$194,800
	Additional miscellaneous equipment (15%)	<u>\$11,000</u>	<u>\$29,200</u>
	<b>Total equipment cost:</b>	<b>\$84,100</b>	<b>\$224,000</b>
	<b>Building Cost</b>		
	Piping, pumps, valves, electrical supplies (20%)	\$14,600	\$44,800
	Equipment installation - labor (15%)	\$11,000	\$33,600
	Utilities, mechanical, electrical – labor (15%)	\$11,000	\$33,600
	Building construction/remodeling w/HVAC, 1800 sq.ft. required, (\$50/sq.ft. identified cost)	<u>\$90,000</u>	<u>\$200,000</u>
	<b>Total Building Cost</b>	<b>\$126,600</b>	<b>\$312,000</b>
	<b>Total Project Cost – Budget Estimate</b>	<b>\$210,700</b>	<b>\$536,000</b>

Schier Equipment Co. provides extensive equipment options and costs for two cheese plant sizes. The smallest capacity plant (called a “Mini Cheese Plant”) could process 4000 pounds raw milk per day; the other larger plant could process about 27,000 pounds of raw milk per day. The following presents a summary of information obtained from Schier Company.

**Schier Equipment Co.**

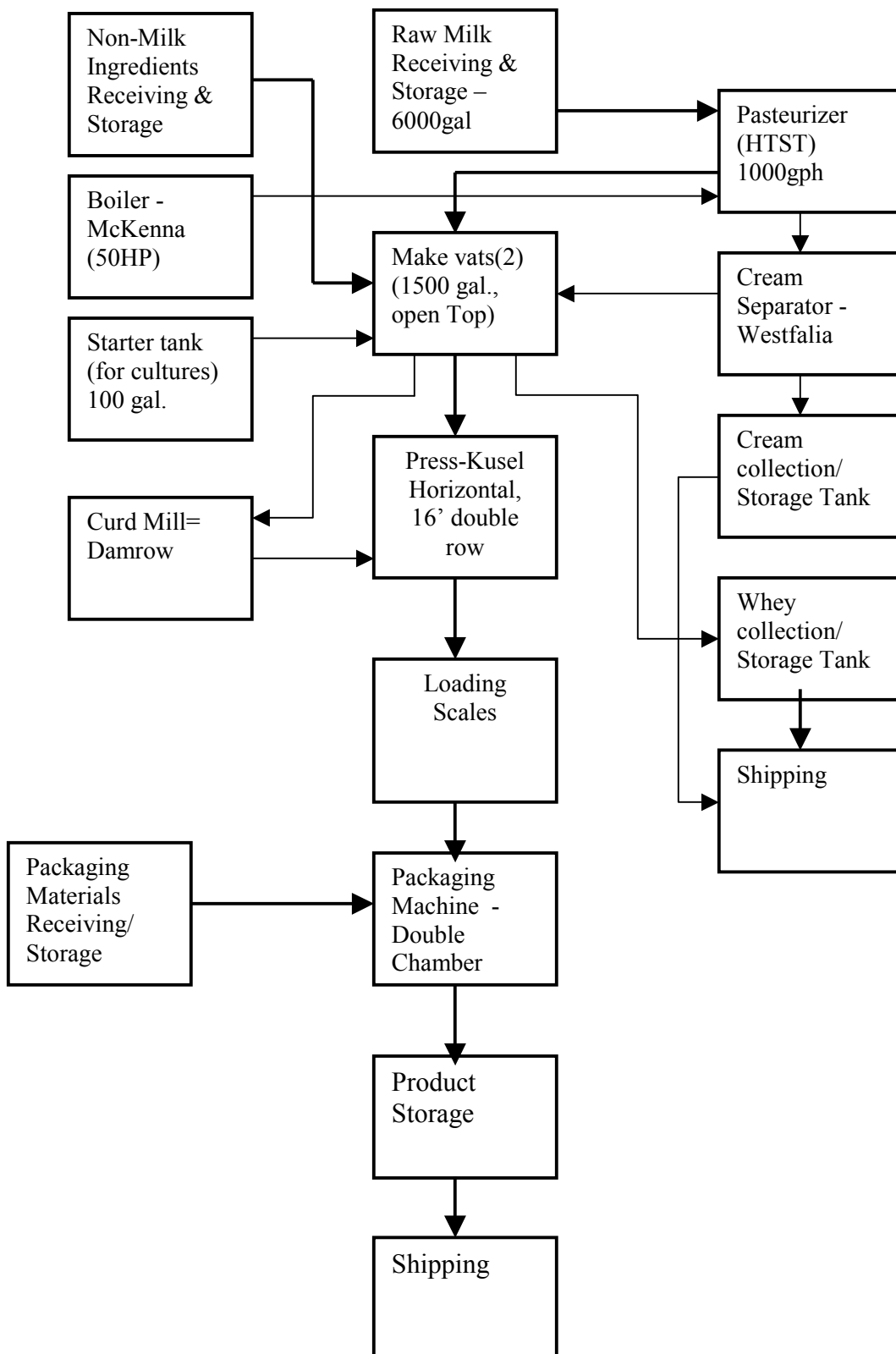
	<b>Equipment/Item</b>	<b>Cost: 4000 lb raw milk/day plant</b>	<b>Cost: 27,000 lb raw milk/day plant</b>
1.	500 gallon Kusel Duo Vat Cheese Vat – reconditioned w/support posts & 2 stir paddles	\$15,000	
2.	U.S. Legal Pasteurization Control Package for vat	\$5,000	
3.	2 – 1,500 gallon open top cheese vats w/agitators		\$30,000
4.	1 - 1000 GPH HTST Pasteurizing System w/controls		\$25,000
5.	Press - Kusel Single Row Horizontal, 16’ - reconditioned	\$3,500	\$7,000
6.	Cheese Hoops, 10 x 40lb (used) + 20 x 20lb (new)	\$2,500	\$5,500
7.	Various cheese tools	\$1,500	\$2,000
8.	Double vacuum packaging chamber	\$8,500	\$7,500
9.	1 – Set loading scales	\$6,400	\$6,400
10.	1 – 1000 gallon refrigerated storage tank	\$2,500	
11.	1 – 6000 gallon refrigerated storage tank		\$14,700
12.	1 – Westfalia raw milk cream separator		\$14,500
13.	1 – 100 gallon cheese culture starter tank		\$7,500
14.	1 – Damrow curd mill		\$7,500
15.	4 – SS Cheese cutting tables		\$3,600
16.	Boiler – 15hp McKenna w/feedwater pump	<u>\$7,500</u>	<u>\$11,000(50HP)</u>
	Cost of identified required equipment:	\$52,400	\$142,200
	Additional miscellaneous equipment (15%)	<u>\$7,800</u>	<u>\$14,000</u>
	<b>Total equipment cost:</b>	<b>\$60,200</b>	<b>\$156,200</b>
	<b>Building Cost</b>		
	Piping, pumps, valves, electrical supplies (20%)	\$11,500	\$31,200
	Equipment installation - labor (15%)	\$8,600	\$23,400
	Utilities, mechanical, electrical – labor (15%)	\$8,600	\$23,400
	Building construction/remodeling w/HVAC, 1800 sq.ft. required, (\$50/sq.ft. identified cost)	<u>\$90,000</u>	<u>\$200,000</u>
	<b>Total Building Cost</b>	<b>\$118,700</b>	<b>\$278,000</b>
	<b>Total Project Cost – Budget Estimate</b>	<b>\$179,900</b>	<b>\$434,000</b>

**Specialty Cheese Plant Process Flow Diagram – Schier Equip. Co.**  
4,000 lb Raw Milk/day



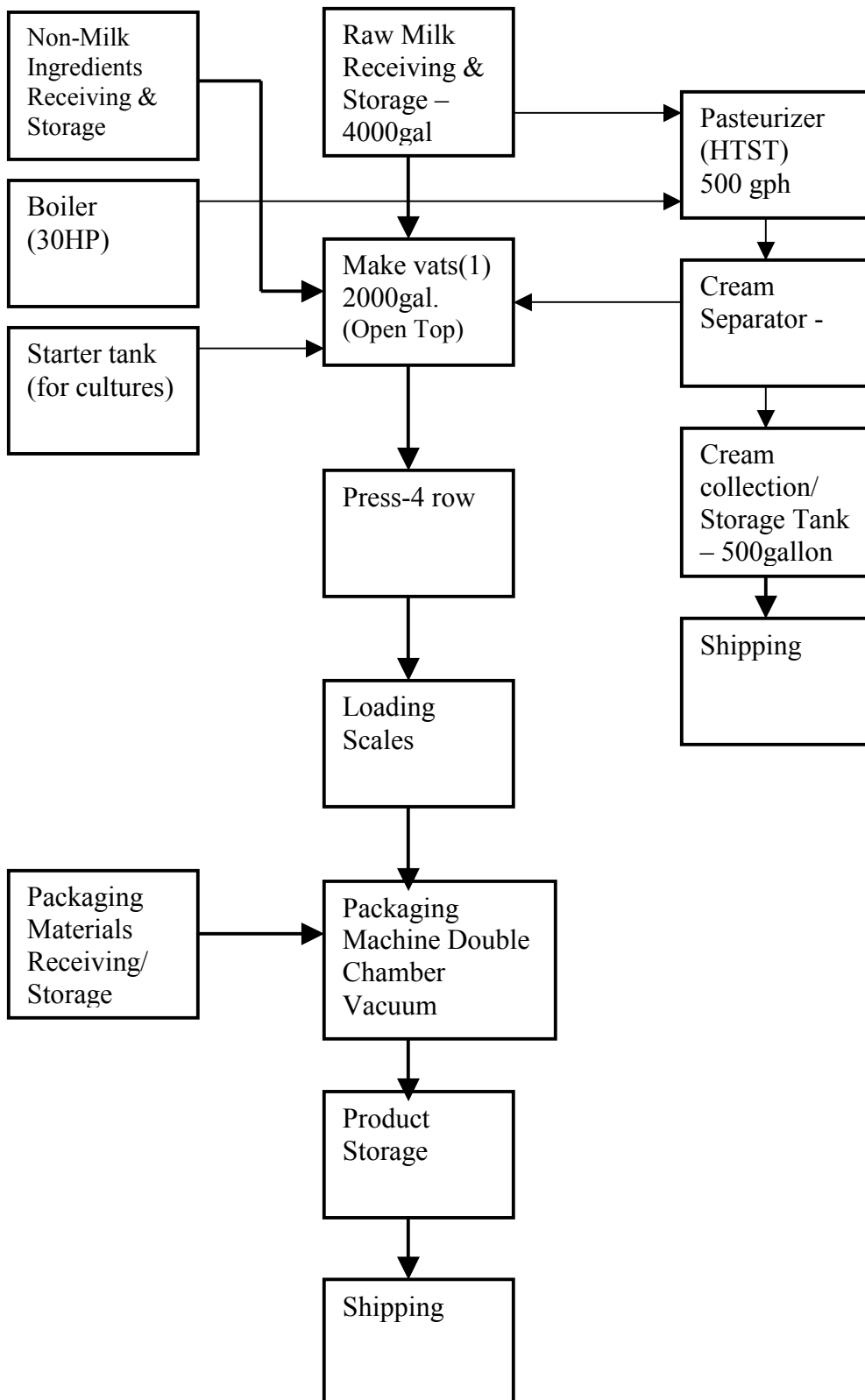
# Specialty Cheese Plant Process Flow Diagram – Schier Equip. Co.

27,000 lb Raw Milk/day



# Specialty Cheese Plant Process Flow Diagram (Estimated)

16,000 lb Raw Milk/day





W.M. Sprinkman Co. submitted a complete (and what they considered to be a very thorough) budget cost estimate for a 30 – 40,000 lb raw milk/day cheese plant. This cost estimate includes all required equipment, all installation and utilities materials, and labor required to complete the project, all of which to be supplied by W.M. Sprinkman Co. Their detailed estimate did not include building construction cost or building HVAC, however.

Their equipment list, the total cost of which came to a budget amount of just over \$400,000, included items such as:

- 10' x 15' fiberglass brine tank
- Whey separator centrifuge
- Whey and Whey cream storage tanks
- Automatic three tank Clean-In-Place system

The cost of the boiler and other utility components needed were not included in the equipment budget, but were included in the facility cost.

W.M. Sprinkman estimated all interconnecting piping materials, including hangers, support materials, pumps, valves, funnels and flow panels at \$75,000 (~19% of equipment cost). Labor to install all of the above, including CIP systems, was estimated at \$50,000. Further, they estimated cost and installation of all required utility/mechanical systems (including boiler, chiller, compressed air, etc.) at \$150,000. Finally, electrical installation for the complete process was estimated at \$100,000.

Total project cost, including \$10,000 in miscellaneous items (such as spare parts, initial packaging and material handling components) and a \$10,000 contingency allowance, was estimated at \$785,000. In addition to this, food grade building construction cost including HVAC could easily add another \$200,000 to this figure (~4,000 sq. ft. @ \$50/sq.ft.), bringing the project total to approximately \$1 million.

Of course it is evident from the preceding information that there are a lot more costs to consider in building a cheese production facility other than the major equipment. Entries were made to accommodate these costs. Other costs to be added to the total project budget figure include: miscellaneous process equipment and plant furnishing needs; pumps, valves, piping, electrical materials needed; mechanical and electrical installation labor costs.

### Building Cost

A specialty cheese plant - either new construction or existing building renovation - must meet U.S., State, and local regulatory requirements and food grade standards for dairy plants. This construction cost, which would normally include the HVAC systems for the plant, has been conservatively estimated at \$50 per square foot. By these estimates, a complete very small cheese plant can be built for under \$200,000. Other vendors have told us that an investment of a minimum of \$250,000 would be required to build a specialty cheese plant.

When estimates of these costs are taken into account, required equipment costs may make up only about 1/3 to 1/4 of the total estimated project cost. Of course good “do it yourselves” can pare significant equipment installation and building construction costs from the estimated project budget

cost, especially for the smallest “mini-cheese plant size. The detailed cost of a small cheese plant cannot be estimated until detailed specifications for the facility are prepared and submitted.

#### General Equipment Vendor Information

Damrow Company and Scherping Systems Inc. are both subsidiaries of a larger company called the Carlisle Companies. These companies specialize in providing equipment, processing systems, and engineering for much larger cheese production facilities projects. They were not able to help much with equipment requirements and costs for very small cheese plants. Scherping Systems distributes a publication called “Cheese Technology Handbook.” It is a 75-page pamphlet-type book that provides a very good short review and summary of cheese products and production processes used. It also contains 20 pages of technical information and conversion table. It also contains an extensive list of useful cheese industry web sites.

George Schwinghammer of Scherping Systems voiced some concerns over location of a small cheese plant at the dairy farm site. He believes that air quality concerns (dirt, odors, potential microbiological contamination) from cross-contamination from barns and feedlots would make it difficult to produce consistently high quality cheese products. He said that at the very least high efficiency air filtration systems would probably be considered.

Kusel Equipment Company provided cost information on new cheese make-vats which included all required accessories to produce cheese, including knives, hoops, and presses. Their smaller sized vats could be equipped with a batch pasteurization option which would be a much lower cost option than including a HTST plate and frame continuous pasteurizer in the equipment list.

Stoelting Company, which manufactures a wide range of cheese making equipment, including large enclosed make-vats, curd tables, block formers, and control systems, recommended that W.M. Sprinkman be contacted to provide useful information, equipment requirements, and estimated budget costs for a small cheese plant.

International Machinery Exchange, which specializes in providing new and rebuilt cheese equipment to the food industry, provided quotations on the “Duo-vat” which doubles as a pasteurization vat and cheese making vat. They also provided budget cost information for other required equipment such as pasteurizers, separators, and packaging equipment. Even though they could not quote in detail all equipment required with out detailed production specifications, the IME representative estimated a minimum equipment, and installation cost of \$250,000 for a very small cheese plant. This did not include building construction/renovation costs. International Machinery Exchange is a cheese plant/processing expert and can provide consultation on layout, design, electrical requirements, steam, water service, specifications preparation, and flow plan assistance.

APV/Advensys offers technology and process equipment for milk treatment, starter culture addition, curd making, and cheese brining. They did not provide equipment recommendations or costs.

**Table 1. Vendor Contact Information**

<p>1. <b>Schier Equipment Co.</b> 14459 S. 65<sup>th</sup> W. Avenue Sapulpa, Oklahoma 74066 (918)321-3151 Web Site: <a href="http://www.schierequipment.com">www.schierequipment.com</a> Contact person: Alice Hurlbert</p>	<p>2. <b>W.M. Sprinkman Co.</b> 4234 Courtney Street P.O. Box 390 Franksville, WI 53126 Web Site: <a href="http://www.sprinkman.com">www.sprinkman.com</a> Contact person: Chad Sprinkman</p>
<p>3. <b>Kusel Equipment Co.</b> 820 West Street Watertown, WI 53094 (920)261-4112 Web Site: <a href="http://www.kuselequipment.com">www.kuselequipment.com</a> Contact Person: Howard Shackley</p>	<p>4. <b>International Machinery Exchange</b> 214 N. Main Deerfield, WI 53531 (608)764-5481 Web Site: <a href="http://www.imexchange.com">www.imexchange.com</a> Contact person: Greg Mergen</p>
<p>5. <b>Ullmer's Dairy Equipment Inc.</b> 8628 Brown County Line Road Pulaski, WI 54162 (920)822-8266 Contact Person: Fran Ullmer</p>	<p>6. <b>Stoelting Co.</b> 502 Highway 67 Kiel, WI 53042 (920)894-7029 Web Site: <a href="http://www.stoelting.com">www.stoelting.com</a> Contact Person: Larry</p>
<p>7. <b>Damrow Equipment Co.</b> 196 Western Avenue Fond du Lac, WI 54936 (920)922-1500 Web Site: <a href="http://www.damrow.com">www.damrow.com</a> Contact Person: Dan Price</p>	<p>8. <b>Scherping Systems</b> P.O. Box 10 Winsted, MN 55395 (320)485-4401 Web Site: <a href="http://www.scherpingsystems.com">www.scherpingsystems.com</a> Contact Person: George Schwinghammer</p>
<p>9. <b>APV/Invensys</b> 5100 River Road Schiller Park, IL 60176 (952)927-4912 Web Site: <a href="http://www.apv.invensys.com">www.apv.invensys.com</a> Contact Person: Britton Miller</p>	

**Table 2. Summary of Equipment Requirements and Costs Information Received from Vendors Specializing in Dairy Equipment Supply and Sales**

<b>Plant Size – Lbs/day milk processed</b>	<b>Equipment Source</b>	<b>Budget Price</b>	<b>Description</b>	<b>Vendor</b>
<b>1. Raw Milk (also whey/cream) Storage</b>				
4000	Used	\$2.5K	1000 gal. Refrig. (\$2.50/gal. most sizes)	Schier Equipment Co.
4000	Used	\$4K	800 gal., cooled, CIP, ladders	DFA Leader T.J.
4000	New	\$25K	Refrigerated storage	Kusel Equipment Co.
4000	Reconditioned	\$7.5K	1000 gallon, jacketed, insulated	W.M. Sprinkman
4000	Reconditioned	\$2.5K	1000 gallon, jacketed, insulated	Ullmer's Dairy Inc.
16000	New	\$35K	Refrigerated storage	Kusel Equipment Co.
16000	Reconditioned	\$15K	3000 gallon, jacketed, insulated	W.M. Sprinkman
25000	Used	\$15K	6000 gallon, refrigerated	Schier Equipment Co.
30000	Reconditioned	\$14K	6000 gallon, refrigerated	Ullmer's Dairy Inc.
32000	Reconditioned	\$20K	6000 gallon, jacketed, insulated	W.M. Sprinkman
<b>2. Make Vats</b>				
4000	Reconditioned	\$20K	500 gal, Duo Vat w/acc., legal past. package	Schier Equipment Co.
4000	Reconditioned	\$15K	500 gal. vat & Agitator	Ullmer's Dairy Inc.
4000	New	\$40K	<u>Includes all accessories</u> W/batch pasteurization option	Kusel Equipment Co.
		\$49K		
4000	Rebuilt	\$8 – 12K	Vat only W/legal pasteurization capability	Int. Machinery Exch.
		\$12K – 17K		
16000	New	\$55K	2 x 8,000#, <u>includes all accessories</u> W/batch pasteurization option	Kusel Equipment Co.
		\$68K		
25000	Used	32K	2 x 1500 gal open top, with agitators, tools	Schier Equipment Co.
30000	Reconditioned	\$30K	2 – 15,000 lb Cheese Vat w/agitators	Ullmer's Dairy Inc.
32000	New	\$80 - \$85K	2 x 16,000#, <u>includes all accessories</u>	Kusel Equipment Co.
32000	Reconditioned	\$60K	2 x 5,000# round end cheese vats Plus 2 x 5,000# drain tables	W.M. Sprinkman
<b>3. Cream Separators</b>				
4000	Rebuilt	\$13 - \$20K	Price depends on capacity, sep. temperature	Int. Machinery Exch.
4000	Reconditioned	\$11K	Westfalia/DeLaval , 9,000 lb/hr	Ullmer's Dairy Inc.
25000	Used	\$15K	Westfalia, 11,000 pounds milk per hour	Schier Equipment Co.
30000	Reconditioned	\$14K	Westfalia/DeLaval , 12,000 lb/hr	Ullmer's Dairy Inc.
32000	Reconditioned	\$40K	DeLaval Model 540 – Cream	W.M. Sprinkman
32000	Reconditioned	\$41K	DeLaval Model 525 - Whey	W.M. Sprinkman
<b>3. Pasteurizers</b>				
4000	Reconditioned	\$14K	Batch Pasteurizer w/U.S. Legal controls	Ullmer's Dairy Inc.
16000	New	\$55K	4,000#/Hr HTST plate exch. w/controls	Kusel Equipment Co.
16000+	Rebuilt	\$60K+	HTST plate exchanger w/controls	Int. Machinery Exch.
25000	Used	\$25K	HTST w/controls, valves, tank, pump	Schier Equipment Co.
30000	New/recon.	\$40K	20,000 lb/hr HTST System w/controls	Ullmer's Dairy Inc.
32000	New	\$65K	16,000#/Hr HTST plate exch. w/controls	Kusel Equipment Co.

<b>Plant Size – Lbs/day milk processed</b>	<b>Equipment Source</b>	<b>Budget Price</b>	<b>Description</b>	<b>Vendor</b>
32000	Reconditioned	\$80K	5,000#/Hr w/accessories, controls, piping	W.M. Sprinkman
<b>4. Presses</b>				
4000	Reconditioned	\$6K	Kusel Single Row Horizontal, w/20 – 20lb hoops	Schier Equipment Co.
4000	Custom built	\$6K	A-Frame Vertical w/20 – 20lb hoops	Schier Equipment Co.
4000	Reconditioned	\$2.2K	Press - Single Row	Ullmer's Dairy Inc.
16000	Reconditioned	\$7.5K	20' Double raw cheese press	W.M. Sprinkman
25000	Used	\$14K	2 x Horizontal, w/100 – 40 pound hoops	Schier Equipment Co.
30000	Reconditioned	\$6K	Kusel A-Frame, 6 row	Ullmer's Dairy Inc.
32000	Reconditioned	\$15K	2 x 20' Double raw cheese press	W.M. Sprinkman
<b>5. Vacuum Packagers</b>				
4000	New	\$15K	Cryovac Sealer	Kusel Equipment Co.
4000	Rebuilt	\$5K	Vacuum Sealer	Int. Machinery Exch.
4000	Used	\$2K	Bizerba, vacuum packer 20lb blocks only	Schier Equipment Co.
4000	Reconditioned	\$3K	Single chamber	Ullmer's Dairy Inc.
30000	Reconditioned	\$6.5K	Double chamber	Ullmer's Dairy Inc.
32000	Rebuilt	65K	Vacuum Sealer	Int. Machinery Exch.
25000	Used	\$8K	Double sided vacuum chamber	Schier Equipment Co.
32000	Reconditioned	\$25K	Hoops, cutter, Cryovac wrapper, tables, scales	W.M. Sprinkman
<b>6. Boilers</b>				
4000	Used	9K	15HP McKenna w/feedwater pump	Schier Equipment Co.
4000	New	\$20 – 25K		Kusel Equipment Co.
4000	Used	\$7.5K	30 HP w/feedwater pump, as is	Ullmer's Dairy Inc.
25000	Used	11K	30 HP	Schier Equipment Co.
30000	New	\$15K	50 HP	Ullmer's Dairy Inc.
<b>7. Other equipment</b>				
4000 - 32000	Reconditioned	\$2K	800 gallon Cream tank (no comp.)	Ullmer's Dairy Inc.
4000 - 32000	Reconditioned	\$2K	2000 gallon Whey tank, enclosed, insulated	Ullmer's Dairy Inc.
32000	New	\$17K	10' x 15' Double tier fiberglass brine tank	W.M. Sprinkman
25000	Used	\$8K	100 gallon starter tank (for cultures)	Schier Equipment Co.
25000	Used	\$8K	Damrow Curd Mill	Schier Equipment Co.
25000	Used	\$6K	Loading Scales – 1 set	Schier Equipment Co.
4000 - 32000	Used	\$3K	Set scales/printer	Ullmer's Dairy Inc.
25000	Used	\$4K	Cheese cutting tables, SS	Schier Equipment Co.
4000 - 32000	New	\$4K	E-Z Way Cheese cutter	Ullmer's Dairy Inc.
4000 - 32000	Used	\$55 each	Cheese Hoops - 40lb rectangular	Schier Equipment Co.
4000 - 32000	Reconditioned	\$45 each	Cheese Hoops - 40lb rectangular	Ullmer's Dairy Inc.
4000 - 32000	Used	\$95 each	Cheese Hoops - 20lb rectangular	Schier Equipment Co.

<b>Plant Size – Lbs/day milk processed</b>	<b>Equipment Source</b>	<b>Budget Price</b>	<b>Description</b>	<b>Vendor</b>
4000 - 32000	Reconditioned	\$80 each	Daisy Hoops - 23lb (round)	Ullmer's Dairy Inc.
4000 - 32000	Reconditioned	\$90 each	Midget (round) Hoops - 23lb	Ullmer's Dairy Inc.
4000 - 32000	New	\$175	Curd Rake	Schier Equipment Co.
4000 - 32000	New	\$175	Curd shovel – SS	Schier Equipment Co.
4000 - 32000	New	\$150	Curd Fork	Schier Equipment Co.
4000 - 32000	New	\$150	Curd pail	Schier Equipment Co.
4000 - 32000	New	\$800	Curd Screen Strainer	Schier Equipment Co.
32000	Reconditioned	\$65K	Three tank CIP system, complete	W.M. Sprinkman
32000	Reconditioned	\$15K	C.O.P. wash sink w/motor, hoop washer	Ullmer's Dairy Inc.
32000	Reconditioned	\$20K	Tank truck unloading/washing equipment	Ullmer's Dairy Inc.

## UNL Dairy Plant Direct Product Costs

The following “direct production” is based upon usage the 8,000 pounds per day raw milk UNL Dairy Pilot Plant operation.

## Specialty Cheese Plant Direct Production Costs

Pounds of Cheese 800                  Pack Ounces 8

<u>Ingredient</u>	Unit	\$ Per/lb.
Raw Whole Milk	Pounds	0.13
Culture	Pounds	8.00
Rennet	Pounds	8.00
Salt	Pounds	0.35
<u>Packaging</u>		
Packaging	8 ounce	0.15
Labels	8 ounce	0.10
<u>Labor</u>		
Cheese Maker	Hours	20.00
Cheese Making	Hour	8.00
Cutting & Packaging	Hours	8.00

<u>Ingredient Costs:</u>	Total lbs	Total Cost	\$ Per/lb.	\$ Per/Package
Milk	8000	\$1,040.00	1.30	2.60
Culture	1	\$8.00	0.01	0.02
Rennet	1	\$8.00	0.01	0.02
Salt	25	\$8.75	0.01	0.02
<b>Total Ingredient Costs:</b>		<b>\$1,064.75</b>	<b>\$1.33</b>	<b>\$2.66</b>

<u>Packaging Costs:</u>	# Of Units	Total Cost	Per/lb.	Per/Package
Packaging	1,600	\$240.00	0.30	0.60
Labels	1,600	\$160.00	0.20	0.40
<b>Total Packaging Costs</b>		<b>\$400.00</b>	<b>\$0.50</b>	<b>\$1.00</b>

<u>Labor Costs:</u>	Hours	Total Cost	Per/lb.	Per/Package
Cheese maker	10	\$200.00	0.25	0.50
Cheese Making	16	\$128.00	0.16	0.32
Packaging	8	\$64.00	0.08	0.16
<b>Total labor Costs:</b>		<b>\$392.00</b>	<b>\$0.49</b>	<b>\$0.98</b>

<u>Total Costs</u>	Total Cost	Per/lb.	Per/Package
Ingredient	\$1,064.75	\$1.33	\$2.66
Packaging	\$400.00	\$0.50	\$1.00
Labor	\$392.00	\$0.49	\$0.98
<b>Total</b>	<b>\$1,856.75</b>	<b>\$2.32</b>	<b>\$4.64</b>

## Weighted Average Manufacturing Costs Cheddar Cheese 1989 - 2001

The California Department of Food and Agriculture, Dairy Marketing Branch provides the following cost of making cheddar cheese.<sup>1</sup> The cost information is based upon very large volume production but it will give some real world bench markets.

Costs include packaging, processing labor, non-labor processing, general and administrative, return on investments and miscellaneous ingredients (for butter and Cheddar Cheese only). Natural gas and electricity costs, which are included in processing non-labor expenses, are summarized separately.

Date of Release		Butter		Nonfat Dry Milk		Cheddar Cheese *	
Year	Month	Cost per/lb.	Number of Plants	Cost per/lb.	Number of Plants	Cost per/lb.	Number of Plants
1989	May	\$0.0879	11	\$0.1370	11	\$0.2251	9
1990	June	\$0.0888	11	\$0.1398	11	\$0.2324	9
1991	May	\$0.0883	10	\$0.1438	11	\$0.2192	9
1992	July	\$0.0969	12	\$0.1443	12	\$0.2010	9
1993	August	\$0.0936	12	\$0.1430	11	\$0.1868	10
1994	September	\$0.0895	11	\$0.1341	11	\$0.1889	8
1995	April	\$0.0889	9	\$0.1327	9	\$0.1862	8
1995	November	\$0.0928	9	\$0.1328	9	\$0.1981	8
1996	December	\$0.0970	9	\$0.1333	9	\$0.1898	8
1997	July	\$0.0958	8	\$0.1327	9	\$0.1840	9
1999	February	\$0.0930	8	\$0.1277	9	\$0.1759	10
2000	February	\$0.0957	8	\$0.1356	10	\$0.1693	9
2001	January **	\$0.0979	8	\$0.1463	11	\$0.1753	9
2001	May +	\$0.1004	8	\$0.1607	11	\$0.1795	9
2001	October ++	\$0.1001	8	\$0.1590	11	\$0.1802	9

\* For the 1996 Cheddar cheese cost study and subsequent cost studies, we have included costs associated with Cheddar cheese plants producing 500-pound barrels and 640 pound blocks. However, costs for packaging labor and packaging expenses were replaced with the average of those costs associated with 40-pound block plants.

\*\* Includes the cost studies completed for periods between January 1998 and December 1999 and adjusted for utility costs. The utility cost adjustments were made using each plant's invoices for energy costs for October 2000.

+ Updated January 2001 Exhibit using each plant's invoices for energy costs for March 2001

++ Includes the most current completed cost studies as well as utility cost adjustments for all plants. The utility cost adjustments were made using each plant's invoices for energy costs for August 2001.

<sup>1</sup> California Department of Food and Agriculture, Dairy Marketing Branch, October 2001  
Specialty Cheese Final



# THEORETICAL CHEDDAR CHEESE PROCESSING COSTS

FOR SELECTED PERIODS, CALIFORNIA, JANUARY 1999 TO DECEMBER 2000 1/

Efficiency Rating	Misc. Ingredient	Package	Processing Labor	Processing Non-Labor	General & Admin	Total Operating Cost	Volume Covered 2/3/4/	Return on Investment	Total Cost
	Dollars per Pound						Percent	Dollars/Lbs	
1	.007	.0145	0.0344	0.0501	0.0058	0.1125	0.0%	0.0043	0.1168
2	.0087	.0169	0.0346	0.0544	0.0179	0.1325	0.0%	0.0057	0.1382
3	.0107	.0169	0.0371	0.0631	0.0194	0.1472	29.5%	0.0068	0.1540
4	.0109	.0177	0.0450	0.0635	0.0194	0.1565	45.6%	0.0081	0.1646
5	.0116	.0185	0.0523	0.0692	0.0196	0.1712	65.2%	0.0135	0.1847
6	.0119	.0200	0.0570	0.0720	0.0217	0.1826	68.4%	0.0149	0.1975
7	.0121	.0212	0.0761	0.0795	0.0222	0.2111	92.3%	0.0149	0.2260
8	.0152	.0223	0.0769	0.1039	0.0256	0.2439	98.6%	0.0151	0.2590
9	.0312	.0254	0.0882	0.1106	0.0262	0.2916	100.0%	0.0167	0.3083

Efficiency Rating	Finished Moisture	Vat Fat	Vat SNF	Vat Yld
		Percent		Lbs/cwt
1	38.40	4.58	9.29	12.69
2	38.38	4.02	9.27	11.28
3	38.34	4.02	8.95	11.08
4	38.20	3.93	8.95	10.87
5	37.86	3.83	8.85	10.59
6	37.72	3.81	8.81	10.52
7	37.50	3.80	8.80	10.40
8	34.98	3.79	8.73	10.24
9	34.46	3.72	8.71	9.89

1/ COSTS REFLECT SELECTED ANNUAL PERIODS FROM JANUARY 1999 TO JULY 2000 AND ADJUSTED FOR NATURAL GAS AND ELECTRICITY FOR AUGUST 2001.

TABLE CONSTRUCTED BY RANKING ACTUAL COSTS IN EACH CATEGORY FROM LOWEST TO HIGHEST. CHEESE VAT DATA WAS RANKED FROM HIGHEST TO LOWEST.

2/ THE VOLUME COVERED IS THE CUMULATIVE VOLUME OF ALL PLANTS WHOSE ACTUAL COSTS ARE LESS THAN OR EQUAL TO THE LISTED AVERAGE COST.

3/ INCLUDES BOTH CHEDDAR AND MONTEREY JACK FOR VOLUME. COSTS, MOISTURE, FAT, SNF AND YIELDS ARE FOR CHEDDAR ONLY.

FOR THE THREE PLANTS PROCESSING BARRELS OR 640 LB. BLOCKS, PACKAGING LABOR AND PACKAGING CONTAINERS REFLECT COSTS FROM THE 40-LB. BLOCK PLANTS

4/ THESE NINE PLANTS PROCESSED 92.9% OF THE CHEDDAR AND MONTEREY JACK CHEESE IN CALIFORNIA IN 1999.

## CHEDDAR CHEESE PROCESSING COSTS

FOR SELECTED PERIODS, CALIFORNIA, JANUARY 1999 TO DECEMBER 2000 1/  
QUANTITY WEIGHTED AVERAGE ROCESSING COSTS 2/

Plant Groups Ranked by Lowest Cost 3/	No. of Plants in Group	Misc. Ingredient	Package	Processing Labor	Processing Non-Labor	General & Admin	Total Operating Cost	Volume Covered 4/ 5/	Return on Investment	Total Cost	Volume Processed 5/ 6/
		Dollars per Pound						Percent	Dollars/Lbs		Pounds
Group 1	3	0.0121	0.0170	0.0349	0.0638	0.0194	0.1472	29.5%	0.0139	0.1611	325,954,498
Group 2	3	0.0124	0.0165	0.0502	0.0929	0.0115	0.1834	68.4%	0.0111	0.1945	223,490,274
Group 3	3	0.0110	0.0253	0.0779	0.0731	0.0247	0.2119	92.3%	0.0109	0.2229	70,600,192
STATISTICS FOR 9 PLANTS											620,044,964
Simple Average		0.0133	0.0204	0.0557	0.0740	0.0198	0.1832	68.4%	0.0111	0.1943	
Weighted Average		0.0121	0.0178	0.0453	0.0753	0.0172	0.1676	52.6%	0.0125	0.1802	
Median /2		0.0118	0.0185	0.0523	0.0802	0.0196	0.1712	65.2%	0.0135	0.1847	

Plant Groups Ranked by Lowest Cost 3/	No. of Plants in Group	Volume Processed 5/ 6/	Finished Moisture	Vat Fat	Vat SNF	Vat Yld
		Pounds	Percent			Lbs/cwt
Group 1	3	325,954,498	36.44	3.99	8.93	10.91
Group 2	3	223,490,274	38.07	3.85	8.92	10.34
Group 3	3	70,600,192	37.98	3.89	8.83	10.74
STATISTICS FOR 9 PLANTS						
Simple Average			37.32	3.94	8.93	10.84
Weighted Average			37.20	3.93	8.91	10.69
Median /2			37.86	3.83	8.85	10.59

1/ COSTS REFLECT SELECTED ANNUAL PERIODS FROM JANUARY 1999 TO JULY 2000 AND ADJUSTED FOR NATURAL GAS AND ELECTRICITY FOR AUGUST 2001.

2/ WEIGHTED BY POUNDS OF PRODUCT PROCESSED BY EACH PLANT.

3/ PLANTS HAVE BEEN GROUPED ON THE BASIS OF PROGRESSIVELY INCREASING PROCESSING COSTS WITH THE FIRST GROUP BEING THE LOWEST COST PLANTS.

4/ THE VOLUME COVERED IS THE CUMULATIVE VOLUME OF ALL PLANTS WHOSE ACTUAL COSTS ARE LESS THAN OR EQUAL TO THE LISTED AVERAGE COST.

5/ INCLUDES BOTH CHEDDAR AND MONTEREY JACK FOR VOLUME. COSTS, MOISTURE, FAT, SNF AND YIELDS ARE FOR CHEDDAR ONLY.

FOR THE THREE PLANTS PROCESSING BARRELS OR 640 LB. BLOCKS, PACKAGING LABOR AND PACKAGING CONTAINERS REFLECT COSTS FROM THE 40-LB BLOCK PLANTS.

6/ THESE NINE PLANTS PROCESSED 92.9% OF THE CHEDDAR AND MONTEREY JACK CHEESE IN CALIFORNIA IN 1999.