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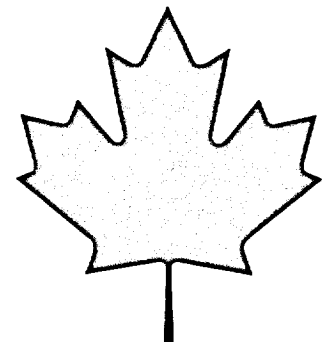
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# Market Studies of United States

no.21

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Pulp and Paper Mill Machinery,  
Southeastern U.S.A.





Sandwell

REPORT: G6879/1  
DATE: 1 AUGUST 1984

DEPARTMENT OF EXTERNAL AFFAIRS  
OTTAWA CANADA

MARKETING STUDY

CANADIAN PULP AND PAPER MILL  
MACHINERY AND EQUIPMENT IN THE  
SOUTHEASTERN UNITED STATES

Dept. of External Affairs  
Min. des Affaires extérieures

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OTTAWA CANADAMARKETING STUDY OF CANADIAN PULP AND  
PAPER MILL MACHINERY AND EQUIPMENT  
IN THE SOUTHEASTERN UNITED STATESDATE 1 AUGUST 1984TABLE OF CONTENTS

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PAPER MILL MACHINERY AND EQUIPMENT  
IN THE SOUTHEASTERN UNITED STATES

DATE 1 AUGUST 1984

SUMMARY

1. The Department of External Affairs, Ottawa, Canada commissioned Sandwell International Incorporated to conduct a marketing study of pulp and paper machinery and equipment in the southeastern United States.
2. The southeastern states, as a geographic area, comprise the major concentration of the pulp and paper industry. In the area there is a total of 165 pulp and/or paper mills. The states of Georgia and Alabama are leading producers of both wood pulp and paper, collectively producing 16% of all pulp and 20% of all paper manufactured in the United States.
3. The early pulp and paper industry in the Southeast was based, in general, on the southern pine species which are highly resinous and relatively long fibered. Hardwoods are now being utilized in increasing amounts as the costs of raw wood increase and volume of fine paper production accelerates. The industry continues to require specialized equipment to pulp and bleach the predominant pine species.
4. The variety of products manufactured in the Southeast includes market pulp, kraft bag and linerboard, corrugating medium, bristols, fine paper, food container stock, tissue, newsprint, and small amounts of several specialty grades. The most significant product in the study area by tonnage produced is bleached and unbleached kraft linerboard.
5. The age of the typical pulp and paper mill in the Southeast is a significant factor that influences equipment purchasing. Approximately fifty percent of the existing mills were constructed in the late 1950's when the kraft process was successfully modified to pulp southern pine species. Since that time new manufacturing facilities have been constructed at the average rate of three per year until the last two years, when economic conditions have dictated delay of further new construction. The earlier mills were constructed with less regard towards energy conservation or today's environmental standards that affect current paper mill design.
6. The costs of construction materials and labor have escalated to the level that facility size has necessarily increased to 1500-2000 TPD production in order to achieve an acceptable return on investment. The capital investment of \$800 million (U.S.) has deterred most corporations from new construction, and instead has favored modernization of existing facilities.



7. It has been estimated that \$10 billion will be spent for projects in the pulp and paper industry in the next four years. It is significant to note that no new mills have been announced in 1984, and further, that the under-utilized paper machine capacity for all grades caused by the 1982 recession has not been eliminated by recovering demand. Therefore, the distribution of funded projects will be initially modernization of existing facilities and, after 1984, incremental expansions. The allocation of the spending will be \$2.2 billion in the pulping area, \$2 billion in the paper machine area, \$1.8 billion in power and utilities, \$1.8 billion in environmental controls, and the remainder in process controls. The markets for auxiliary equipment such as tanks, chests, pumps and agitators resulting from these anticipated projects will be considerable, and consist of at least sixty percent of the spending in some areas.
8. Several industry trends will affect spending in certain mill areas and by product type. Woodyards are being converted to process long-log pulpwood deliveries and to receive increasing amounts of residual produced chips. Existing pulping methods will be converted to low sulfur pulping systems or replaced with less environmentally sensitive systems. In all paper mill areas, there will be a trend towards higher consistency processing to reduce water consumption and treatment. The industry is attempting to convert manufacturing facilities to the highest return products. There will be conversions to printing paper and from kraft bag to linerboard as markets permit. Several corporations have already shut down portions of their newsprint operations.
9. Purchasing authority by individuals varies according to the size and complexity of the manufacturing facility and the type of product being purchased. Commodity items are normally purchased locally by the purchasing agent or department in all types of mills. The person having decision making authority for the purchase of specialty items such as capital equipment is dependent on the size and organization of the facility. In single machine mills, the manager has the sole purchasing authority. As the mill increases in size and complexity, the purchasing authority passes to department superintendents or managers. There are several industry directories available which identify the size of the facilities and also the names of the key personnel; the most complete directory is Lockwood's Directory of the Paper Industry and Allied Trades.  
  
There is an increasing trend for design/construct projects, in which case the purchasing department of the construction firm becomes the purchasing authority. Because the projects are bid competitively, low price and delivery are major factors.
10. The most significant product factor that affects purchasing decisions is reliability, followed closely by technical service capability. Paper mills traditionally operate twenty-four hours per day, seven days per week. This operating schedule, combined with the paper mill's high capital costs,



makes downtime extremely costly. Potential suppliers must insure that their equipment can operate continuously in the harsh environment of corrosive chemicals and high moisture levels with a minimum of preventative maintenance. When a failure does occur, the supplier is expected to have accessible spare parts and technical service personnel to support the mill's maintenance department as required. Reliability is also defined as product consistency from shipment to shipment. Ranked lowest among the selection factors was price.

11. Current marketing techniques in the pulp and paper industry consist of direct client contact through sales representatives, advertising, participation in trade shows, and conducting customer seminars. Industry personnel rated direct supplier contact the most effective sales technique, provided the sales representative was technically qualified and made regular sales calls. Advertising was considered less effective because it is difficult to insure that the promotional literature will reach the target personnel. There are several equipment shows in which suppliers can exhibit their equipment or services. Although economic conditions have until recently limited attendance to trade shows, the shows are considered favorably by industry personnel because it allows them to make a hands-on inspection of the equipment and make comparisons of competitive equipment. Mill personnel also liked supplier seminars presented at the mill or nearby, as these required less time away from the job.
12. Sandwell has reviewed the marketing requirements for selling equipment and services to the pulp and paper industry in the southeastern United States. There is no reason that Canadian manufacturers can not penetrate this market area provided that the supplier can demonstrate the reliability and serviceability of his product and that the technical service organization is local.
13. Based on the results of this study, Sandwell recommends the following marketing techniques to Canadian manufacturers for penetrating the U.S. pulp and paper market.
  - a) Professional Associations. Sandwell recommends that, as a minimum, Canadian manufacturers join the Technical Association of the Pulp and Paper Industry (TAPPI) as a Sustaining Member, and then actively participate in the committee and divisional meetings and programs. This membership will encourage product recognition through direct contact with industry personnel, and provide access to membership lists and trade information. A second association worthy of mention is the Paper Industry Management Association (PIMA) that is more targeted towards operating personnel. Finally, for manufacturers of process controls and instrumentation, membership in the Instrument Society of America (ISA) would be extremely valuable, and complementary to the previously mentioned groups.



- b) Direct Sales. A Canadian supplier should establish a direct sales organization to provide contact with purchasing decision making personnel at regular intervals. The sales force can either be contract salesmen or a manufacturer's representative. The critical factor is that the salesman or representative be fully knowledgeable concerning the product. It is also preferable that the sales force be from the Southeast so that they are knowledgeable of the geographic area and, hopefully, pulp and paper industry personnel.
- c) Trade Shows. The TAPPI biannual Trade Show and Exhibition at the World Trade Center in Atlanta, Georgia should be utilized by Canadian manufacturers to introduce their equipment. The TAPPI show is the largest industry show and normally receives the highest rate of attendance by purchasing authority personnel. The presentation of the equipment exhibit and the calibre of the personnel manning the booth are extremely important. The next show will be held from 2-5 March 1986. Planning for future shows commences immediately after the completion of the current show, so timeliness is critical to reserve preferred space. There are numerous small shows targeted to specific clientele that manufacturers may want to consider as part of their marketing plan.
- d) Customer Seminars. Supplier seminars hosted at the clients' mills, corporate offices, or technical centers are highly recommended. These seminars reduce the time requirement for mill participants. The seminars given during working hours should be limited to one hour in length and to a singular product line. Several suppliers may join together for an after-hours program combined with refreshments or dinner. The program should not exceed three suppliers and the individual presentations should be shortened to approximately forty-five minutes and breaks scheduled between presentations. The presentations should be scheduled prior to dinner or refreshments.

Sandwell recommends that suppliers utilize seminars to present product lines and information to consulting engineering firms and construction firms. The increasing popularity of design/construct projects is shifting some of the purchasing authority from the clients to engineering/construction firms. Suppliers should stress the amount of vendor engineering that can be supplied and also the amount of pre-wiring/piping that could reduce erection costs.

- e) Advertising. There are numerous trade journals in the pulp and paper industry in which to advertise. The supplier should stress in his advertising the broad utilization of his product, perhaps highlighting current installations and customer comments. Sandwell recommends that direct mailings be utilized to supplement advertising as it can be targeted. In addition to normal promotional literature, a supplier can utilize technical papers given at seminars or articles from magazines that can highlight their products. Mailing lists are available from the various professional associations and from the sponsors of all seminars or training programs.



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## INTRODUCTION

Sandwell International Incorporated was commissioned by the Department of External Affairs, Ottawa, Canada to conduct a study of the potential markets for Canadian pulp and paper mill machinery and equipment in the twelve southeastern states of the United States. The study was essentially limited to the southern pine distribution area consisting of the states of Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia.

The objective of this study was first to define the market for capital equipment, replacement components, and process controls in the study area; and secondly, to establish the potential for Canadian manufacturers to enter such market areas. The Department of External Affairs arranged for Canadian pulp and paper equipment manufacturers and service industries to submit promotional literature on the equipment or services to Sandwell. It was intended that Sandwell could comment on generic product areas in the text of this report, including the applicability of such products and services to the pulp and paper industry in the southeastern states.

Numerous directories document the widespread distribution of the pulp and paper industry in the southeastern states, and confirm the concentration of potential equipment and services market in this geographic area. It is further projected that the majority of the future industry growth will take place in this area. The true size of the potential markets, however, is often underestimated, because of the publicity concentrated only on new mill construction and new paper machine installations. A recent industry review states that these highly publicized expenditures actually account for less than forty percent of the project expenditures and mask the spending on modernizations of pulping equipment, paper machine rebuilds, and utility improvements. For the period 1983 to 1987, the same review estimated that there will be an annual expenditure of \$3,500,000,000 for pulp and paper equipment with expenditure beginning modestly in 1983 and accelerating until 1985. Because of the prohibitive costs of new plant construction, the capital spending will be concentrated on expansion and modernization at existing sites. The accuracy of these projected expenditures is extremely dependent on the economy in the United States, the cost and availability of basic raw materials, and the relative prices and demand for the various end products. During the recent recession, capital spending in the pulp and paper industry was reduced to minimum levels and consisted mainly of





emergency maintenance or environmental projects. Several major construction projects were actually delayed during design engineering or actual construction and have only recently been reactivated. Traditionally, the demand for paper products recovers more quickly than the general economy and the pent-up demand for plant improvements has accelerated capital spending at this time for all types of projects.

It is also possible to forecast future technical requirements and trends in the pulp and paper industry by considering some of the following general conditions:

Energy Supply and Consumption. Even though the pulp and paper industry as a whole generates almost fifty percent of its own energy requirements, the industry still is one of the highest industrial energy consumers. Utility companies maintain there will be an adequate source of energy for industry expansions, but at increased costs. Mills, particularly the integrated pulp and paper mills, will, therefore, attempt to become more energy self-sufficient to minimize future energy costs.

Water Supply. The present water supplies are adequate to support the current pulp and paper industry. Future growth, however, will be pressured both for water supply and quality by population growth requirements. The industry will be forced to increase capital expenditures for reuse of water and to research methods of higher consistency pulping, etc.

Fiber Supplies. Because of the rapid regeneration rates of the southern species of trees on which the pulp and paper industry is dependent, it can be assumed that there will be an adequate fiber source in years to come. The cost of this fiber will increase significantly due to competition for land use and higher labor and transportation costs. The trend, therefore, will be to consider less desirable species and make more efficient use of the wood resources such as whole tree chipping. Wood will remain the dominant fiber source in the pulp and paper industry and there is not expected to be any significant growth in non-wood fiber sources such as bagasse or kanef.

Chemicals. Chemicals to support the pulp and paper industry will be available but at increasing costs. Mills will install equipment to produce some of their own chemical requirements to minimize this cost spiral. Research will be ongoing to consider less expensive chemicals and modified pulping processes.

Environmental. Air and water quality restrictions will become even more stringent in the future, forcing the mills to initiate environmental projects and process changes to reduce emissions. Reducing water consumption and closing up the mills will be a major trend.

Product Changes. The industry will be responsive to consumption trends, but industry management can be expected to react to continued competitive pressures by converting current product lines to higher return items.



There are some significant differences between the pulp and paper industries in Canada and the United States, particularly the Southeast, that can affect the marketability of some Canadian equipment and services in the study area. For instance, the largest segment of the Canadian industry is dedicated to newsprint and market pulp, whereas in the southeastern United States the emphasis is more on fine and coated papers and converted kraft products. Equipment selection criteria is different because the availability of widespread, inexpensive hydroelectric power is missing in the Southeast where most electrical power is generated from fossil fuel or nuclear power. It is common to find mill purchased electrical costs of \$0.05 (US)<sup>1</sup>/kWh as compared to average Canadian costs of \$0.025 (US)/kWh. Various forecasts have predicted that electrical costs in the Southeast will increase to \$0.10 to 0.15/kWh by 1990. Natural gas costs in the United States have been deregulated for several years. Current natural gas costs at southeastern pulp and paper mills average \$4.00/MCF, with predictions of price increases to \$9-10/MCF by 1990. The size and integration of southeastern paper mills is also significant. The U.S. mills in the study area have an average production capacity of 1000 to 1500 TPD, which is generally larger than Canadian mills. The manufacturing facilities in the Southeast tend to be integrated pulp and paper mills rather than stand-alone pulp mills. Fiber furnish to the mills generally is based on a higher percentage of roundwood than chips as compared to Canadian mills. The dominant wood species is southern pine, mainly loblolly pine, which is more resinous and knotty than the Canadian species - hemlock, spruce, and balsam fir - and therefore requires different pulping and bleaching processes. Labor costs are lower in the southeastern U.S. because of a lesser degree of unionization. The result of these collective differences is that Canadian manufacturers must carefully analyze their products and services before attempting to penetrate the U.S. markets.

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<sup>1</sup> All costs in this report are in terms of U.S. Dollars.



REVIEW OF PULP AND PAPER INDUSTRY

Distribution and Ownership of Facilities

The twelve southeastern states that form the geographic boundaries of this study comprise the major pulp and paper manufacturing center of the industry in the United States. Six of the states are among the top ten paper producing states, and eight of the states rank among the top ten woodpulp producing states (Table 1). According to 1983 Department of Commerce statistics, the state of Georgia produces 9% of all paper and board produced in the U.S., and 11% of all wood pulp. Alabama is the second largest manufacturer, producing 7% of all paper and board and 9% of all wood pulp. Southern wood pulp capacity presently is 67.1% of the U.S. total and this is expected to increase to 80% by 1990.<sup>1</sup>

Table 1. Ranking of the Top Ten Paper and Woodpulp Producing States (1983)

<u>Paper</u>	<u>Woodpulp</u>
Georgia	Georgia
Alabama	Alabama
Wisconsin	Louisiana
Louisiana	Florida
Maine	Washington
Oregon	Oregon
Washington	Texas
Virginia	North Carolina
South Carolina	Virginia
Florida	South Carolina

The concentration of the pulp and paper industry has resulted from the availability of a fast growing pine fibre source with relatively low stumpage costs, sufficient labor force with low labor rates, and proximity to the rapidly growing population centers and markets. Table 2 is a summary of Pulp and Paper Facilities by State within the study area that were in operation in 1983 or at least near construction completion. Also shown in Table 2 is a breakdown of the pulping methods for those facilities which will be related to equipment content in later sections of this report. The significance is the preponderance of kraft process based mills versus other pulping methods. Groundwood mills are relatively few due to the high power costs in the Southeast and species characteristics of the southern pines. A detailed listing of pulp and paper facilities by state, including location, is contained in Appendix 2. Also included in Appendix 2 are maps of each state showing the geographic distribution of the facilities.

<sup>1</sup> Tappa Journal Volume 67.

Table 2. Summary of Pulp and Paper Facilities by State

<u>State</u>	<u>Number of Facilities</u>		<u>Number of Facilities by Pulping Method</u>				
	<u>Paper Mills</u>	<u>Pulp Mills</u>	<u>Ground-wood Mills</u>	<u>Semi-Chemical</u>	<u>Sulfite</u>	<u>Kraft</u>	<u>*Misc.</u>
Alabama	17	23	5	2	---	13	3
Arkansas	12	9	1	---	---	7	1
Florida	10	10	---	1	2	8	---
Georgia	23	22	4	1	---	12	5
Louisiana	14	21	3	4	---	12	2
Mississippi	12	10	2	---	---	6	2
North Carolina	16	12	---	1	---	8	2
Oklahoma	7	6	---	1	---	2	3
South Carolina	11	12	4	2	---	5	1
Tennessee	14	13	2	3	---	3	5
Texas	14	12	3	---	---	6	3
Virginia	15	11	2	3	---	5	1
<b>TOTAL FACILITIES</b>	<b>165</b>	<b>161</b>	<b>26</b>	<b>18</b>	<b>2</b>	<b>87</b>	<b>28</b>

\* waste paper, thermomechanical, etc.

The sizes of the facilities in the Southeast as listed in Appendix 2 are extremely variable and are highly dependent on the ownership. Forty percent of all types of pulp and paper facilities in the Southeast are owned by major U.S. pulp and paper corporations as shown in Table 3. If the sample is restricted to mills larger than 500 TPD production, the percentage of ownership by major pulp and paper corporations increases to eighty-four percent. International Paper Co. has the largest number of facilities with twelve operations, Georgia-Pacific Corporation is second with five facilities, and Champion International, Union Camp, and Weyerhaeuser have four. Corporate ownership of multiple facilities is a significant consideration when considering marketing plans, as purchasing is more likely centralized at the corporate levels. There is also some foreign ownership of pulp and paper facilities in the South. Abitibi-Price operates two mills; MacMillan Bloedel Ltd., one; Smurfit, two; Bowater, two; and Kymi Kymmene Oy has joint ownership of one mill. Since operating management of these foreign owned mills is generally local, the fact that ownership is wholly or partly foreign has little effect on purchasing decisions.

There are several pulp and paper industry directories available which provide valuable information concerning mill distribution and capacities. Two that are published annually and that cover the entire North American area are Lockwood's Directory of the Paper and Allied Trades (Vance Publications, P. O. Box 400, Prairie View, Illinois 60029) and Post's Pulp and Paper Directory (Miller Freeman Publications, 500 Howard Street, San Francisco, California 94150). The Lockwood's Directory contains extensive information such as listing of corporate headquarters, addresses of individual mills, equipment content thereof, grades

manufactured, and names and titles of key personnel. Southern Pulp and Paper Magazine (75 Third Street, N.W., Atlanta, Georgia 30308) also publishes an industry directory which covers only mills in the southern states. This directory, however, does not provide as much detail concerning mill equipment and process as do the other directories.

The United States Government, through the U.S. Printing Office, publishes industry statistics such as monthly production rates for pulp, paper, and paperboard, and also summarized quarterly statistics which can be utilized for market planning and forecasting. The problem with this data source is that all the data lags by three months due to printing delays.

Another industry information source that publishes annual capacity surveys and weekly, monthly statistics for production of various grades of paper is the American Paper Institute, 260 Madison Avenue, New York, New York 10016.

### Summary of Products Manufactured

The range of products that are being manufactured by southeastern pulp and paper mills is extremely variable and is highly dependent on ownership and existing sales outlets. The list of mills contained in Appendix 2 also identifies which products are currently being produced at those mills. The trend in the industry has been to convert to production of fine quality paper and other high return products when market conditions permit. The following will summarize the generic grades which are being manufactured and provide some production statistics about each.

#### Newsprint

The current U.S. production of newsprint is slightly more than 5,000,000 TPA and represents 40-45% of the total U.S. demand for newsprint. In the southeastern states, there were twelve operating newsprint mills which collectively produce seventy percent of the U.S. production. The recent shutdown of mills in Alabama and Arkansas by International Paper Co. will significantly change these production figures. Kimberly-Clark Corporation, St. Regis Paper Co., and Boise Southern are the major producers of newsprint since the shutdown of the International Paper mills.

#### Printing and Writing Paper

The current U.S. production of coated and uncoated paper for printing and writing paper is 15,000,000 TPA. This grade is one of the desirable grades from a manufacturing viewpoint because of the relatively high sales returns. International Paper is currently reviewing the costs of converting one of the two newsprint mills that were shut down in March 1984 to fine paper. In the study area, there are currently fourteen operating mills producing this grade, and another new mill nearing construction completion. In addition, there are two other mills producing groundwood printing paper. Champion International Corporation is the largest manufacturer of this grade in the study area.



### Kraft Packaging and Paperboard

This category is a combination of bleached food container stock, unbleached bag stock, unbleached kraft linerboard, and other wrapping stock. By far, unbleached kraft paper and linerboard are the most popular products in the southeastern area. Current annual production from thirty existing mills is 25,500,000 TPA. There are several machine installations and one new kraft linerboard mill nearing completion which will add another 740,000 TPA of production. In addition to the unbleached mills, there are five mills producing bleached linerboard, and thirteen producing bleached food container board. A number of the major forest products firms are principal manufacturers of this grade - International Paper, Georgia-Pacific, Container Corporation of America, Union Camp Co., and Inland Container. International Paper, Weyerhaeuser, Champion International, and Westvaco are the largest manufacturers of food container board.

### Tissue

Current production of tissue in the U.S. is approximately 7,000,000 TPA as the demand for tissue products has been growing at the steady rate of 3% per year for the last ten years. There are six operating mills in the study area with three additional machines under construction at this time. Scott Paper Company, Fort Howard Paper Company, Northern Towel, and Georgia-Pacific Corporation are the major producers of tissue grades. Procter & Gamble is the single largest specialty tissue/napkin manufacturer.

### Market Pulp

The production of market pulp in the Southeast has generally developed from a desire to balance paper production to pulping capacity or for pulp supply to other corporate mills. Bleached sulfate pulp comprises 75% of the market pulp produced from the sixteen pulp mills in the area. Only four of these sixteen mills are stand-alone and are neither part of an existing paper mill complex nor within a larger corporate organization which will consume the majority of the pulp internally. Two mills operated by ITT-Rayonier and Buckeye-Cellulose produce bleached sulfite dissolving pulp for both international consumption and market sales.

### Typical Mill Description

The age distribution of the pulp and paper mills in the Southeast is a significant factor that affects equipment purchase. A high percentage of the present operating mills were originally constructed in the mid to late 1950's when the kraft process was modified to process the southern pine species. Since that time new mills have been constructed at an average rate of 3 to 5 per year. At the present time three new mills are nearing completion, and although several corporations are conducting feasibility studies, no announcements of further construction have been confirmed. The most common plant capacity of the older



mills is approximately 600 TPD. As a result of modernizations and expansions, some of the mills have been expanded to 1000 TPD production. New construction since 1975 has tended to be mills of 1500 TPD or more, except for specialty mills. The cost of new plant construction has become prohibitive except for very large corporations primarily because the capital requirement for the capacity of mill that will produce an acceptable return on investment is so large.

Although it is impossible to describe a typical southern pulp and paper mill, there are some common design factors or equipment utilization which can be said to be the norm. In the woodyard, for instance, all mills will have at least one chip unloading truck dump and some kind of chip storage and reclaim system. The mills larger than 1200 TPD production will also have an additional chip unloading system for rail deliveries. The mills commonly have at least two drum debarkers for processing roundwood and more if their dependence on roundwood is high. At least 50% of the mills are dependent on one chipper. The mills constructed since 1970 tend to have two chippers for redundancy and to achieve higher chip production rates. All chip production is screened for oversize removal and approximately one-third of the mills also remove fines during screening. The capacity of the woodyards has been increased in most mills to permit processing of the entire daily fibre demand in long wood form (approximately 800-1500 cds/day) to insure continuity of supply in case of chip delivery problems.

The older mills tend to rely entirely on batch digesters and in order to increase pulp production simply added further digesters. The newer mills have either had a combination of batch and continuous digesters or converted completely to continuous digesters. Those mills with a reliable source of sawdust generally have a specialized continuous digester to maximize fibre recovery. Most mills have a single lime kiln and this is generally the bottleneck in each mill. The initial design of the mills was very conservative in sizing recovery boilers, as compared to other parts of the United States and Canada. It is typical to find at least two recovery boilers at each site. Those boilers that are being run at capacity are generally in mills where pulp production has been significantly increased from the original design. The most common bleaching cycle for southern bleached pulp mills is C-E-D-E-D with the exception of those on tissue grades that utilize C-E-H-E-D.

The number and manufacture of paper machines is probably the most variable equipment factor when attempting to describe a "typical" mill. The mills in the 1000 TPD and higher production rates generally have two or more paper machines. The mills with single machines are generally specialty mills or an older mill that has not been modernized.

Energy costs were not a significant design factor when the original mills were constructed. It has only been since 1973 that corporate management has directed that the mills become self-sufficient for steam and electrical energy. The typical mill has three power boilers and one turbine generator. The power boilers were initially designed to fire on natural gas or oil; however, the



majority are now being modified or replaced by new boilers fired by coal or waste wood. The older mills have steam systems designed for 600 psig, whereas newer plants will have 1200 or 1500 psig pressure boilers to maximize electrical power generation. The typical mill currently produces approximately 50% of its electrical energy requirements. There has been a major project effort in the last two years throughout the industry to increase electrical power generation.

Because of environmental regulations, most mills have some type of secondary effluent treatment systems and usually electrostatic precipitators for air emission controls.

Current Equipment Suppliers

A summary of the major equipment by manufacturer that is currently installed in mills in the Southeast was made from various industry sources and from responses from companies that were willing to divulge such information. Table 3 lists those manufacturers by process area that were most frequently mentioned and therefore can be considered principal suppliers. The column designated "Highest Frequency Response" contains that supplier identified the most. In some cases such as Manitowoc - debarkers, Rotex - chip screens, and Beloit - paper machines, those manufacturers have captured 75-80% of the canvassed installations.

Table 3. Principal Suppliers of Pulp and Paper Machinery to Existing Southeastern Mills

	<u>Highest Frequency Response</u>	<u>Second Most Frequent Reply</u>	<u>Occasional</u>
<u>Woodyard Area</u>			
Drum Debarkers	Manitowoc	Fiber Making Processes	
Chippers	Carthage	Murray	
Chip Screens	Rotex	Sprout Waldron	
Chip Reclaimers	Wennberg	Atlas	
Truck Dumps	Peerless	Cowan-French	
Woodyard Cranes	Manitowoc	Kockums	Hepburn





	<u>Highest Frequency Response</u>	<u>Second Most Frequent Reply</u>	<u>Occasional</u>
<u>Pulping Area</u>			
Refiners Continuous Digesters	Sprout Waldron Kamyr	CE Bauer M & D (Sawdust Application Only)	
Cleaners Screens Washers Save-Alls Chlorine Dioxide Generation	Celleco Impco Dorr-Oliver Dorr-Oliver	Bauer Bird Impco Impco	Beloit Jones Hooper KMW
Causticizing Equipment Agitators Batch Digesters	Erco Dorr-Oliver Impco Chicago Bridge & Iron	Hooker CE Raymond Lightning Goslin	
<u>Paper Machines &amp; Finishing</u>			
Paper Machines - Fourdrinier - Twin Wire	Beloit Valmet	Black Clawson	Tampella
Roll Handling Bale Press Pulp Dryers Size Press Felt Conditioning Profile Controls Slitters/Rewinders Strapping Machinery Vacuum Pumps Stock Pumps	Lambs-Gray Lambs-Gray Ross Beloit Sandy Hill Accuray Beloit Dualstrapping Nash Goulds	Wartsilla Hepburn Flakt  Clark & Vicario Measurex Black Clawson Signode Dresser Ingersol Rand	Warren
<u>Power &amp; Recovery Area</u>			
Recovery Boilers	Babcock & Wilcox	Combustion Engineering	
Lime Kilns Power Boilers	Traylor Combustion Engineering	Allis Chalmers Babcock & Wilcox	Foster Wheeler
Generators Evaporators Ash Handling	General Electric Goslin-Birmingham Montague	Westinghouse Unitech Beaumont Birch	Ashtech
Feedwater Systems Feedwater Treatment Feedwater Pumps	Graver L* Water Treatment Ingersol Rand	Zurn Purmutit Bingham	Cochran Glegg Worthington



	<u>Highest Frequency Response</u>	<u>Second Most Frequent Reply</u>	<u>Occasional</u>
<u>Miscellaneous</u>			
Distributed Controls	Foxboro	Fisher	Honeywell
Motor Controls Center	Westinghouse	Allen Bradley	
Stainless Steel Tanks	C B & I	Douglas Bros.	
Tile Chests	Stebbins	Ballard	KTS

Foreign Equipment Suppliers

In the last several years, several foreign equipment manufacturers have made concentrated marketing efforts to penetrate the pulp and paper industry in the United States. At the present time, the strength of the U.S. dollar in relation to the European currencies has made European equipment attractive because of the translation advantage. The primary reluctance of mill personnel to accept this foreign equipment is the concern about service and spare parts availability. Potential purchasers are not willing to accept the sales promotion that a technician/repairman or critical spare part could be delivered by plane from Europe within twenty-four hours. Several of the companies such as Ahlstrom have established marketing centers/spare parts warehouses in Atlanta and Houston to overcome purchasing reluctance. Another successful factor has been the hiring of local servicemen and manufacturers' representatives who can readily communicate with local operators and management.

Some of the foreign companies who now have equipment in southeastern mills are as follows:

Paper Machines	Tampella Valmet Voith KMW-Johnson
Roll Handling	Ahlstrom Wartsilla
Lime Kilns	Ahlstrom
Boilers	Gotaverken Energy Systems
Turbine Generators	ASEA (Stal Laval)
Paper Machine Controls	Kajaani Inc.
Distributed Controls	Valmet
Feedwater Pumps	K.S.B.

## FORECAST OF BUSINESS ACTIVITY

### Capital Spending Overview

The character and rate of capital spending in the U.S. pulp and paper industry is extremely sensitive to the general economic condition and the direction that corporate management believes it is moving. Historically, capital spending in the industry has increased at the rate of 14% per year over the last ten years. Although part of this growth can be discounted for the rapid inflation of construction and equipment costs during the period, there still was a substantial growth in greenfield construction and plant capacity expansions. An example of this inflation effect is the comparison of the completed costs of Weyerhaeuser's 1600 TPD Valliant, Oklahoma mill completed in 1971 for \$100 million and International Paper Company's 2000 TPD Mansfield, Louisiana mill completed in 1982 for \$600 million. This creeping inflation and then the recession in 1982 have significantly changed how corporate management will measure the attractiveness of future projects.

The recession in 1982 caused under-utilization of existing mills and seriously reduced paper industry profits. Those corporations with large divisions in the forest products sector, such as Georgia-Pacific and Potlatch, were further squeezed for cash flow. The immediate result was most corporations slashed capital spending except for emergency repairs and necessary environmental projects. More importantly, projects relating to capacity expansions have been shelved until existing capacity becomes utilized and the corporations have improved financial liquidity.

The philosophy of capital expenditures in the past two years (1983-84) has been to convert manufacturing facilities to higher unit profit products, and to concentrate on projects that either improve efficiencies of existing facilities or reduce raw material and/or labor costs. Projects to reduce energy dependence on fossil fuels and to reduce the percentage of purchased electrical energy have been the most frequent in the last two years. In 1982 there were 35 new power boilers and 29 recovery boilers in construction or were considered in feasibility studies.

In the next four years, it has been forecasted that \$10 billion will be expended on capital projects in the pulp and paper industry. Since the industry has not achieved the required utilization of existing facilities, the percentage of this forecasted spending for new mills or even new machines will be small compared to the expenditures for machine rebuilds, retrofits, and other equipment modernizations. The significant factor for market planning is that the primary thrust of industry spending will be incremental expansions and modernization of existing sites. The expenditures in the pulping areas will be slightly more than \$2.2 billion because increased paper demand during the recovery years 1983-84 can be met by existing spare pulping capacity. The anticipated growth after 1984 must be the result of expanded capacity. In the pulping area, two-thirds of the expenditures will be for new recovery boiler installations, and the



remainder divided between digesters and other pulping equipment. The paper making area will also require a \$2 billion expenditure in the next four years. New paper machines and paper machine rebuilds will each consist of 30% of the expenditures, and the remaining percentage of the expenditures split between various paper making equipment - tanks, chests, pumps, and agitators. The largest area of expenditures will be for auxiliary equipment consisting of utilities, environmental controls, and process controls. Efficiency improvements in the utility area will drop off rapidly as the opportunities for savings decrease. Process controls, however, will remain a major expenditure area, because most of the existing mills were constructed with first and second generation process controls, and recent technological advances in distributed controls have made these existing controls obsolete. In some cases, suppliers are no longer willing to service their original equipment. The new generation of distributed controls, in addition to being more reliable and more flexible, permit faster product changes and provide more accurate process measurement. Once the distributed or shared display system is in operation, a whole world of potential control and management information systems can be developed. The primary consideration is that, as various areas of the mill are converted to new microprocessor based instrumentation, the system can be optimized into a single overall management system with the lowest capital cost per ton of product. It is estimated that expenditures for pollution controls will be split two-thirds for air emissions and one-third for water treatment. After several delays, the states are now enforcing strict total reduced sulphur (TRS) standards which will significantly affect the older kraft mills, forcing major expenditures in the area of the recovery boiler, evaporators, digester, and lime kilns.

The Pulp and Paper Magazine annual industry expenditure survey forecasted that the southeastern states will again lead the United States for the volume of capital expenditures within the industry. For the period 1983-1985 South Carolina will lead the nation with projected expenditures of 1.25 billion dollars, with Alabama second at \$1.1 billion, and followed by Mississippi (\$640 million) and Georgia (\$344 million).

Table 4 is a listing of those corporations with the highest announced capital spending plans for the next two years. It is significant to note that the majority of these corporations have mills and/or extensive timber holdings in the Southeast.

Table 4. Corporations with Announced Capital Expenditure Plans Exceeding \$100 Million for 1984-85

	\$(000,000)
Champion International	\$733
Great Northern Nekoosa	600
Union Camp	592
International Paper	540
Crown Zellerbach	454
Scott Paper	435
St. Regis	222
Westvaco	129

New Mill Construction

There are currently three greenfield mills under construction in the southeastern states. Union Camp Corporation is constructing a 210,000 TPY bleached pulp/white paper mill at Eastover, South Carolina which is targeted to come on line in September 1984. Great Northern Nekoosa will start up a 350,000 TPY bleached kraft market pulp mill in New Augusta, Mississippi later this year. Kimberly-Clark has a non-woven facility in initial construction in Georgia. A number of other projects have been proposed; however, the sponsor corporations have not indicated an approval to commence the design and construction. A list of these tentative projects is contained in Table 5.

Table 5. List of Tentative Greenfield Pulp and Paper Projects

<u>Corporation</u>	<u>Location</u>	<u>Type of Mill</u>
Augusta Kraft Co.	Augusta, Georgia	750 TPD kraft linerboard mill
Boise Cascade	South Carolina	800 TPD bleached kraft mill
Champion International	Halifax, North Carolina	600 TPD bleached kraft mill
Champion International	Jasper, Texas	1000 TPD unbleached kraft mill
Georgia Kraft	Elberton, Georgia	1300 TPD linerboard mill
Independent Kraft Corp.	Tuscaloosa, Alabama	800 TPD linerboard mill

Industry Trends Affecting Spending by Mill Area

The estimated distribution of capital expenditures in dollar amounts or percentage by mill area was discussed earlier. Besides the desire of management to reduce costs and increase production, there are various external factors which are directly affecting the type of equipment which will be purchased as part of these expected projects. The applicability of Canadian equipment and services for the current and projected southeastern United States markets must be evaluated against the current market requirements as well as these market trends.

Woodyard Area

Woodyard design and operation will be affected by increasing wood costs, decreasing wood quality, and environmental pressures. Wood costs, which have traditionally been low in the Southeast, are now in an upward spiral due to competition for land use by agricultural, residential, and recreational applications; increasing harvesting labor costs; and competition for wood for alternate uses such as fuel. The harvesting sector has already adjusted to these pressures by converting to more mechanized and long-log harvesting methods. Woodyard operations now process increasing amounts of pulpwood roundwood in longwood form rather than traditional pulpwood length. Fiber deliveries in chip form are decreasing as independent



suppliers consume larger volumes for self-produced energy or because of competition from other industries or public facilities for chips as fuel. At the present time whole tree chips are only a factor for fiber supply in the Southeast in localized situations. No mills have converted as yet to whole tree chips as a total fiber source. In those areas with extensive growth of low-grade hardwood, whole tree chipping operations have been installed but only for a source of fuel.

The quality of chips for pulp is projected to worsen due to the cost pressures to harvest all available trees, and as the percentage of chips produced from wood residues rather than roundwood increases. Lumber will remain the dominant force in forest utilization, with pulpwood becoming more of a residual operation. Chip screening and cleaning installations will become more extensive. There is also considerable interest in chip thickness screening, although the economic justifications are not yet proven.

The concern for energy conservation has caused large numbers of mills to convert pneumatic chip transport systems to mechanical conveyors which require much less horsepower.

Most mills have initiated projects to become energy self-sufficient due to increasing purchased power costs. The trend has been to convert power boilers from natural gas and oil to waste wood and coal, and generate electrical power from the steam. The attractiveness of either of the two new fuels is entirely dependent on local costs and availability. Despite the attractiveness of alternate fuels such as waste wood, no mills have gone beyond the level of energy self-sufficiency. Wood is not expected to become an exclusive fuel source in the near future. Improvements in boiler design and controls have actually reduced fossil fuel consumption per ton of paper by 35% since 1975.

#### Pulping Area

Chemical pulping methods in the Southeast will become more dominant as the power costs increase. Kraft pulping with some variations will, therefore, remain the primary pulping process. There will be continued need for any pulping methods that will improve production rates and yields from existing equipment. For existing mills, there will be a trend to low sulfur pulping methods. In new mills, however, there is sufficient technology to control odor problems without having to resort to these low sulfur methods.

For the products where high yield and fiber strength are a factor, mechanical pulping systems may still be necessary. The importance of thermo-mechanical pulping (TMP) systems will increase and will eventually replace significant volumes of chemical or semi-chemical pulps. Trials are being conducted utilizing various pretreatments such as sodium sulfite, ozone, or chloride dioxide to reduce the energy requirement of the TMP process. With a trend toward automation and continuous process, the TMP process also becomes more attractive.



For modernizations and new plant construction continuous digesters will be favored over batch digesters. Digester controls will be increasingly automated through computer controls to maximize output. The trend of the industry will be towards larger manufacturing units in the 1500 to 2000 TPD capacity. The future mills will be highly integrated, with the percentage of market pulp reduced.

Environmental pressures will affect changes in the screening and cleaning area where pressure screening will become more important. The industry is constantly researching means of increasing consistency while maintaining energy requirements.

Research into combined pulping and bleaching processes rather than separate process sequences is ongoing with considerable interest. The potential is extremely attractive environmentally as with increases in lignin removal, oxygen bleaching in such sequences as OC/CEDED could produce bleached pulp with acceptable strength and viscosity levels at reduced costs.

Recovery of chemical by-products such as turpentine and tall oil will become increasingly more important.

#### Bleaching

Environmental pressure to reduce BOD levels, color, and chemical content in mill effluents will cause mills to reduce liquid discharges. Current bleaching systems are based on chlorine or chlorine based compounds. A reduction of these chemicals is necessary for the decrease in formation of problem chlorinated compounds and simplification of recycle to the recovery boilers.

Research into methods of increasing consistency from the current 10-15% consistency range to potentially 30% is being pursued. The increased consistency must be balanced with energy usage but projects in this area will be extremely sensitive as new technology becomes available. Fiberglass plastics will become more popular as a construction material in the bleach area as a substitute for exotic metal compounds.

#### Recovery

Of the three basic areas of pulping, the least technology changes can be expected in the recovery area. Recovery boilers will be operated at higher steam pressures to maximize power generation, and controls will be more automated to improve efficiency and safety. Lime kilns offer considerable possibilities for improvements, particularly as energy conservation is emphasized. Real cost savings are available by converting the kiln fuel source from natural gas and oil to alternate fuels such as petroleum coke or waste wood. These conversions require extensive fuel conveyance systems and fuel processing equipment such as crushers and hogs.



## Paper Making Area

### Fiber Sources

Although wood will remain the primary source of fiber for paper making process, considerable research is ongoing into the utilization of combination of wood and synthetic fibers for certain specialties such as cup and plate stock. In the South, there will be a trend to utilize greater percentages of hardwood.

Secondary fibres will become an increasing fibre source not just for paperboard but also for utilization in various paper grades. This increase in secondary fibre demand will create a market for deinking equipment and various cleaning systems.

### Stock Preparation

Although there has been some improvement in refiner plate design and metallurgy, further technological changes are needed, particularly in refining techniques for secondary fibres. The possibility of chemical additives to improve refining would create markets for refining related machinery.

The potential increased utilization of chemicals such as retention aids, drainage aids, heater adhesives, and slimicides all have application in the stock preparation area. They will require more sophistication in the water recycling systems around the paper machine.

### Forming and Paper Machines

The industry standard paper machine will continue to be fourdrinier machines. It is expected, however, that twin wire formers will be utilized in some new installations because of their higher speed capability and improved machine efficiency. Traditional cylinder machines for paperboard manufacture will be gradually replaced with various types of pressure formers.

There is considerable interest in multiple ply forming to achieve desired paper properties. It is desired that the multiple layers be formed on either fourdrinier or twin wire machines at high speeds.

After plant capacities become pressured, projects to increase machine speeds will be initiated. It has been estimated that through various modifications it will be possible to achieve machine speeds of 7000 to 9000 fpm for tissue manufacture, 4500 to 6000 fpm for newsprint, and 3000 to 4000 fpm for fine papers. Machine widths are not expected to extend beyond current limits of 400 inches. The web-handling capacity after the former will limit the ultimate speed for tissue and newsprint grades. For fine paper the limitation will remain the size press.





## Processing

The desire for increased production and energy conservation has caused extensive research into improving the press section. The goal that most manufacturers want to achieve is an average moisture entering the dryers of 50-55%. Double felting will be a standard for heavy weight grades and also for lighter weights where finishing requirements do not prevent utilization. There is considerable interest in the extended nip press with its inherent high PLI capability and excellent dewatering capacity. It is expected that plain or grooved stainless steel press rolls will be favored, resulting in hard nips and suction press rolls being avoided. Any improvements in press clothing will certainly be popular in the industry.

## Drying

Although research in possible dryer modifications such as air flotation in the first dryer section are being considered, few changes in the existing steam heated cylinder dryers are expected. Any improvements in this area will be dependent on the development of improved humidity control hoods and ventilating systems, and new fabric runs.

## Finishing Area

### Baling and Roll Handling

With the expected reduction of market pulp sales and increase in integrated consumption, the demand for pulp baling equipment will decline except for replacements and spare parts.

The primary goal in roll handling equipment will be automation to reduce manpower and to provide better inventory control. This area is certainly ripe for computer operated systems.

### Paper Machine Controls

At the present time more than 60% of the paper machines in the Southeast have some type of computer operated process controls. It is expected that continued conversion and upgrade of existing systems will be emphasized in the next several years as pressure for increased productivity occurs. Two of the most recent developments are wet-end slice profile controls and color sensors for fine paper machines. The trend will also create a demand for other strength and surface property measurement systems to optimize the performance of the faster, wider paper machines.

## Industry Trends Affecting Spending by Product Type

The future demand for various paper and pulp products will also affect the acceptability and priorities of projects at various mills. The Pulp and Paper Institute makes two-year projections of demand and growth for each grade, and publishes the figures in the January issue. A summary of the current projections is reviewed below.

### Newsprint

The reported annual production of newsprint in short tons for 1980 and 1982 in relation to the percentage of manufacturing capacity is shown in Table 6. The most rapid production growth in the United States occurred during the period 1979 to 1982, when capacity was increased by 35.9% by the start-up of several new machines. It is expected that this growth pattern will be reversed, as the recent trend has been to shut down indefinitely older, inefficient machines as evidenced by International Paper's announcement in July 1984 that machines in Arkansas and Louisiana would be permanently shut down.

Existing fourdrinier machines are generally being replaced with twin wire machines during rebuilds because the fourdriniers are usually drainage limited. There is also a desire to improve sheet characteristics and increase machine speed which cannot be obtained from typical fourdrinier installations.

Table 6. Annual Capacity of Newsprint Production

	<u>1980</u>	<u>1982</u>
Production (000 short tons)	4672	5300
Production as percent of capacity	96.8%	94.9%

### Uncoated Groundwood

There is considerable interest in uncoated groundwood grades for magazines and paperback books because of its printability and brightness. As postage rates and other manufacturing increase, and with intensive competition among publishers, each has been forced to examine all areas where costs can be cut. The demand for groundwood is extremely dependent on the relative difference in price between groundwood and free sheet. As long as there is a sufficient price incentive between these grades, customers will continue to substitute uncoated groundwood for printing applications.

One of the primary unknowns for continued growth is the potential for electronic communications and news services which could have a drastic effect on the demand for magazines and catalogues.

### Coated Papers

The primary market for coated papers is for 4-color printing. The main trend in this product area is to develop grades less than 40 lb basis weight for magazines to reduce the effect of increasing postage rates. Some European manufacturers have already successfully produced a 30 lb product and are gaining a market share in the U.S. Technical developments have also emphasized process modifications to maintain surface properties and run-ability while permitting reductions in basis weight. The possible development of the electronic communications that could affect catalogue printing will actually benefit printed paper markets because of the increased demand for advertising brochures, and instruction manuals for such services.

### Bristols (Bleached or Semi-Bleached)

The demand for file folders, postcards, etc. that are based on Bristol grades is considered to have little growth; therefore, the future for these grades must be flat or declining.

### Tissue

This is one product area that is relatively insensitive to general economic trends, and is more affected by population growth rate at a relatively fixed per capita growth rate. Technology has been concentrated on process changes to permit layering of specific fibres in cross-section to improve sheet characteristics. Various designs of creping blades are constantly being developed to improve surface smoothness and product softness.

### Kraft Bag/Linerboard/Corrugating Medium

The strong rebound in the U.S. economy has created a demand for unbleached kraft linerboard for shipping containers, etc. at a growth rate of six percent per year. The general shift of the U.S. economy to the service sector should give the corrugated box business further momentum. Part of this demand can be obtained through shifts of unbleached kraft paper machines to kraft linerboard, however, linerboard mills are currently running at near capacity. Kraft bag paper demand, on the other hand, will decrease, partially due to penetration of the bag market by plastics. Currently, plastic sacks have displaced approximately five percent of grocery sacks in metropolitan areas. This percentage replacement could potentially increase to twenty percent, in which case there would be an excess of kraft paper machines that could be converted to linerboard and result in some machines being shut down.

New mill or machine lead time is two or three years from start of construction.

Another area of uncertainty is the effect of U.S. dollar strength on export markets.



## MARKETING OF PULP AND PAPER MACHINERY

### Identification of Purchase Decision Making Personnel

#### Definition of Equipment and Services

Because of the differences in sizes of mills and management organization, it is sometimes difficult for a manufacturer who is attempting to establish a market for his equipment or service in a new mill to identify which person has the decision making authority for purchasing such products. The nature of the equipment or service will generally determine who will have purchasing authority. A simple differentiation is to divide products and services into commodity items, specialty items, and storeroom items. Commodities are generic products purchased for a specific end-use - such as salt cake or a pump. Once a specification has been established, the commodity can be purchased from any number of suppliers, generally for the lowest price. The specialty item is a product that is part of the manufacturing process and must interact with other items. Specialties could be a specific premodified starch or a piece of equipment such as a size press. Storeroom supplies can be a combination of both types with some non-substitutable replacement parts for a specific machine or a generic item such as flashlight batteries.

#### Role of the Purchasing Department

The influence of the purchasing department is directly related to the type of product or service being purchased. For commodity items and storeroom items, the purchasing agent or storeroom manager has the primary authority for purchasing. The lowest price and best delivery will be the major criteria. The significant fact is that commodity items are normally locally acquired.

When specialty items such as capital equipment are being considered, the purchasing department will normally pre-qualify certain manufacturers, solicit proposals, be responsible for negotiating commercial terms, and issue the purchase order. Operating or technical personnel ordinarily will write the initial technical specifications and evaluate proposals. If a qualified bidder's proposal meets the technical specifications, the lowest bid is normally given the order.

Consulting engineering firms are utilized extensively by the pulp and paper industry for the design of large capital projects. The consultant generally assumes the responsibility of the client's operating personnel and prepares the technical specifications, analyzes the proposals, and recommends a preferred bidder. The purchasing department still issues the purchase requisition and, more importantly, provides a list of qualified bidders. Consulting engineering firms in some cases are requested to submit a list of possible bidders to the client's purchasing department and project management. This is one method for new companies to be included in Requests for Proposals. A list of consulting engineering firms is summarized in Appendix 6; however, it is recommended that manufacturers refer to the



various directories such as Lockwood's or the numerous trade journals for a more complete and current listing of consultants. Consultants generally are specialized in areas of expertise such as environmental, process controls, energy management, or pulp and paper process design.

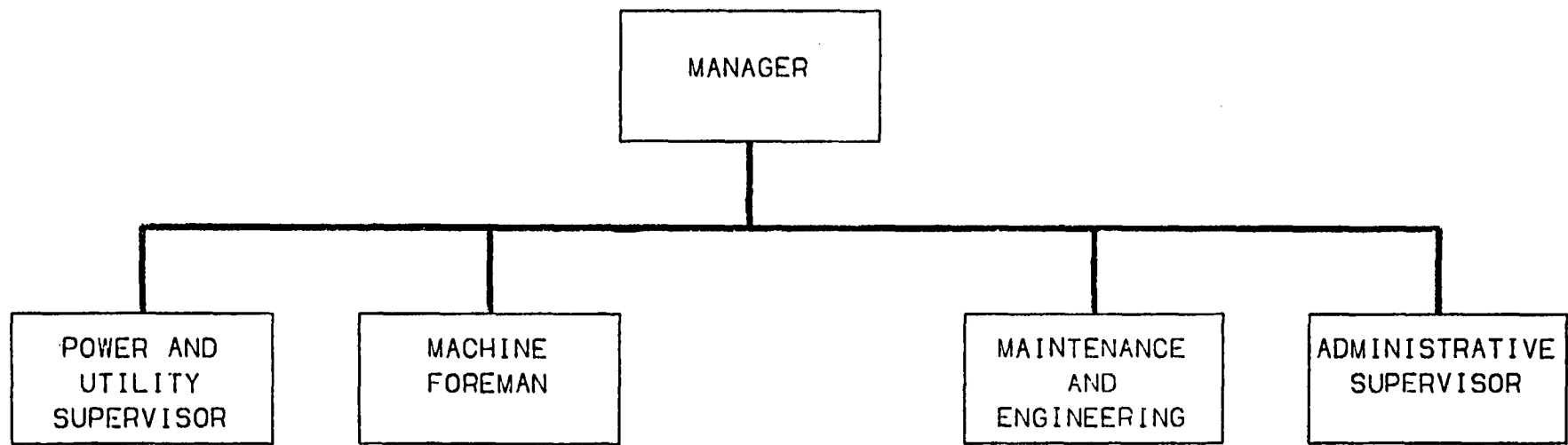
Larger pulp and paper companies have organized central purchasing departments to attempt to standardize on types of equipment, but more importantly, to obtain quantity discounts by negotiating larger supply contracts. Generally, central purchasing has been more active in commodity type purchasing; however, several firms have indicated that they have begun buying machine clothing and specialty chemicals through the central purchasing department.

#### Purchasing of Major Equipment

The purchase of major capital equipment involves increasing numbers of operating and technical people and therefore makes it more difficult to identify decision making personnel. The size of the mill also has a major influence upon who will render judgments and evaluations leading to equipment purchases. To illustrate how the size of the mill affects purchasing decisions, three typical organizational charts for a single machine, non-integrated mill (Drawing A6879-1); multiple machine, non-integrated mill (Drawing A6879-2); and a multiple machine, large integrated mill (Drawing A6879-3) have been included.

In the single machine, non-integrated mill there is a general manager to which all the department heads or supervisors report directly. The general manager is the sole buying decision maker for almost all equipment purchases as well as operating supplies such as raw materials, chemicals, and machine clothing. Storeroom items and replacement parts will generally be purchased by the maintenance supervisor. Typical office supplies will be purchased by an administrative supervisor or head bookkeeper.

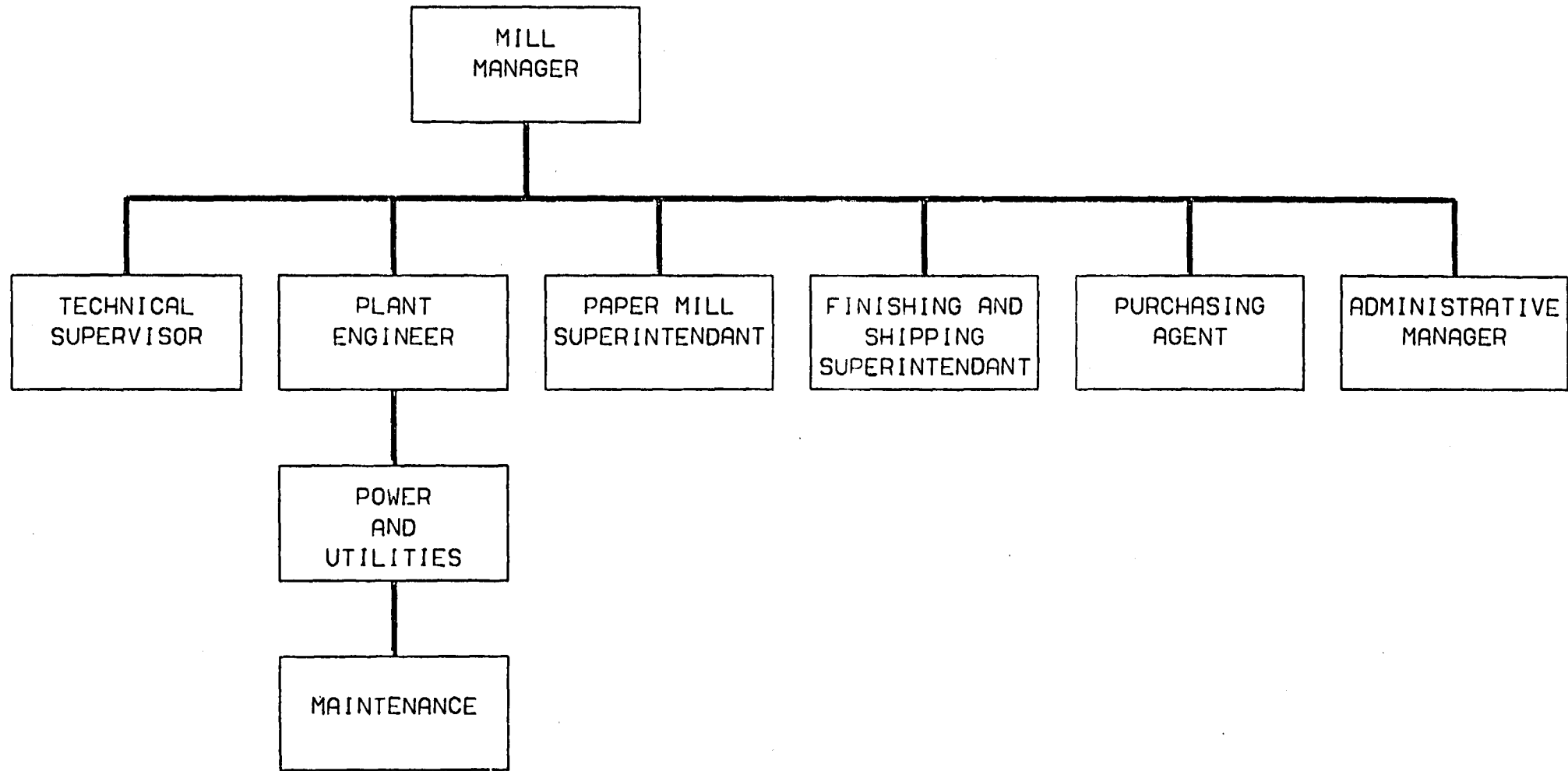
As the mill complexity increases in a multiple machine, non-integrated mill the authority for purchasing decisions is spread between various superintendents or department heads as the mill manager delegates responsibility for the operation. The purchasing agent has responsibility for supervision of purchases of all raw materials and commodities. The technical supervisor usually has responsibility for purchasing processing aids and functional additives and direct influence for purchases in the environmental area. The paper mill superintendent will be the primary decision maker for purchases of machine clothing, roll covers, and other operating supplies. The finishing and shipping superintendent selects supplies for his area of responsibility. The plant engineer has primary decision authority for such items as maintenance supplies, instrumentation and controls, lubricants, and consulting engineering services. In general, the interaction among these various managers concerning material selection can be summarized as the paper mill superintendent being concerned about runability and ease of operation, the plant engineer with reliability and maintenance, the technical director with validity of generated data, and the mill manager about return on investment and payback.



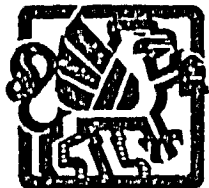
**Sandwell**  
ATLANTA, GEORGIA

TYPICAL ORGANIZATION  
SINGLE MACHINE NON-INTEGRATED  
MILL

A6879-1



24

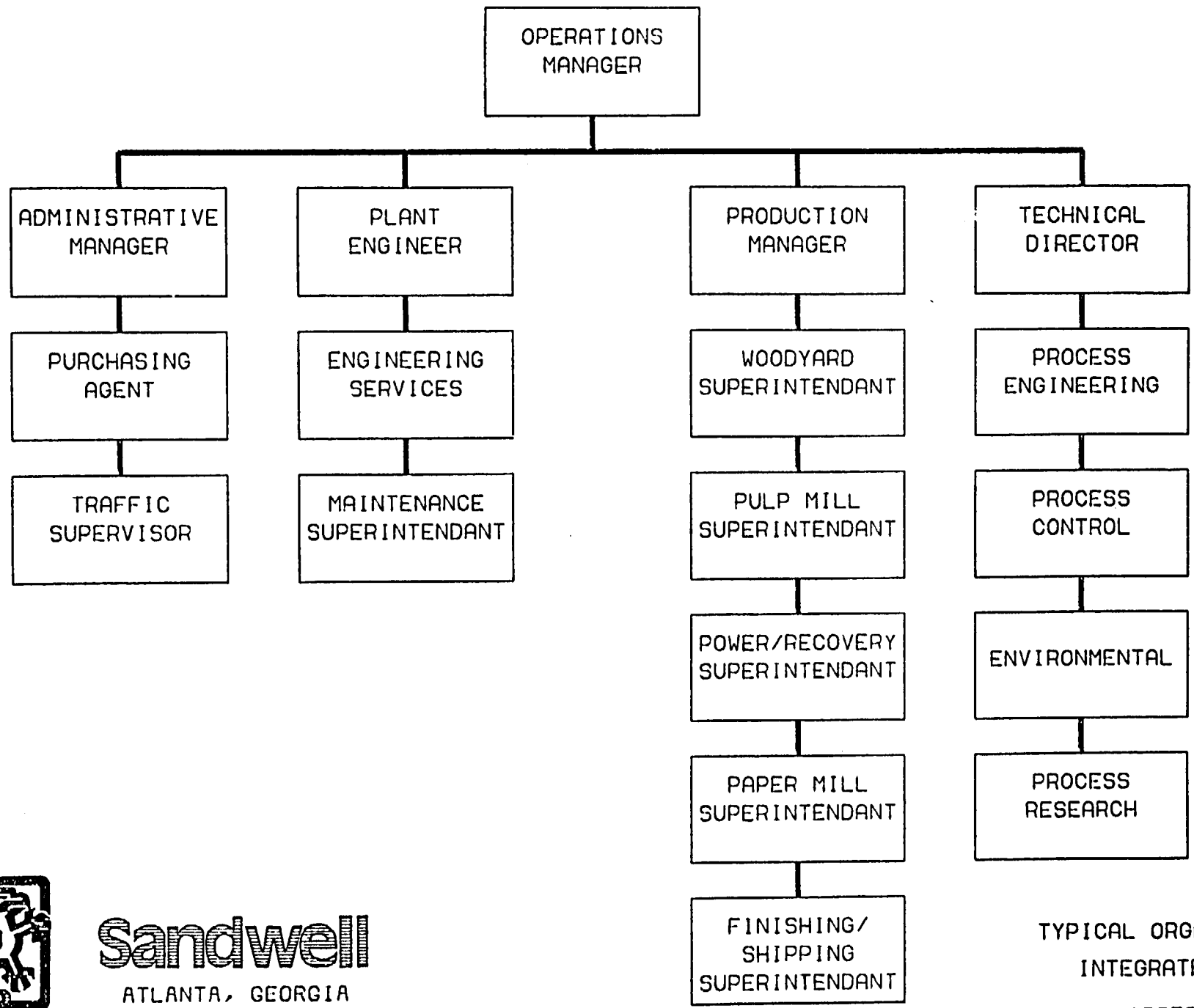


**Sandwell**  
ATLANTA, GEORGIA

TYPICAL ORGANIZATION  
MULTIPLE MACHINE NON-INTEGRATED  
MILL

A6879-2

56109V



25



**Sandwell**  
ATLANTA, GEORGIA

TYPICAL ORGANIZATION  
INTEGRATED MILL

A6879-3

96109V





Drawing A6879-3 depicts a typical organization for an integrated pulp and paper mill, emphasizing positions with buying decisions. The mill is divided into functional areas with a manager for each. The production manager has superintendents for each of the operational areas - wood department, pulp mill, power and recovery, paper mill, and finishing/shipping. Each has considerable responsibility for equipment specification and approval in their responsible area. The technical director is responsible for process improvements, process and quality monitoring, and environmental compliance. The plant engineer has responsibility for the general physical plant, maintenance, and in-house engineering services.

In larger corporations with multiple plants, some of the localized purchasing authority is superseded, or at least diluted, by corporate departments such as Corporate Research and Development, Corporate Engineering, and Corporate Purchasing. The major pulp and paper companies have developed centralized corporate research centers to evaluate new equipment or process. Product development, however, is usually a shared responsibility between Corporate R & D and mill production management.

There is an extreme variance in the size and the charter of the central engineering department among the major pulp and paper companies. Some corporations such as Scott Paper Company and Weyerhaeuser Company have the resources to accomplish either project management or complete detailed design. Equipment specifications and purchasing decisions are made directly by such engineering teams. The majority of the paper companies, however, maintain a limited corporate engineering staff sufficient to manage projects and provide specialized expertise in certain disciplines. The economic climate during the last several years has caused companies to pare down corporate and mill engineering staffs. The result has been the increased utilization of consulting engineering firms, not only for design engineering but also for developing feasibility studies and also project management.

A recent industry trend has been to increase the authority of corporate purchasing divisions. Traditionally, Corporate Purchasing is involved in establishing uniform purchase policy, negotiating supply contracts, and commercial terms of major capital equipment contracts. Several of the larger pulp and paper companies have now increased the authority of corporate purchasing to include operating supplies and equipment such as standard motors and centrifugal pumps. It is forecast that this authority will continue to increase and include inventory agreements and rebates.

Another trend in the industry has been the increasing acceptance of design/construct projects for major expansions. In these cases, the pulp and paper company provides potential construction firms with a bid package including flow sheets, generic equipment requirements, and construction standards. The construction firm has the responsibility to solicit proposals on equipment and make the actual purchases. Often a consulting engineering firm is hired by the contractor to make technical evaluations and purchasing recommendations. Since the majority of the design/construct bid procedures are



awarded to the low bidder, purchases of equipment are also based on price or a unique compatibility with the other equipment. Design/construct projects are presently limited to large capital expenditure projects, but it is expected that the trend to this type of contract will expand.

#### Identification of Purchasers

There are various directories which identify industry personnel by job classification that will assist manufacturers to direct their marketing programs. Lockwood's Directory of the Pulp and Paper Industry mentioned earlier provides a list of personnel by plant, by title, and mailing address, and is as up-to-date as the mill responses to the annual questionnaires. A second source of personnel information is the annual Technical Association of the Pulp and Paper Industry (TAPPI) Membership Directory. This includes only those persons who are members of TAPPI, but that association is probably the most prominent in the industry. Paper Industry Management Institute also publishes a membership directory which can be a useful document for preparing mailing lists.

A list of industry personnel who are directly in charge of long range planning that might not be readily apparent from the directories above is included as Appendix 3.

#### Evaluation of Product Selection Criteria

The motivation to purchase capital equipment is highly influenced by the parameter that the pulp and paper industry is essentially a continuous process. The industry is one of the most capital intensive per employee in the United States. The continuous process design and large capital investment lead to unusually high overhead costs per operating hour or produced product tonnage. Any firm that intends to market capital equipment or services to the pulp and paper area must fully understand the impact of the proposed new product on productivity and profits.

As part of this study, industry personnel were questioned as to what features or characteristics influence their decision to select one product or service over another. For raw materials and commodity items, price and reliable delivery were the total criteria. For capital equipment the selection is more complicated, as usually there are significant differences in products which do not allow them to be directly substitutable, and that could have major effects on process and profits that will be generated.

The number one attribute that mill personnel are looking for in capital equipment is reliability. The result of the industry capital intensivity and high overhead costs is that paper machine down time or off quality paper production represent major losses. Industry personnel also interpret reliability as product consistency from shipment to shipment. It is not uncommon for a mill to



select a more consistent quality manufacturer over one that produces occasional superior results, but has a wide range of quality. The bottom line is that suppliers with the highest reliability will obtain and maintain the dominant market shares.

All equipment sold in the pulp and paper industry typically carries some type of manufacturer's warranty as evidence of confidence of performance. There is not within the industry a standard length of time that the warranty is in effect or even when the warranty commences. Some manufacturers start the warranty period immediately upon shipment, whereas others specify that the warranty begins either after start-up or after some maximum length of time from date of shipment. The length of time that a piece of equipment is covered under warranty can vary from thirty days to in excess of a year. The most common is a warranty for one year that covers both replacement parts and replacement labor for that specific piece of equipment, including any third party components purchased and supplied by the base manufacturer. Because there is no standard warranty, a new manufacturer can utilize an attractive warranty as a marketing tool.

The second most important selection factor was technical service. Since paper mills operate twenty-four hours per day throughout the year, mill personnel place a high value on the routine servicing and troubleshooting by the manufacturer after the initial sale, and also the time factor to receive replacement parts and/or a serviceman after a failure. Many U.S. suppliers utilize sales engineers or train their manufacturers' representatives to perform routine servicing and in some cases even emergency repairs to improve their response time. Any supplier, particularly one attempting to market into a new area, must be able to demonstrate how he intends to service his equipment and respond to emergency calls.

A third important characteristic that influences buyers is technical innovation. It will be extremely difficult for a supplier to sell completely new technology to the pulp and paper industry as, on a whole, mill personnel are not willing to be a guinea pig. On the other hand, mill personnel said they preferred suppliers who not only can deliver a reliable product but also continually research methods to improve their product. This situation makes it important that a supplier be able to produce a user's list with references to demonstrate the product's competency.

Quick delivery was another important factor, particularly for commodity type products. The recent economic conditions have caused the majority of the industry to reduce investment in operating supplies and spare parts. The pressure is now on suppliers to maintain inventories in local warehouses as there is now minimum timing available to insure continued mill operation. A trend that has developed has been for mills to enter into a continuous replacement order basis with suppliers to insure consistency of supply.

Ranked lowest among selection criteria except for commodity materials was price. When all other factors are equal, the lowest price is chosen.



## Marketing Methods in the Pulp and Paper Industry

### Current Marketing Channels

The primary goal of any marketing program is to develop client product awareness, establish a desire to purchase, and create and maintain a preference for that product or service. The three basic marketing channels that are currently utilized in the pulp and paper industry are: direct sales or technical service group, manufacturers' representatives, and stocking distributors. The manufacturing representative generally sells a variety of unrelated products, whereas the distributor normally handles a line of related products.

The most prevalent marketing channel in the pulp and paper industry for major equipment is the direct sales force or technical service group. For many small equipment manufacturers staffing, training, and payment of travel expenses of a sales force is prohibitive. The alternative is to utilize manufacturing representatives. There are several types of manufacturers' representatives and they have varying degrees of ability to contact mill personnel. Equipment firms normally represent manufacturers of mechanical components and operating supplies and are very effective in contacting operating superintendents and mill engineering departments as well as having secondary contacts with technical departments. Chemical specialty firms normally maintain strong contacts with mill technical and research and development departments while having only occasional client contact with engineering and the operating superintendents. General manufacturing representatives tend to sell only storeroom items and other products where the purchasing agent is the dominant buying decision maker. There is no complete directory listing manufacturers' representatives with a definition of their services from which an equipment manufacturer can select a marketing representative. One possible source, however, is the November issue of Pulp and Paper Magazine which annually includes a Buyers Guide and provides a fairly complete listing of suppliers and sales representatives. The representatives would have to be interviewed to determine their specialties and applicability to a manufacturer's needs.

### Advertising

The second method of reaching potential clients is through advertising in magazines and, when combined with the personal contact of the salesmen or manufacturers' representatives, it is an effective marketing tool. The purpose of advertising is to increase reader awareness of the product; therefore, it is extremely critical to select those periodicals which reach the desired readership. A list of trade journals and periodicals published within the industry is included in Appendix 4.

Direct mailing is another method utilized by manufacturers to distribute technical and promotional literature to large numbers of potential buyers. The problem again is to identify those persons who should receive mailers. Because it can be directed, direct mailing can be more effective than trade journal advertising. Various mailing lists can be purchased for sales programs or the supplier can prepare his own from various directories.

## Trade Shows

Industry trade shows are an effective method of introducing new products and services to large numbers of potential clients in a short period. The commitment to participate in a trade show must consider the costs of transporting equipment and/or displays to the site, renting of space, and extensive involvement of salesmen and other key personnel. A secondary benefit of participating in a trade show is that it provides an opportunity to inspect competitive equipment and technology.

During the recent economic recession, most companies restricted the travel authorizations of their personnel, particularly for attendance at seminars and trade shows, which reduced the shows' effectiveness. With the current recovery, attendance levels at such exhibits are forecasted to return to normal levels. Senior industry personnel recognize that trade shows are one of the best sources of becoming aware of the latest technological advances and also permit a physical inspection of equipment in a short time frame.

It is common practice for suppliers to sponsor hospitality suites at national or even regional professional meetings. The suites permit a more relaxed meeting area for one-on-one presentations to selected clientele. The organization of a hospitality suite is extremely critical to insure success. The suite should be located at or at least close to the main meeting site, and large enough for the intended numbers. Potential clients can be invited by mail and provide confirmation of attendance.

The largest pulp and paper industry trade show in the United States is sponsored by TAPPI and is held biannually at the World Congress Center in Atlanta, Georgia. The most recent TAPPI show had approximately 7500 visitors over a four day period despite the travel restrictions and cost reductions caused by economic conditions. The next show is scheduled for 2-5 March 1986, and TAPPI has already commenced taking reservations from exhibitors. The cost to exhibit is \$15 per square foot with a minimum exhibit size of 100 square feet (9.3 square meters). This rental cost includes lighting, utilities, and security. TAPPI provides extensive advertisement of the show to all its membership, other industry associations and to the press and news media. An analysis was made of the visitors attending the last show. Of the 7500 persons in attendance, 17% were in corporate management and 27% were either mill managers or superintendents. Another 25% were involved in mill engineering or technical services, so the potential to reach purchasing decision personnel was exceptional even in poor economic times. Further information and applications for the TAPPI show can be obtained from Larry Singleton, Exhibits Manager TAPPI 86, Technology Park, P. O. Box 105113, Atlanta, Georgia 30348. TAPPI also sponsors a smaller, specialized show specific to the corrugated container industry, and which is held concurrently with the biannual technical conference of TAPPI's Corrugated Containers Division.



There are several other small, specialized technical trade shows which appeal to limited personnel. The Instrument Society of America sponsors an annual exposition for process controls. Details for this show can be found in Control Engineering Magazine or Intech Magazine listed in Appendix 4.

Calendars of other small shows with their sponsors are contained in all the major trade journals.

#### Customer Seminars

Another method of contacting groups of personnel that has been utilized to a limited degree is to conduct a seminar at the client's mill, corporate office, technical center, or even at a nearby motel. These seminars are effective in approaching multiple personnel from a single company and eliminate the restriction of required travel to a trade show.

#### Professional Associations

By far, the Technical Association of the Pulp and Paper Industry (TAPPI) is the largest professional association servicing the pulp and paper industry. TAPPI estimates the current membership is approximately 25,000 members, consisting of all levels of supervision, operation, and suppliers. TAPPI offers essentially two types of memberships. The first is an Individual Membership at a cost of \$40 that includes a subscription to the monthly TAPPI Journal, reduced registration costs to conferences and seminars, reduced prices for technical books, and potential for participation on any of the eighty technical committees organized by TAPPI (Appendix 5). The second type of membership is a sustaining member which is available to firms which engage in the manufacture of pulp and paper or the supply of raw materials, equipment, or services to the industry. The cost is \$500 per year which includes product listing in TAPPI's Membership Directory, reduced fees for participation in conferences and seminars, employee training, and access to technical data and preferred treatment at the annual conference. TAPPI sponsors an annual meeting in February or March of each year and also functional conferences in the spring and fall.

A second professional association that has membership from the pulp and paper industry is the Paper Industry Management Association (PIMA). This association tends to be more restricted to operating personnel so the membership totals are less than TAPPI. The individual membership costs are \$40 per year. PIMA publishes the PIMA Magazine and sponsors some seminar and training conferences. Information on membership can be obtained from Membership Director, PIMA, 2400 East Oakton Street, Arlington Heights, Illinois 60005.



An even more specialized association is the Instrument Society of America, which includes persons interested in instrumentation and process controls. Membership in the society costs \$35 per year and includes a subscription to the magazine Intech. ISA sponsors an annual conference and exhibit in October and also symposiums directed at specific industries or topics. It should be noted that the society membership is not specific to the pulp and paper industry. Information on membership should be requested from Instrument Society of America, P. O. Box 3561, Durham, North Carolina 27702.

#### Evaluation of Current Marketing Techniques

Sandwell asked numerous industry personnel what they thought are the most effective marketing methods for selling equipment and services to them, and also the least effective. The following paragraphs summarize their comments.

There is no question that direct supplier/client contact through regular sales calls was rated the most effective marketing approach. Clients did not make any distinction between the effectiveness of direct salesmen versus manufacturers' representatives or distributors provided the contact was fully knowledgeable about the product and could effect emergency response if necessary. Several persons said that they had changed purchasing decisions after having seen warehousing facilities for stocking spare parts, etc. that confirmed the supplier's intent to back up his product. The critical factor is that the sales force must identify those persons who can make or influence purchasing decisions. Clients object to salesmen wasting their time when they are not involved in the purchase of that product. The clients said that the regularity and frequency of the sales call was also important. They stated that the effective frequency was at least once per quarter for capital equipment, more frequently for commodity items, and by the same sales representative.

The effectiveness of advertising in trade journals as a marketing tool is extremely dependent on readership of the selected journal and that it reaches the targeted personnel. The TAPPI Journal and Pulp & Paper Magazine were the two general interest journals that the surveyed personnel of all disciplines said they regularly read. Instrument personnel said they all read Intech, the Instrument Society magazine. Direct mailings also have the same problem of identification; however, the literature or promotional material is more likely to reach the targeted individuals.

Trade shows are an effective method of introducing new products to large numbers of persons and also of demonstrating equipment in the presence of competitive products. Clients like shows because they permit them in a relaxed atmosphere to put their hands on the equipment and ask technical questions. The effectiveness of the exhibit is highly dependent on the material content of the exhibit and the personnel manning the booths. Potential customers prefer to see live demonstrations and displays rather than static displays. The utilization of operating models is also effective to induce people to enter the booth. The personnel manning the exhibit should be highly knowledgeable concerning the product and there should be sufficient personnel to handle surges of visitors



arriving at the same time. The location of the exhibit in relation to the general traffic patterns is also a factor in the effectiveness of the exhibit. Those on the periphery are less likely to be found than those closer to the center. The location assignments are generally on a first-come basis, so it is important to reserve space early -- normally immediately after the current show. Absence of a supplier from a trade show has a negative connotation from potential clients.

Most mill personnel and corporate staff favorably considered supplier seminars, as it reduces the time requirement for personnel attending and also that no transportation costs were involved. These seminars tend to get a high percentage of interested persons in attendance, particularly those that have purchasing authority. The most effective presentation given in the mill environment appears to be a single supplier exhibit of one hour in duration. For presentations given off site in conjunction with drinks or supper, the program can be divided between two or three suppliers, but the presentations should be shortened to 45 minutes with adequate breaks between suppliers. The presentations should precede the refreshments to maintain the attention span of the participants. It is important to obtain the assistance of a key person in the mill or company to assist in preparing the invitations to the seminar and to promote attendance.

#### Tariff Regulations

The importation of Canadian equipment into the United States is subject to import duties according to the Tariff Schedule of the United States (TSUS). Pulp and Paper Machinery is generally classified under the TSUS, Schedule 6 (Metal and Metal Products), Part 4 - Machinery and Mechanical Equipment, Subpart D (Pulp and Paper Machinery). Table 7 is a summary of those TSUS provisions and identifies specific tariff rates as well as the corresponding scheduled duty rate reductions that have been negotiated with the United States. The rates of duty are relatively low and therefore are not a factor in the salability of Canadian goods in the U.S.





Table 7. Summary of Provisions of TSUS Schedule 6, Part 4 Subpart D

<u>Classification</u>	<u>Title</u>	(percent Rates of Duty by Year ad.val.)			
		<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>
668.00	Machines for making cellulosic pulp, paper or paperboard	1.3%	0.9%	0.4%	free
668.02	Machines for processing or finishing pulp, paper, or paperboard or making them into articles	3.1	2.8	2.4	2.0
668.04	Bed plates, roll bars, and stock treating parts for pulp or paper machines	5.6	5.3	5.0	4.7
668.05	Yankee dryer cylinders	free	free	free	free
668.06	Parts of machines for making cellulosic pulp, paper or paperboard	1.3	0.9	0.4	free
668.07	Other parts of machines in TSUS item 668.02	3.8	3.5	3.3	3.0



## CONCLUSIONS

The purchasing motivations of pulp and paper industry personnel have been discussed earlier. The Canadian manufacturer that desires to penetrate the market in the southeastern United States must demonstrate a credibility that his product first of all has the serviceability and reliability to be utilized in the southeastern pulp and paper industry, but also that the manufacturer is capable of the required technical servicing and spare parts backup. The first question that a supplier must be ready to respond to is where the product has been operating or why the supplier recommends that the product be tested. Movies, slides, or pictures of the product in service are effective to overcome a potential purchaser's concerns. A reference list of users of the product is also important. Secondly, the supplier should positively identify how he will service the equipment. Several clients said they preferred to meet the servicemen that will be utilized and possibly inspect the warehouse of spare parts. Finally, the supplier must prove his confidence in the product by offering an attractive warranty. Since most components interact within a process, the failure of a single component may cause a paper machine or section of the mill to shut down. The high overhead costs make downtime of portions of a mill extremely costly. A supplier must, therefore, consider the total effect of a failure of his product when composing his warranty. Clients feel that the length of the warranty is also indicative of the confidence a supplier has in his product, so the longer the warranty period the better.

The strongest marketing recommendation that Sandwell can make from this study is that Canadian suppliers who desire to market their products in the South should join TAPPI, the largest professional association in the pulp and paper industry, and participate in TAPPI's multiple programs and conferences. The participation will provide suppliers access and recognition from a broad range of industry personnel and reduce the problems of identifying purchasing influencing personnel. Other associations to be considered are PIMA and the Instrument Society of America.

The desirability of customer seminars dictates the suppliers should attempt to utilize this effective marketing approach whenever possible. Sandwell recommends that this seminar concept should be expanded further to include participation in the programs and paper submissions to the TAPPI and PIMA sponsored conferences or committee meetings. These conferences are generally organized by mill area or subject. The advantage of participating in such programs is that the persons attending will all have an interest in the specialized topic and will probably have some purchasing decision authority. TAPPI is further organized into sections which sponsor quarterly meetings or conferences. These generally have a special subject for each meeting, but the persons attending will have more general interests than the national meetings. The organizers attempt to maintain a balance between supplier and mill sponsored papers/presentations. This should not be a problem for a manufacturer if he can work with a mill person in joint authorship of a paper or presentation. A summarized list of the TAPPI Divisions and Committees is contained in Appendix 5. Also, a list of TAPPI Annual Meetings and Conferences for the next four years is shown in Table 8.



With the increasing trend toward turnkey design-construct projects in the pulp and paper industry, more purchasing is being done by construction firms. Sandwell recommends that the concept of seminars be also utilized to contact consulting engineering firms and major construction firms. Even though the purchasing decision generally weighs heavily on price because of the competitive bidding, the manufacturer can stress such things as ease of construction or higher state of shop fabrication that will be of interest to a contractor. Consultants tend to be willing to listen to new suppliers and technology as it affects their design. Also, the scope of required engineering required from the supplier has increased because of the technology involved, which then requires considerable interface in the design phase. Consultants are a good source of entry onto bidders lists and prequalifying lists.

Of all the marketing approaches reviewed, the direct sales representative, or at least a manufacturing representative, to meet one-on-one with purchasing decision making personnel in the mill's and in corporate management is acknowledged to be the most effective method of selling. The salesman or representative must be fully qualified from a technical sense and capable of representing the manufacturer. It is preferable to utilize sales persons who have lived in the South and who are familiar with the customs and can speak the language. Another advantage of using persons who are already in the geographic area and/or the pulp and paper industry is that they will already have a list of client contacts on which to draw. The importance of directing the marketing program to the decision making individuals has been stressed. Several directories (Lockwood's, TAPPI Membership Directory, and Paper Industry Management Association - PIMA) have been referenced in this report as the best sources of personnel identification. If the names of management personnel are not available, the identification of those generic management positions which have purchasing authority has been discussed herein.

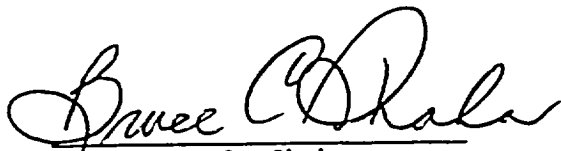
Advertising in trade journals also provides product recognition but cannot insure positive client contact. It is important that the correct medium is selected to obtain the desired readership. The photographic content of any advertising campaign should emphasize action photos of the product, preferably in a mill situation. Secondly, the editorial content should stress the reliability of the product in the industry and utilization in particular plants. Direct mailing is also an effective method of distributing literature to selected personnel and is useful in supplementing normal advertising and technical publicity. All the professional associations will sell their membership lists, and also attendance records from seminars and conferences which should be utilized by suppliers to prepare mailings. Another possibility that has been overlooked is the mailing of technical articles or papers presented at conferences to potential clients who have not attended the conference.




The final major recommendation is that suppliers should participate in the bi-annual TAPPI Equipment Show because the show draws the largest attendance of any show in the industry, and is the most effective method of introducing a new supplier's products or services. The effectiveness of a show is highly dependent on the supplier's exhibit content and the quality of the personnel manning the booths. It is extremely important that live demonstrations or displays are utilized and that the displays are significantly different from previous years. Further, a list of invitations should be mailed to the desired clientele that could be attending. Contacts made at the show should be quickly followed up by visits from sales personnel.

Although import tariffs will be assessed on Canadian goods entering the United States, they will not be a significant factor in marketing decisions. The favorable currency translation rate between the U.S. and Canadian dollar can more than offset the tariffs. A regular reduction of the tariff rates already has been negotiated which will further improve the situation.

Submitted by:

  
B. C. Shaha

  
W. L. Harrison

WLH/kss

Table 8. List of TAPPI Meetings and Conferences

# TAPPI ANNUAL MEETINGS AND CONFERENCES SCHEDULE

1984	1985	1986	1987	1988
<b>FEBRUARY/MARCH</b>				
25 840 Technical Management Symposium & Annual Meeting February 20-22 Washington, D.C./Capital Hilton	25 850 Technical Management Symposium & Annual Meeting March 4-7 New Orleans-Hilton	25 860 Technical Management Symposium & Annual Meeting March 2-5/Atlanta Georgia World Congress Center	25 870 Technical Management Symposium & Annual Meeting San Francisco	25 880 A Technical Management Symposium & Annual Meeting February 28-March 2/Atlanta Georgia World Congress Center
		TAPPI 86 EXHIB Atlanta Georgia World Congress Center		A TAPPI 88 EXHIB Atlanta Georgia World Congress Center
<b>APRIL</b>				
CA5092 Papermakers April 2-4 Atlanta Sheraton Atlanta	A Nonwovens April 15-18 Orlando, FL Hyatt Regency	CA12008 Papermakers April 14-18 New Orleans Marron	5094P Papermakers April 6-8 Atlanta Hyatt Regency	5095P Papermakers April 6-8 Atlanta Hyatt Regency
CA9076 Environmental April 9-11 Savannah Hyatt Regency Savannah	A Papermakers April 15-17 Denver	CA5093 Environmental 9088T	9087T Environmental	9087P Papermakers Chicago
	6388 International Chemical Recovery April 20-May 1 New Orleans Marron New Orleans	12012P Nonwovens April 6-10 Orlando, FL	12013T Nonwovens Nashville	A Environmental 9088T
	9077T Environmental			
<b>MAY</b>				
CA1340 Coating May 13-16 Nashville Ooryland Hotel	B International Mechanical Pulping May 6-11 Stockholm	1342P Coating May 4-8 Washington, D.C. Washington Hilton	A Coating May 17-21 Houston Hyatt Regency	A Coating 1350T
	1341P Coating May 20-23 Atlanta Hilton	A B CA6389 International Sulfite Pulping Quebec City		A International Pulp Bleaching
<b>JUNE</b>				
	B International Pulp Bleaching June 18-20 Quebec Chateau Frontenac, Quebec			
<b>AUGUST</b>				
	A B International Symposium Wood & Pulping Chemistry August 27-29/Vancouver, B.C. Hyatt Regency			
<b>SEPTEMBER</b>				
CA4337 Engineering September 17-20 Boston Sheraton	A CA2173 Polymers, Laminations, & Coatings September 9-11 Chicago Chicago Drake	A 2178P Polymers, Laminations, & Coatings September 15-17 Nashville Ooryland	A 2179T Polymers, Laminations, & Coatings September 14-18 Philadelphia	A 2180T Polymers, Laminations, & Coatings
A CA2172 Polymers, Laminations, & Coatings September 24-28 Boston Westin Copley Place	CA4457 Engineering September 16-19 Atlanta The Westin Peachtree Plaza	4458P Engineering September 22-25 Seattle The Westin	4459T Engineering New Orleans	A 4460T Engineering
A CA7124 Research & Development September 30-October 3 Aspen/Inn. W. Paper Valley Hotel				
<b>OCTOBER</b>				
CA10045 Finishing & Converting October 8-11 Savannah Savannah Hyatt	10048P Finishing & Converting October 6-10 Albany, NY Albany Hilton	10047T Finishing & Converting October 5-9	A Corrugated 3239T	A Corrugated 3240T
CA3231 Corrugated October 14-18 Atlanta Marron	CA3237 Corrugated October 13-17 Kansas City Hyatt Regency	3236T Corrugated October 19-23 Philadelphia	A 10048T Finishing & Converting Mobile, AL	A 10049T Finishing & Converting
B CA1426 International Printing & Graphic Arts October 23-25 Niagara Falls/Hilton		A International Printing & Graphic Arts October 20-22 Canada		A International Printing & Graphic Arts
<b>NOVEMBER</b>				
CA6289 Pulping November 12-14 San Francisco Hyatt Regency	CA6296 Pulping November 3-7 Hollywood, FL Diplomat	A 6297T Pulping	6296P Pulping November 1-5 Washington, D.C. Washington Hilton	A 6299T Pulping

## EVENTS

Events listed in boldface are conducted by ISA. For details, contact ISA, PO Box 12277, Research Triangle Park NC 27709; 919/549-8411. See ISA Advance Calendar on page 96 for future Society events.

**Event** **Format**

• **September 10-12** **Symposium**  
**Industrial Temperature Measurement Symposium, Knoxville TN. Dr T W Kerlin, Measurement and Control Program, Perkins Hall, The University of Tennessee, Knoxville TN 37996; 615/974-5048.**

• **September 10-12** **Short Courses**  
**Process Plant Start-Up, Houston TX (5730); Control Valve Technology, Houston TX (5790). General Information, PO Box H, East Brunswick NJ 08816-0257; 201/238-1600.**

• **September 10-13** **Conference**  
**10th Annual Advanced Control Conference, West Lafayette IN. E J Kompass, Control Engineering, 1301 S Grove Ave, PO Box 1030, Barrington IL 60010; 312/381-1840.**

• **September 10-13** **Short Course**  
**19th Annual Gulf Coast Gas Measurement Short Course, Houston TX (540). Jerry Blankenship, Daniel Industries, PO Box 19097, Houston TX 77224; 713/467-6000.**

• **September 10-14** **Short Course**  
**Fundamentals of Industrial Measurement & Control, ISA Training Center, Raleigh NC (5880; ISA members, 5850).—ISA.**

• **September 10-14** **Short Course**  
**Pneumatic Instrument Service, ISA Training Center, Raleigh NC (5880; ISA members, 5850).—ISA.**

• **September 10-14** **Short Course**  
**Engineering Applications of Personal Computers, Knoxville TN. Dr T W Kerlin, 124 Perkins Hall, University of Tennessee, Knoxville TN 37996; 615/974-5048.**

• **September 10-14** **Short Course**  
**Signal Processing Technology and Its Applications, Knoxville, TN. B R Upadhyaya, Dept of Nuclear Engineering, Nuclear Engineering Bldg, The University of Tennessee, Knoxville TN 37916; 615/974-5048.**

• **September 11-12** **Short Course**  
**Human Factors in Man-Machine Interface, Birmingham AL (5385; ISA members, 5550).—ISA.**

• **September 11-13** **Conference**  
**11th International Committee of the IMEKO Technical Committee 2: Photon Detectors, Weimar, East Germany. Photon Detectors '84, Humboldt-Universität zu Berlin, Sektion Physik 03, Prof Dr K H Herrmann, DDR - 1086, Berlin, PSF 1297.**

• **September 11-14** **Conference**  
**Tenth International Conference of the IMEKO Technical Committee TC-3 on Measurement of Force and Mass: Recent Advances in Weighing Technology and Force Measurement, Kobe, Japan. IMEKO TC-3, M Namiki, Society of Instrument and Control Engineers, 35-28-303, Hongo 1-chome, Bunkyo-ku, Tokyo, 113 Japan.**

• **September 11-21** **Short Course**  
**Interregional Training Course on Ensuring Measurement Accuracy, Seibersdorf, Austria. IMEKO Secretariat, 1371 Budapest, POB 457, Hungary; telex: 225792 mtesz h.**

• **September 12-14** **Short Course**  
**Microprocessor Fundamentals, New Orleans LA (5530; ISA members, 5495).—ISA.**

• **September 12-14** **Short Course**  
**Introduction to Distributed Process Control Systems, New Orleans LA (5495; ISA members, 5460).—ISA.**

• **September 12-December 7** **Seminars**  
**Stack Sampling and Particle Sizing Seminars, September 12-14, Denver CO, October 15-19, Gainesville FL, December 5-7, Pittsburgh PA (5595, 3-day Stack Sampling and Particle Sizing seminar; 5395, 3-day Stack Sampling and Particle Sizing seminar; 5340, 2-day Stack Sampling seminar; and 5150, 1-day Particle Sizing seminar). R P Ford, Andersen Samplers Inc, 4215 Wendell Dr, Atlanta GA 30336; 404 691-1910.**

• **September 17-20** **Conference**  
**1984 TAPPI Engineering Conference, Boston MA (before August 17, \$240, TAPPI members, \$160; on-site, \$315, TAPPI members, \$210). Meetings Dept, TAPPI, Technology Park, Atlanta, PO Box 105113, Atlanta GA 30348; 404 446-1400.**

• **September 17-21** **Short Course**  
**Electronic Instrument Service, ISA Training Center, Raleigh NC (5880; ISA members, 5850).—ISA.**

• **September 17-21** **Short Course**  
**Industrial Automation & Control, ISA Training Center, Raleigh NC (5880; ISA members, 5850).—ISA.**

• **September 18-20** **Exhibit**  
**1984 Chem Pro Show, Cincinnati OH. Reber-Friel Co, Exposition Management, 216 Goodard Blvd, King of Prussia PA 19406; 215-265-0825.**

• **September 18-21** **Conferences**  
**Sixth Hungarian Conference on Biomedical Engineering and Second IMEKO Conference on Measurement in Clinical Medicine, Balatonfured, Hungary. IMEKO Secretariat, 1371 Budapest, POB. 457, Hungary.**

• **September 24-26** **Short Course**  
**Basic Principles of Boiler Control, Akron OH (5495; ISA members, 5460).—ISA.**

• **September 24-27** **Short Course**  
**Fundamentals of Industrial Measurement and Control, ISA Training Center, Raleigh NC (5595; ISA members, 5560).—ISA.**

• **September 24-28** **Short Course**  
**Advanced Industrial Automation & Control, ISA Training Center, Raleigh NC (5880; ISA members, 5850).—ISA.**

• **September 25-27** **Conference & Exhibit**  
**International Industrial Controls Conference & Exposition, Philadelphia PA. Tower Conference Management Co, 331 W Wesley St, Wheaton IL 60187; 312-668-8100.**

• **September 26-27** **Short Course**  
**Boilers, Pressure Vessels, and Piping, Newfoundland, Canada. Hira N Ahuja, Continuing Engineering Education Centre, Memorial University of Newfoundland, St John's, Newfoundland, Canada A1B 3X5; 709/737-7467.**

• **September 26-December 6** **Short Courses**  
**Advanced Distillation Control, September 26-28; Estimating Benefits for Computer Control, October 17-19; Advanced Computer Control Techniques, November 7-9; and Advanced Oil Fractionation Control, December 4-6 (Houston TX). Setpoint Inc, Technicenter, 950 Threadneedle, Suite 200, Houston TX 77079; 713-496-3220.**

• **October 1-5** **Short Course**  
**Control Systems Troubleshooting, ISA Training Center, Raleigh NC (5880; ISA members, 5850).—ISA.**

• **October 1-5** **Short Course**  
**Temperature Measurement Systems, ISA Training Center, Raleigh NC (5880; ISA members, 5850).—ISA.**

• **October 8-10** **Conference**  
**Association for Computing Machinery 1984 Annual Conference, San Francisco CA. ACM-84, The Fifth Generation Challenge, PO Box 32573, San Jose CA 95152; 415/945-6306.**

• **October 8-12** **Short Course**  
**Flow Measurement Systems, ISA Training Center, Raleigh NC (5880; ISA members, 5850).—ISA.**

• **October 9-11** **Conference**  
**16th National SAMPE Technical Conference, Albuquerque NM. SAMPE, PO Box 2459, Covina CA 91722; 818-331-0616.**

• **October 14-18** **Conference**  
**Quality Assurance in Air Pollution Measurements, Boulder CO. APCA, PO Box 2561, Pittsburgh, PA 15250; 412-621-1090.**

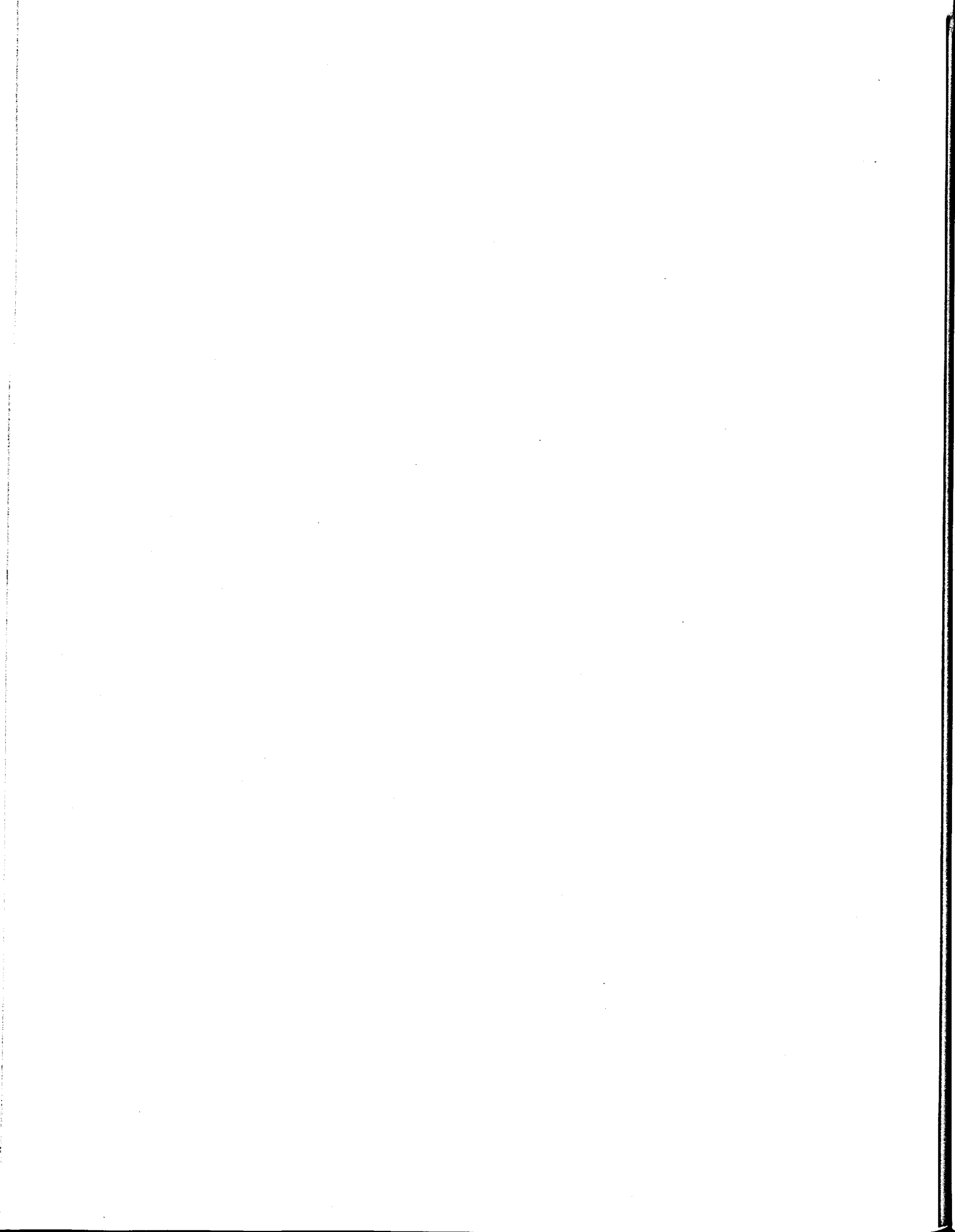
• **October 16-18** **Symposium**  
**IMEKO Technical Committee 12 Second Symposium on Temperature Measurement in Industry and Science, Suhl, East Germany. Doz Dr-Ing F Bernhard, Technische Hochschule Ilmenau, DDR - 6300 Ilmenau.**

• **October 29-November 2** **Short Course**  
**Instrument Installation Practices, ISA Training Center, Raleigh NC (5880; ISA members, 5850).—ISA.**

• **October 30-November 1** **Exhibit**  
**Electronic Test and Measuring Instrumentation Exhibition, London UK. British Information Services, 845 Third Ave, New York NY 10022; 212-752-8400.**

• **October 30-November 1** **Seminar**  
**Instrument and Control Installation, Atlanta GA (5600). E G Bailey Training Center, 2882 Cricket Lane, Willoughby Hills OH 44092; 216-943-5533.**

• **October 31-November 2** **Symposium**  
**IEEE 1984 Symposium on Nuclear Power Systems, Orlando FL. B M Rice, Duke Power Co, PO Box 33189, Charlotte NC 28242; 704-373-4516.**

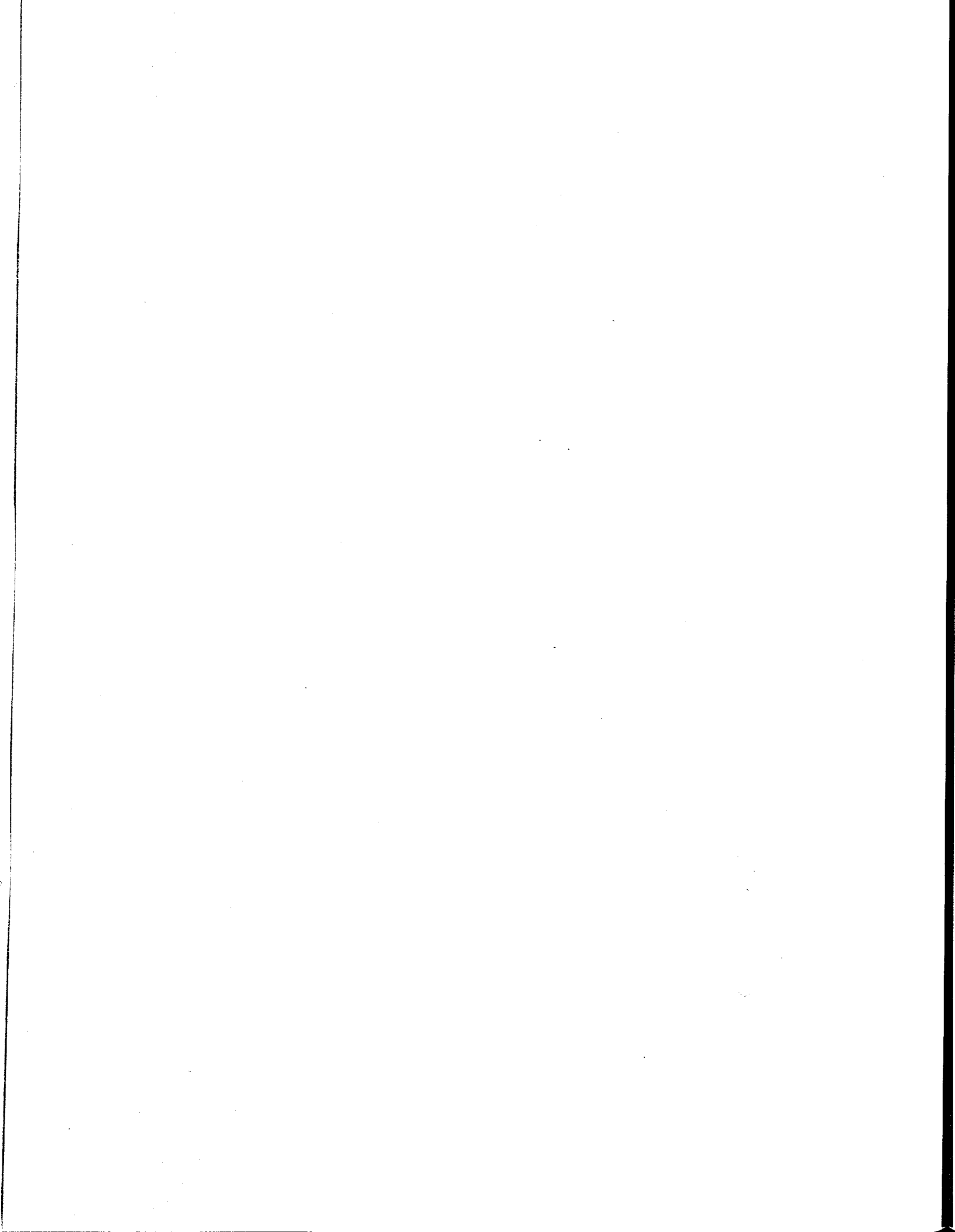




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REPORT G6879/1  
MARKETING STUDYDEPARTMENT OF EXTERNAL AFFAIRS  
OTTAWA CANADAMARKETING STUDY OF CANADIAN PULP AND  
PAPER MILL MACHINERY AND EQUIPMENT  
IN THE SOUTHEASTERN UNITED STATESAPPENDIX 1 - GLOSSARY OF TERMS

annum or year	A
board feet	BF
biochemical oxygen demand	BOD
ords (128 cu ft)	cds
cubic feet	cu ft
days	D
diameter at breast height	dbh
etcetera	etc.
feet	ft
feet per minute	fpm
figure	fig.
gallons	gal
horsepower	hp
hours	h
inches	in.
kilowatt hour	kWh
maximum	max
million British thermal units	MB
million cubic feet	MCF
million board feet	MMBF
minimum	min
minutes	min
months	mo
number	no.

GLOSSARY OF TERMS

percent	%
pounds per lineal inch	PLI
square feet	sq ft
square inches	sq in.
thousand board feet	MBF
tons per year	TPA
tons per day	TPD
United States	U.S.
yards	yd
years	yr

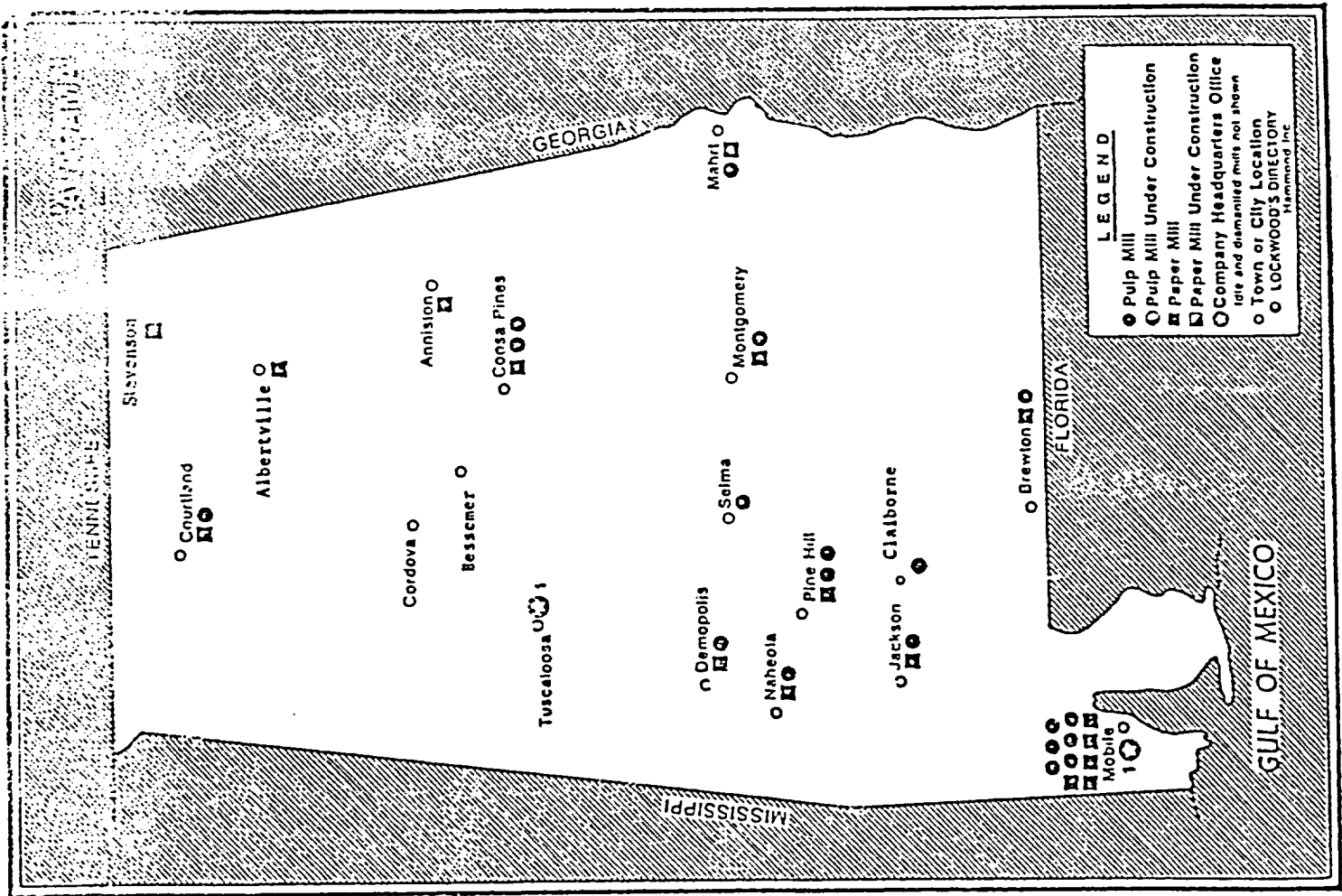
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OTTAWA CANADAMARKETING STUDY OF CANADIAN PULP AND  
PAPER MILL MACHINERY AND EQUIPMENT  
IN THE SOUTHEASTERN UNITED STATESAPPENDIX 2 - LIST OF PULP AND PAPER MILLS BY STATEALABAMA

Keyes Fiber Co.	Albertville	Formed plates and dishes
National Gypsum Co.	Anniston	215 TPD gypsum board
Container Corporation of America	Brewton	1100 TPD bleached and coated foodboard, unbleached linerboard
Alabama River Pulp Co.	Claiborne	1000 TPD bleached hardwood and softwood kraft pulp
Kimberly-Clark Corp.	Coosa Pines	1165 TPD newsprint and groundwood printing paper 420 TPD bleached kraft market pulp
Champion International Corp.	Courtland	1550 TPD offset, envelope, bond, tablet, copy papers
Gulf State Paper Corp.	Demopolis	500 TPD coated and uncoated foodboard
Allied Paper Inc.	Jackson	220 TPD bond, envelope, tablet, writing 380 TPD bleached kraft market pulp
Alabama Kraft Co.	Mahrt	1100 TPD containerboard, coated unbleached board
GAF Corporation	Mobile	120 TPD roofing felt
International Paper Co.	Mobile	1001 TPD MF and MG unbleached, semi-bleached and bleached kraft wrapping and converting paper 343 TPD newsprint

LIST OF PULP AND PAPER MILLS BY STATEALABAMA, continued

National Gypsum	Mobile	350 TPD insulation board, sheathing, acoustical tile
Scott Paper Company	Mobile	750 TPD bond, printing, and business paper 750 TPD toilet and facial tissue, napkins and towelling
Stone Container Corporation	Mobile	162 TPD boxboard, lined manila
Union Camp Corporation	Montgomery	2120 TPD kraft linerboard
James River-Dixie/Northern Towel	Pennington	1000 TPD napkin, toilet tissue, cup stock, and packaging board
MacMillan Bloedel Inc.	Pine Hill	1250 TPD unbleached kraft linerboard 600 TPD corrugating medium
Hammermill Papers Group	Selma	1100 TPD bleached kraft market pulp

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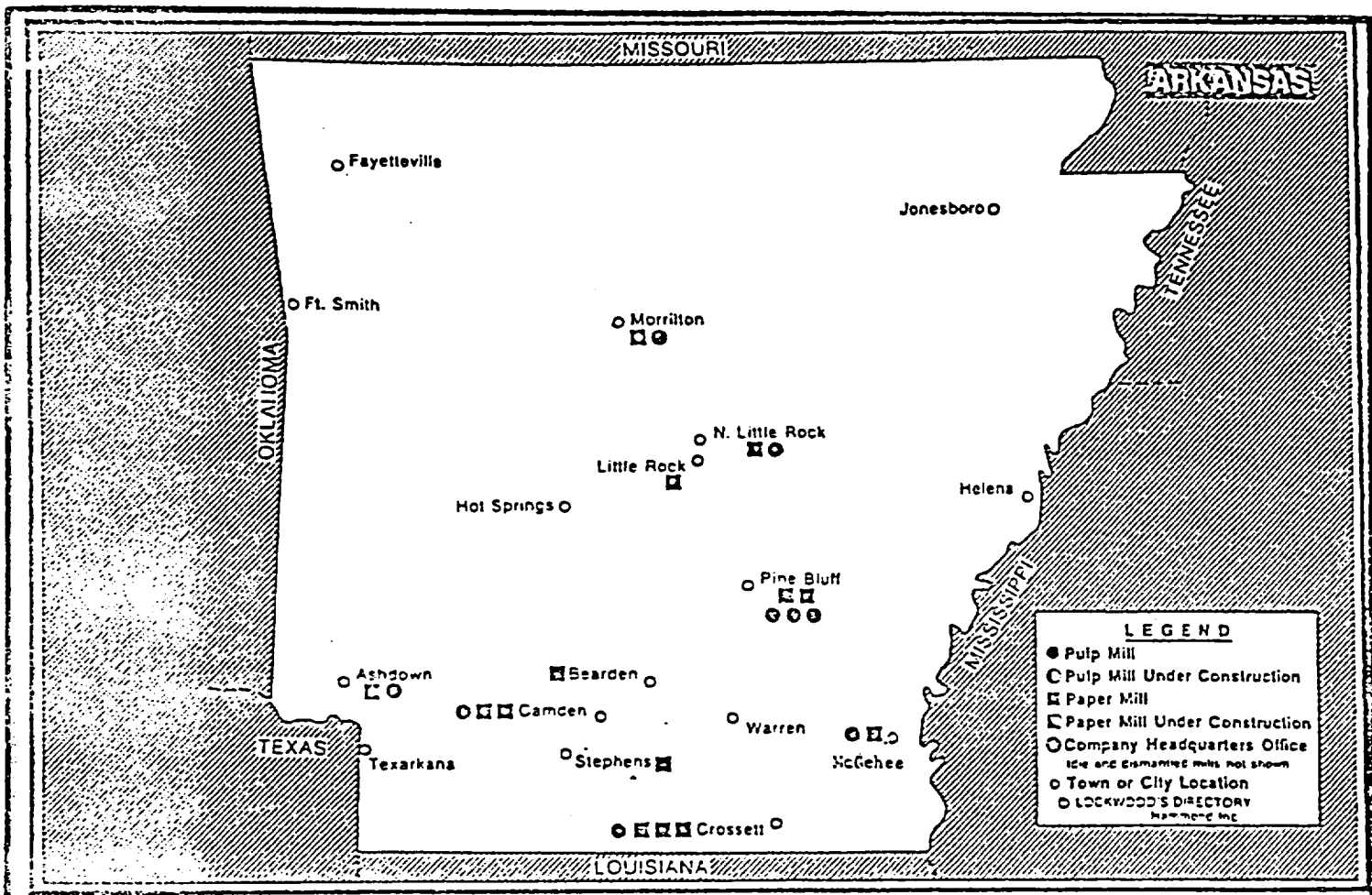


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LIST OF PULP AND PAPER MILLS BY STATE



ARKANSAS

Nekoosa Papers Inc.	Ashdown	1000 TPD offset, bond, envelope, tablet and copy papers
Celotex Corporation	Camden	35 TPD roofing felt
International Paper Co.	Camden	719 TPD unbleached MF kraft wrapping and extensible paper
Georgia-Pacific Corp.	Crossett	450 TPD kraft wrapping, sack 450 TPD foodboard, carton, plate 400 TPD bathroom and facial tissue
Potlatch Corporation	McGehee	500 TPH bleached kraft board and bleached linerboard
Arkansas Kraft Corp.	Morrilton	1075 TPD kraft linerboard
International Paper Co.	Pine Bluff	1065 TPD bleached kraft and poly coated board 520 TPD newsprint
Weyerhaeuser Co.	Pine Bluff	300 TPD multiwall bag and sack
Elk Corporation	Stephens	850 TPD roofing felt



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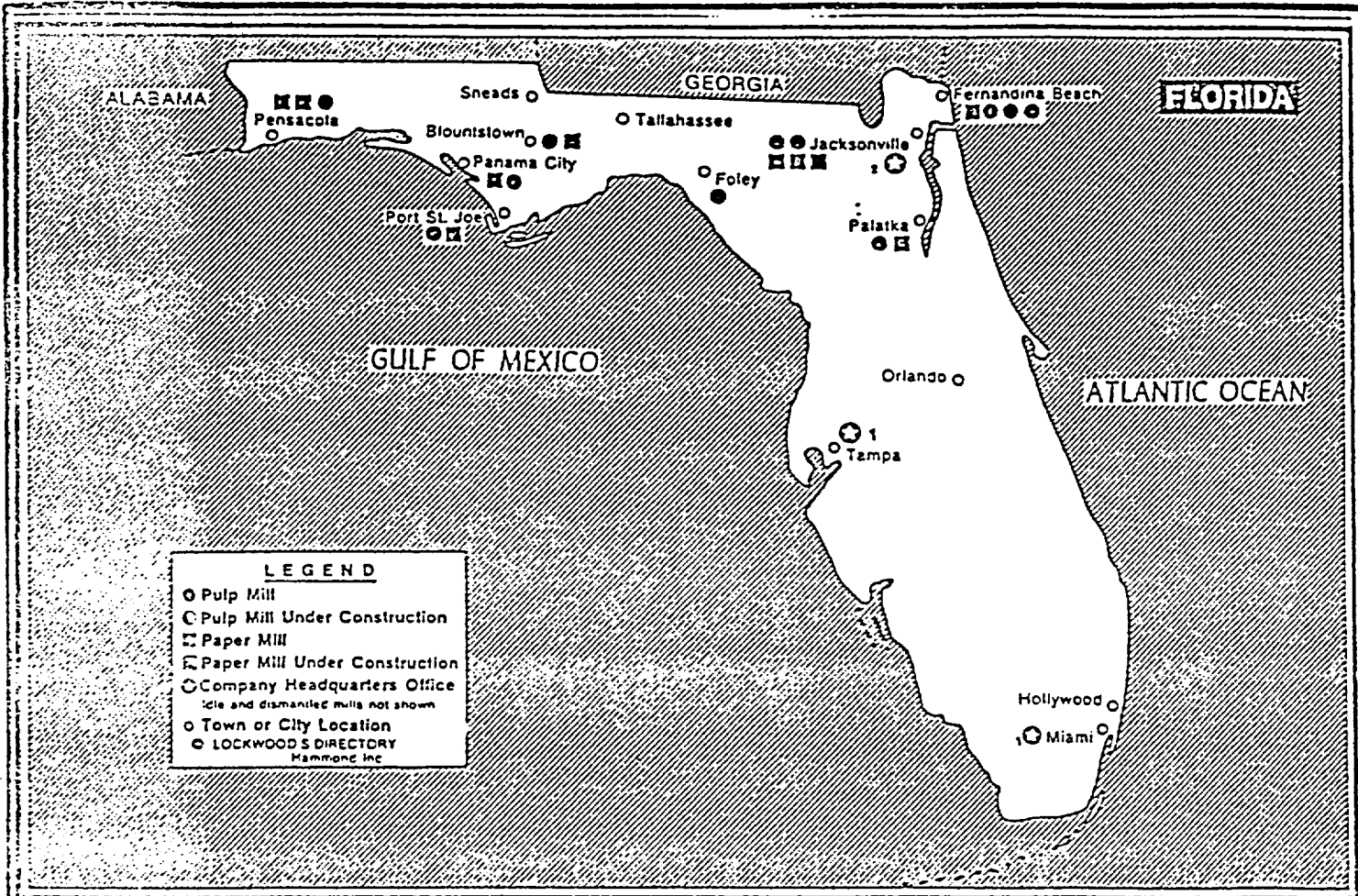
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LIST OF PULP AND PAPER MILLS BY STATEFLORIDA

St. Regis Corp.	Cantonment	1100 TPD kraft sack and linerboard 275 TPD cup and foodwrap
Container Corporation of America	Fernandina Beach	1850 TPD unbleached kraft linerboard
ITT Rayonier Inc.	Fernandina Beach	450 TPD bleached sulphite dissolving and market pulp
Buckeye Cellulose Corp.	Foley	1200 TPD bleached sulphite dissolving and market pulp
Alton Packaging Corp.	Jacksonville	800 TPD kraft linerboard
Jacksonville Kraft Paper Co.	Jacksonville	1400 TPD kraft wrapping, bag, and linerboard
U.S. Gypsum Co.	Jacksonville	190 TPD gypsum board
Georgia-Pacific Corp.	Palatka	600 TPD kraft bag 370 TPD facial and toilet tissue 200 TPD bleached hardwood pulp
Southwest Forest Industries	Panama City	800 TPD kraft containerboard 650 TPD kraft pulp
St. Joe Paper Co.	Port St. Joe	1200 TPD kraft linerboard



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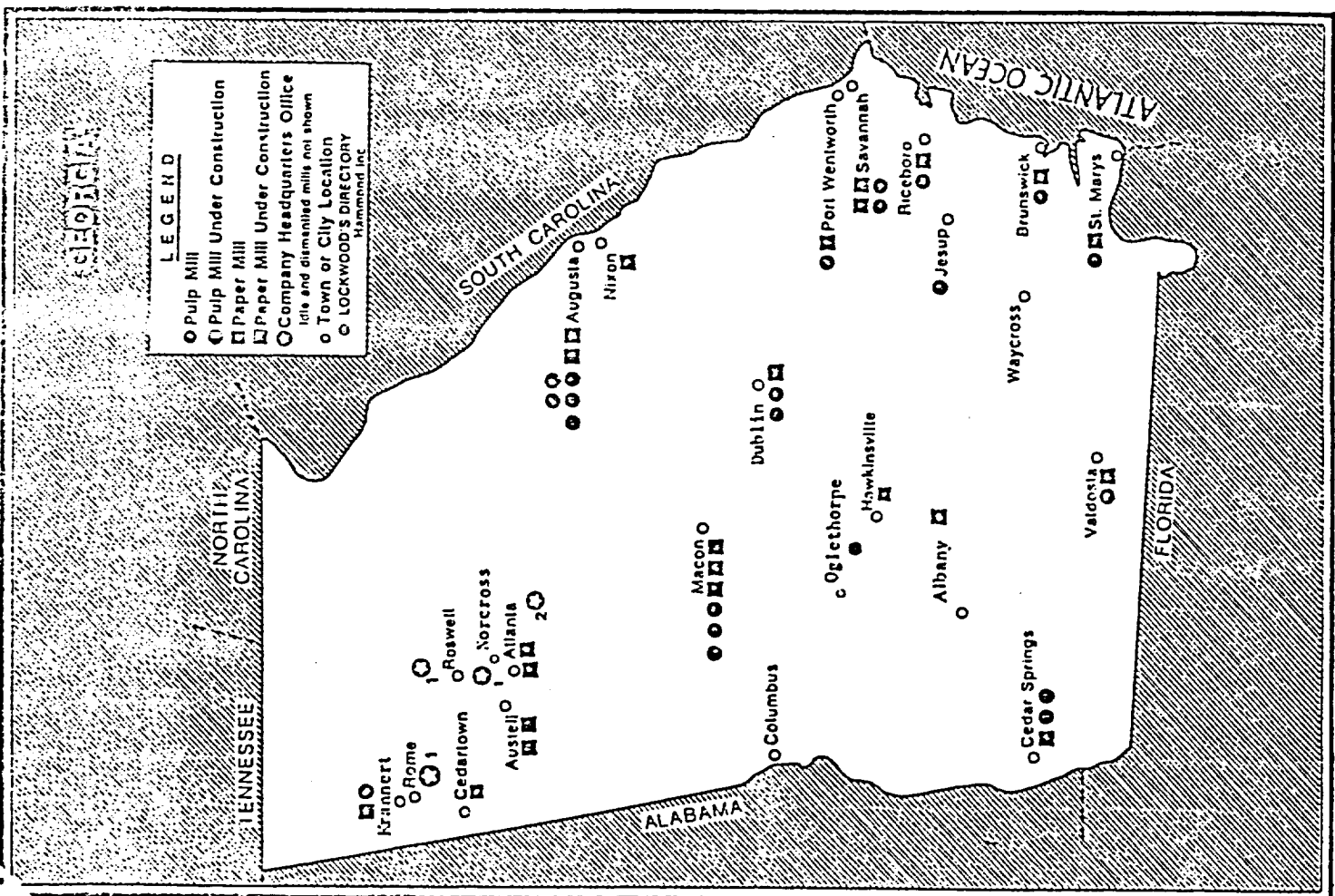
LIST OF PULP AND PAPER MILLS BY STATEGEORGIA


Procter & Gamble Paper Products	Albany	Sanitary tissue, paper products
Sonoco Products Inc.	Atlanta	100 TPD core and tube board
Augusta Newsprint	Augusta	1240 TPD newsprint
Continental Forest Products	Augusta	1075 TPD bleached kraft board, coated cup and plate stock
Ponderosa Georgia Corporation	Augusta	100 TPD deinked pulp
Austell Box Board Corporation	Austell	350 TPD white lined kraft, bleached manila
Sweetwater Paper Board Co.	Austell	340 TPD linerboard, gypsum board liner
Brunswick Pulp and Paper Co.	Brunswick	400 TPD bleached containerboard 1300 TPD bleached market pulp
Great Southern Paper Co.	Cedar Springs	1920 TPD unbleached kraft linerboard 500 TPD corrugating medium
Alton Packaging Corp.	Cedartown	50 TPD tube stock
Southeast Paper Manufacturing Co.	Dublin	500 TPD newsprint
Portals, Inc.	Hawkinsville	10 TPD currency paper
ITT Rayonier	Jesup	1400 TPD bleached kraft dissolving pulp, fluff pulp
Georgia Kraft Co.	Krannert	1800 TPD kraft linerboard
Georgia Kraft Co.	Macon	1400 TPD kraft linerboard
Packaging Corporation of America	Macon	88 TPD egg cartons

LIST OF PULP AND PAPER MILLS BY STATEGEORGIA, continued

Buckeye Cellulose Corp.	Oglethorpe	750 TPD bleached kraft market pulp
Stone Container Corp.	Port Wentworth	880 TPD kraft linerboard
Interstate Paper Corporate	Riceboro	580 TPD kraft linerboard
Gilman Paper Co.	Saint Marys	750 TPD bleached and unbleached kraft bag and converting paper 450 TPD bleached, coated boxboard
Union Camp Corporation	Savannah	3000 TPD kraft bag and wrapping linerboard
Owens-Illinois	Valdosta	850 TPD linerboard

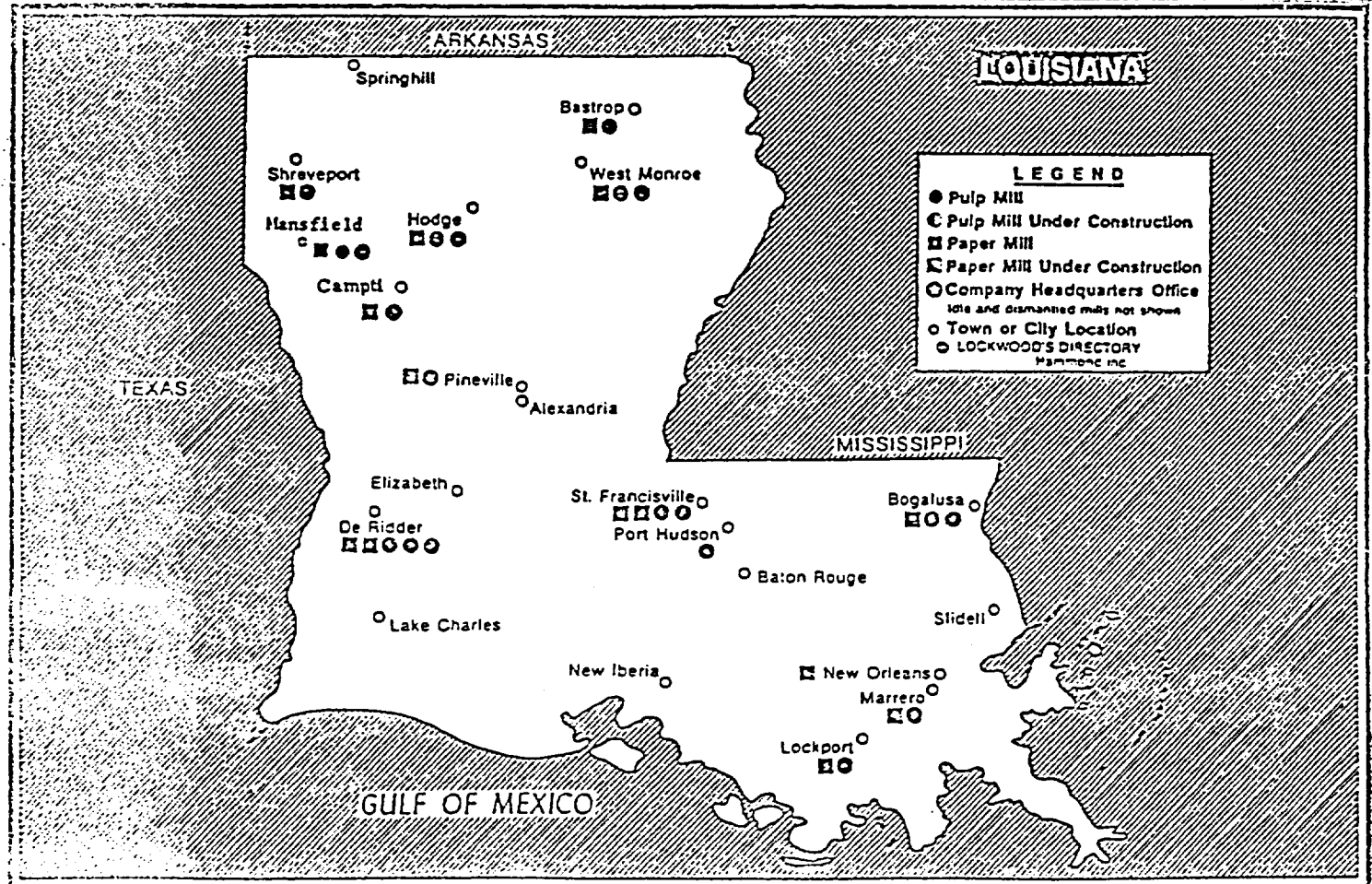
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LIST OF PULP AND PAPER MILLS BY STATELOUISIANA

International Paper Co.	Bastrop	600 TPD semi-chemical corrugating medium
Crown Zellerbach Corp.	Bogalusa	1250 TPD kraft linerboard
Willamette Industries Inc.	Campti	850 TPD kraft linerboard
Boise Southern Co.	DeRidder	1050 TPD kraft linerboard 1000 TPD newsprint
Stone Container Corp.	Hodge	1500 TPD kraft wrapping, bag and corrugating medium
Valentine Pulp & Paper Co.	Lockport	125 TPD offset, bond, tablet, writing paper
International Paper Co.	Mansfield	1140 TPD kraft linerboard 700 TPD semi-chemical corrugating medium
Celotex Corporation	Marrero	200 TPD insulation board
International Building Materials	New Orleans	100 TPD roofing felt
International Paper Co.	Pineville	1000 TPD unbleached kraft linerboard
Georgia-Pacific Corp.	Port Hudson	1250 TPD bleached hardwood and softwood kraft pulp
Crown Zellerbach Corp.	Saint Francisville	275 TPD kraft specialty 525 TPD coated printing paper
Manville Forest Products Co.	West Monroe	1150 TPD coated board 100 TPD kraft bag



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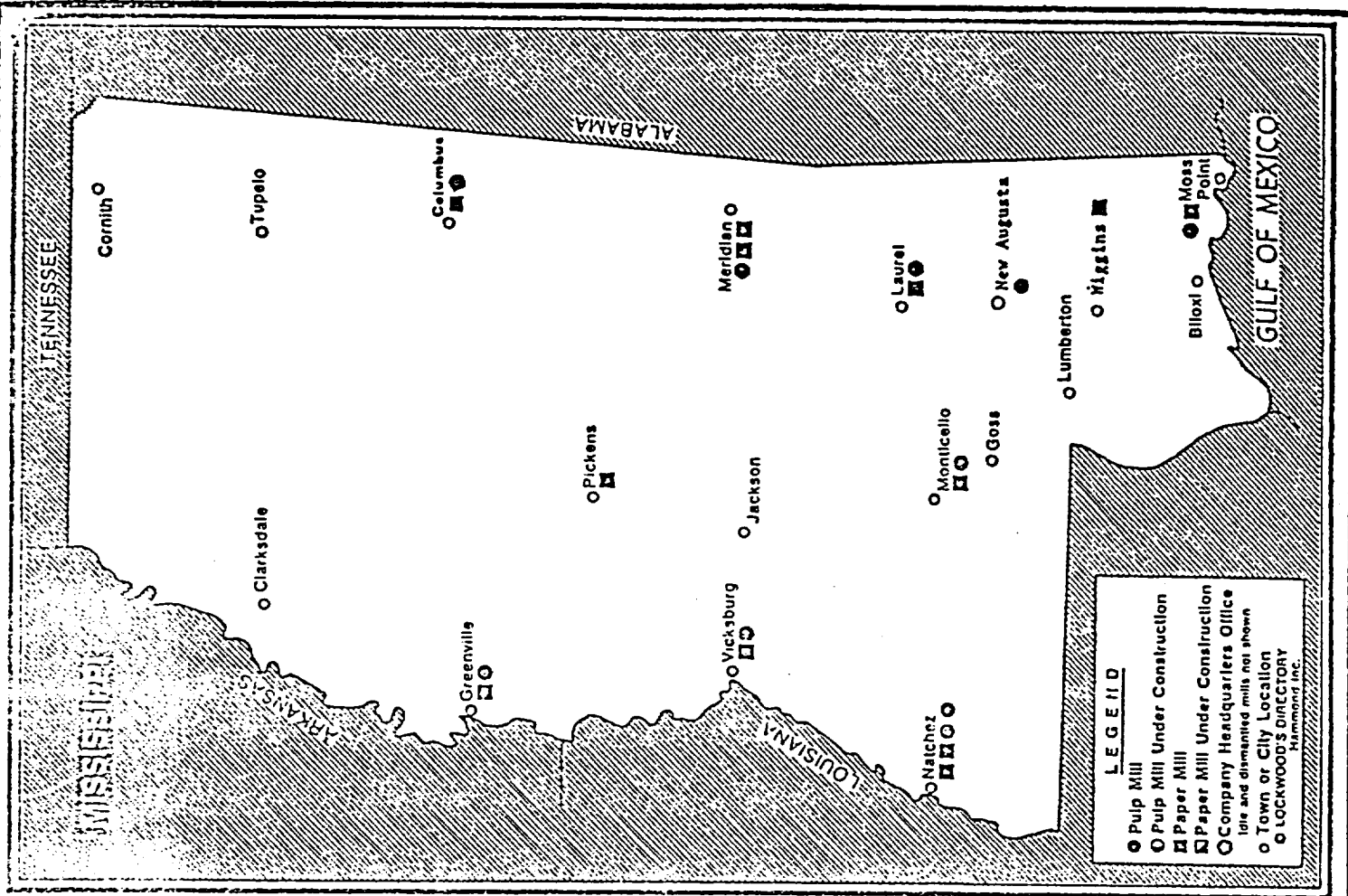
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LIST OF PULP AND PAPER MILLS BY STATEMISSISSIPPI

Weyerhaeuser Company	Columbus	500 TPD coated papers
Georgia-Pacific Corp.	Monticello	1200 TPD linerboard 450 TPD kraft bag
International Paper Co.	Moss Point	760 TPD MF semi-chemical, unbleached kraft wrapping, coated board
International Paper Co.	Natchez	1100 TPD bleached hardwood kraft dissolving and market pulp
Leaf River Forest Products	New Augusta	1000 TPD bleached and semi- bleached hardwood and softwood kraft pulp
Burrows Southern Corporation	Pickens	20 TPD specialty tissue
International Paper Co.	Vicksburg	1500 TPD kraft linerboard
Dunn Paper Co.	Wiggins	50 TPD one-time carbonizing paper





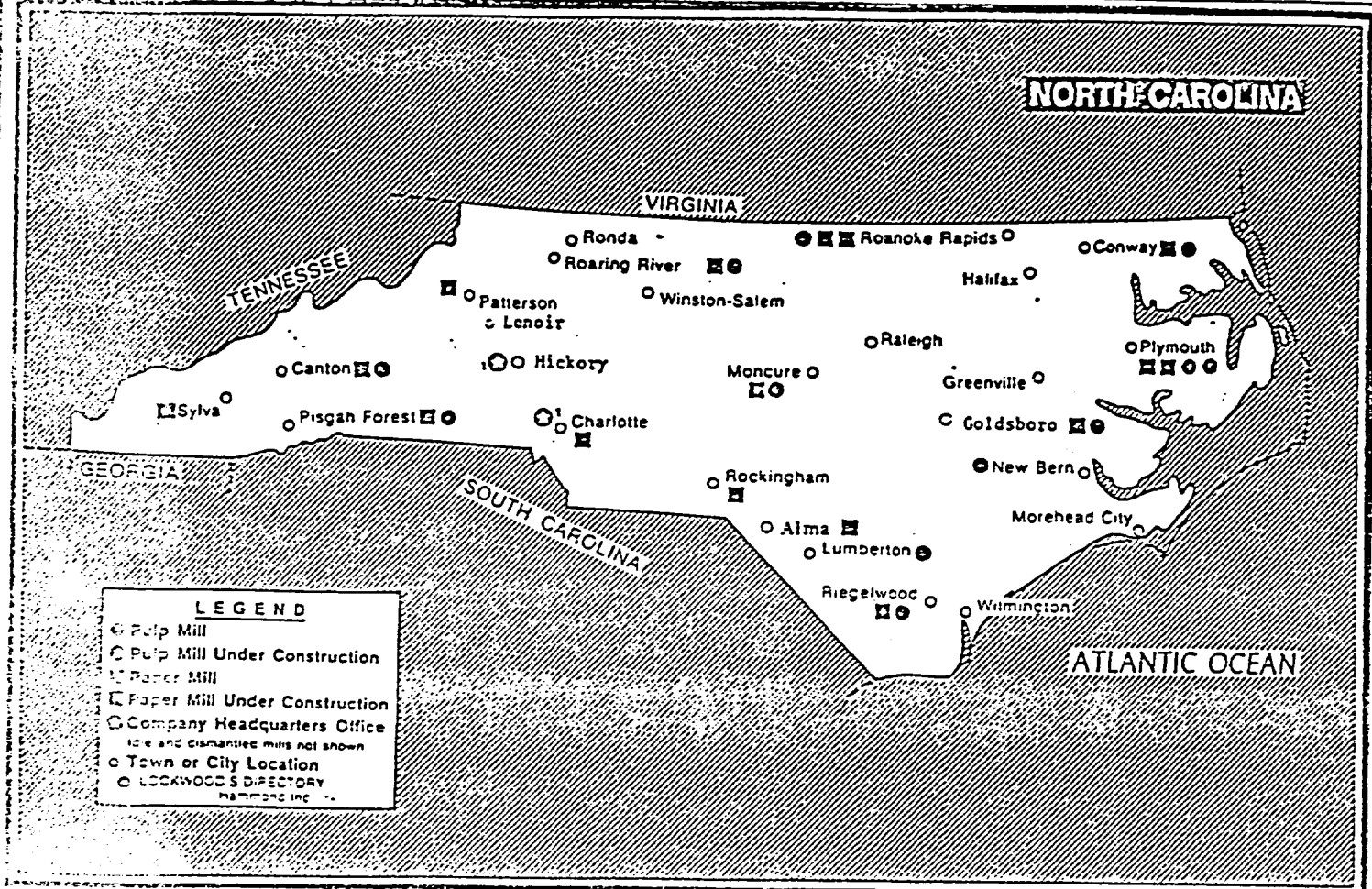
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LIST OF PULP AND PAPER MILLS BY STATENORTH CAROLINA

Champion International Corp.	Canton	1540 TPD envelope, bond, milk carton, food container
Carolina Paper Board Corp.	Charlotte	115 TPD specialty boards
Alpha Cellulose Corp.	Lumberton	130 TPD custom cotton pulp
Weyerhaeuser Co.	New Bern	800 TPD bleached hardwood and softwood kraft pulp
Cellu Products Co.	Patterson	20 TPD cellulose wadding
Olin Corporation	Pisgah Forest	300 TPD cigarette paper, specialty papers
Weyerhaeuser Co.	Plymouth	1290 TPD kraft linerboard, milk carton 795 TPD fine writing paper
Federal Paper Board Co.	Riegelwood	975 TPD coated and uncoated kraft board 1025 TPD bleached softwood and hardwood kraft market pulp
Champion International Corp.	Roanoke Rapids	450 TPD kraft bag 650 TPD linerboard
Jackson Paper Manufacturing	Sylva	200 TPD recycled corrugating medium



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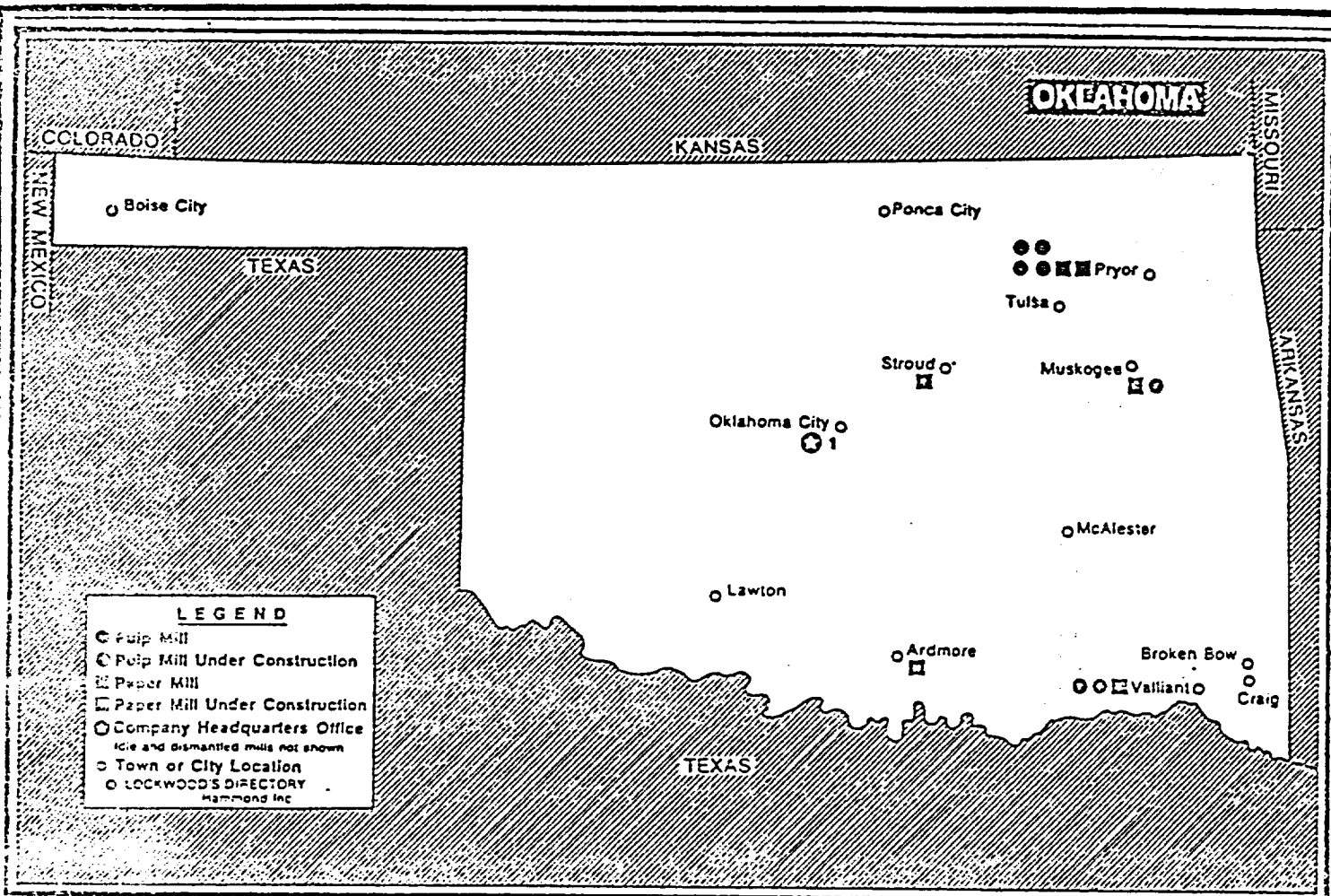
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LIST OF PULP AND PAPER MILLS BY STATEOKLAHOMA

Fort Howard Paper Co.	Muskogee	600 TPD tissue, napkin products
Georgia-Pacific Corp.	Pryor	160 TPD gypsum board liner
National Gypsum Co.	Pryor	215 TPD gypsum board liner
Robel Tissue Mills	Pryor	70 TPD napkin, toilet and facial tissue
Allied Materials Corp.	Stroud	125 TPD roofing felt
Weyerhaeuser Co.	Valliant	550 TPD lightweight coated linerboard 1415 TPD kraft linerboard 545 TPD corrugating medium



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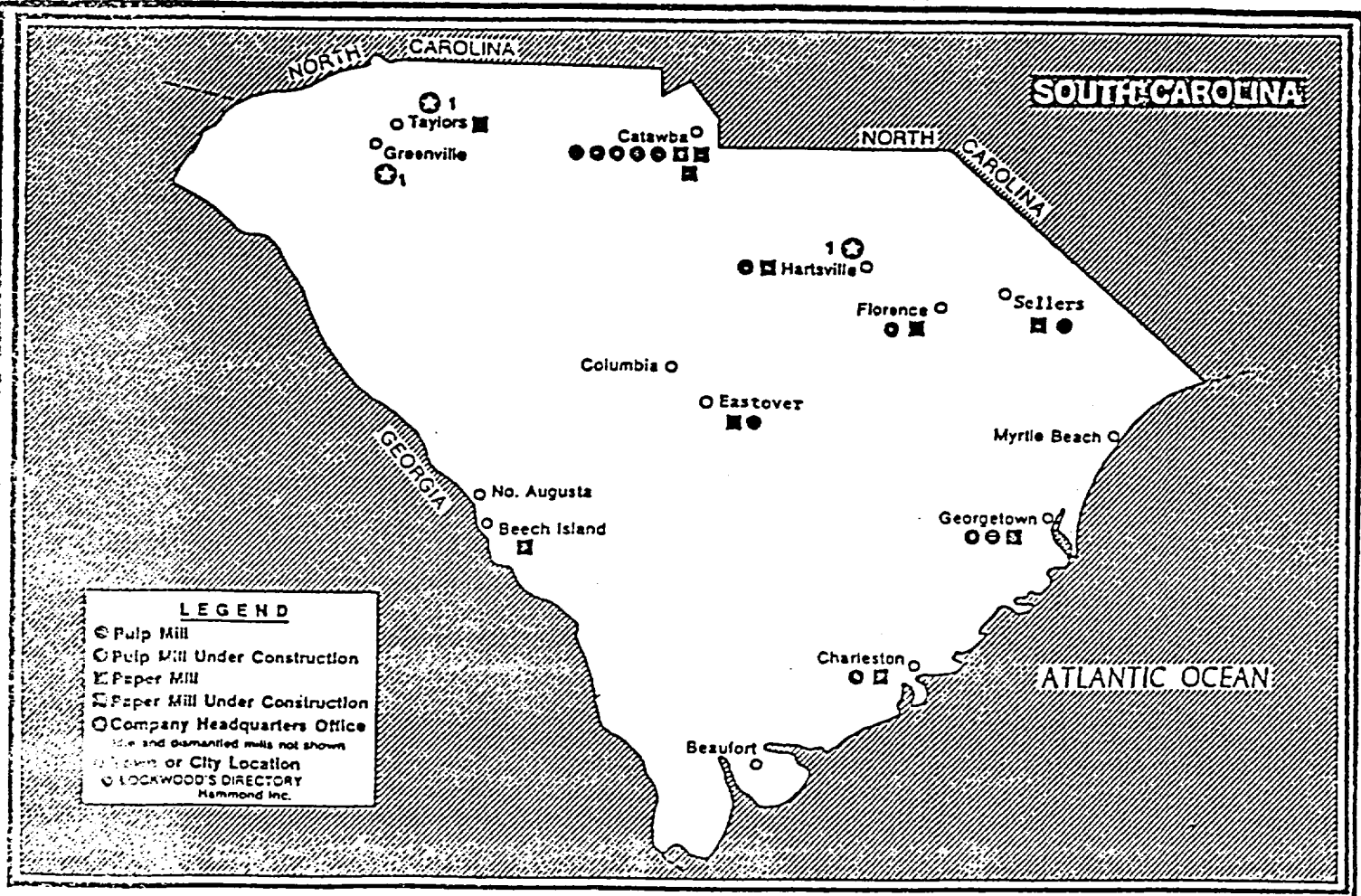
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LIST OF PULP AND PAPER MILLS BY STATESOUTH CAROLINA

Kimberly-Clark Corp.	Beech Island	260 TPD feminine napkins
Bowater-Carolina Co.	Catawba	340 TPD coated groundwood paper 700 TPD bleached kraft pulp
Catawba Newsprint Co.	Catawba	625 TPD newsprint
Union Camp Corporation	Eastover	600 TPD uncoated writing paper
Stone Container Corporation	Florence	1675 TPD kraft linerboard
International Paper Co.	Georgetown	1680 TPD bleached kraft board, corrugating medium
Sonoco Products Co.	Hartsville	1020 TPD cone, core, tube board
Westvaco Corporation	North Charleston	2150 TPD kraft linerboard, folding carton stock
Carotell Paper Board Corp.	Taylors	150 TPD bleached manila, hi-density specialty board



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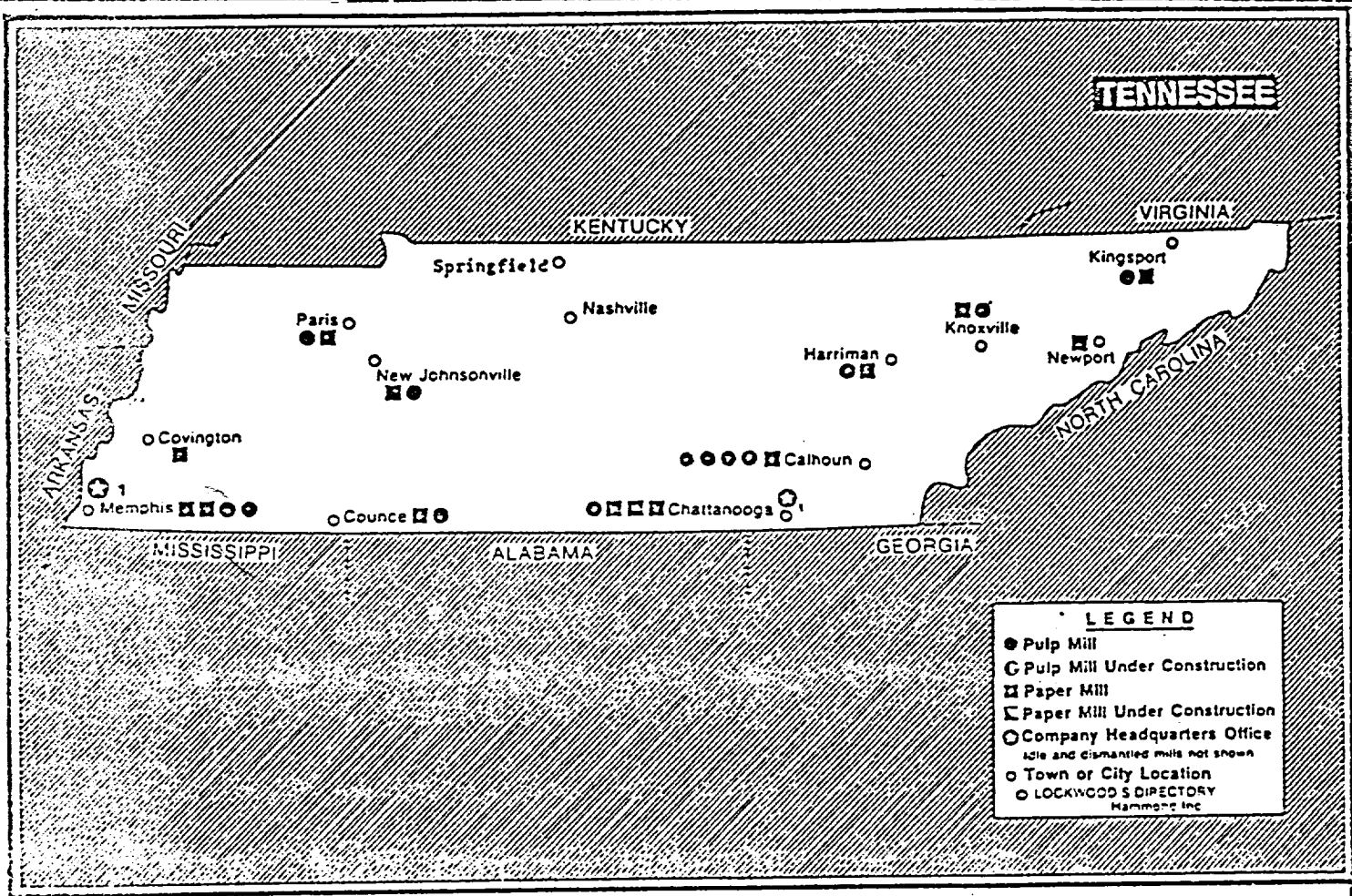
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LIST OF PULP AND PAPER MILLS BY STATETENNESSEE

Bowater Southern Paper Co.	Calhoun	2200 TPD newsprint
Container Corporation of America	Chattanooga	140 TPD tube board
Rock-Tenn Corporation	Chattanooga	300 TPD boxboard, manila lined
Tennessee River Pulp & Paper Co.	Counce	1600 TPD kraft linerboard
Harriman Paperboard Corp.	Harriman	250 TPD corrugating medium
Mead Corporation	Kingsport	550 TPD book, coated offset, bond and litho paper
Buckeye Cellulose Co.	Memphis	250 TPD absorbent filter paper
Kimberly-Clark Corp.	Memphis	300 TPD facial and bathroom tissue, diapers
Inland Container Corp.	New Johnsonville	500 TPD corrugating medium
Sonoco Products Co.	Newport	200 TPD cone and tube stock





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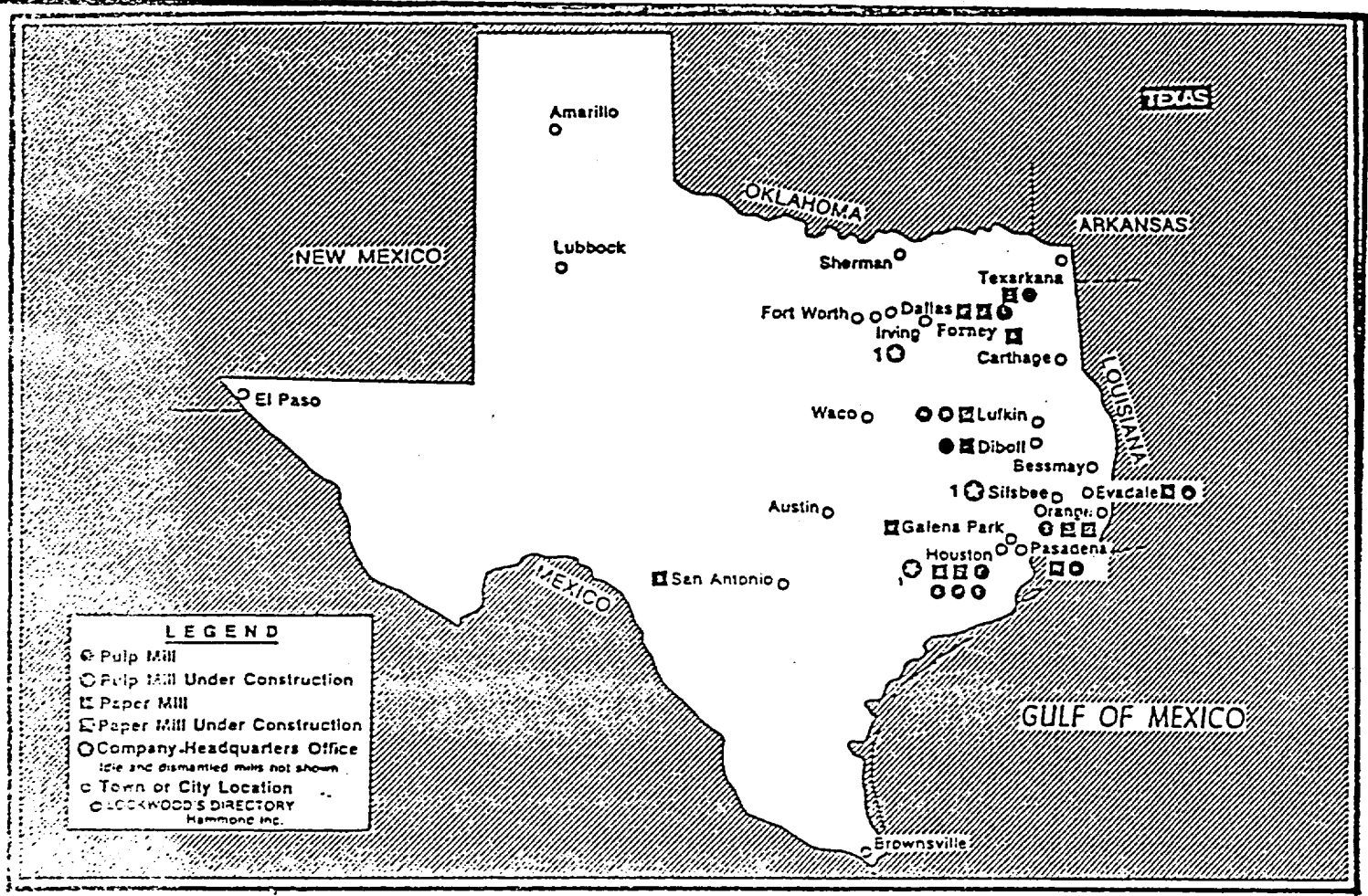
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LIST OF PULP AND PAPER MILLS BY STATETEXAS

GAF Corporation	Dallas	66 TPD roofing felt
Rock-Tenn Co.	Dallas	340 TPD clay coated board
U.S. Gypsum Co.	Galena Park	175 TPD gypsum board liner
St. Regis Corp.	Houston	1325 TPD newsprint
St. Regis Corp.	Lufkin	1000 TPD newsprint
Equitable Bag Co.	Orange	100 TPD unbleached kraft bag
Owens-Illinois	Orange	1100 TPD kraft linerboard
Champion Paper Co.	Pasadena	750 TPD coated and uncoated, envelope, bond
Temple-Eastex Inc.	Silsby	1520 TPD food container, carton, cup stock, market pulp
International Paper Co.	Texarkana	1300 TPD bleached kraft and coated board, market pulp



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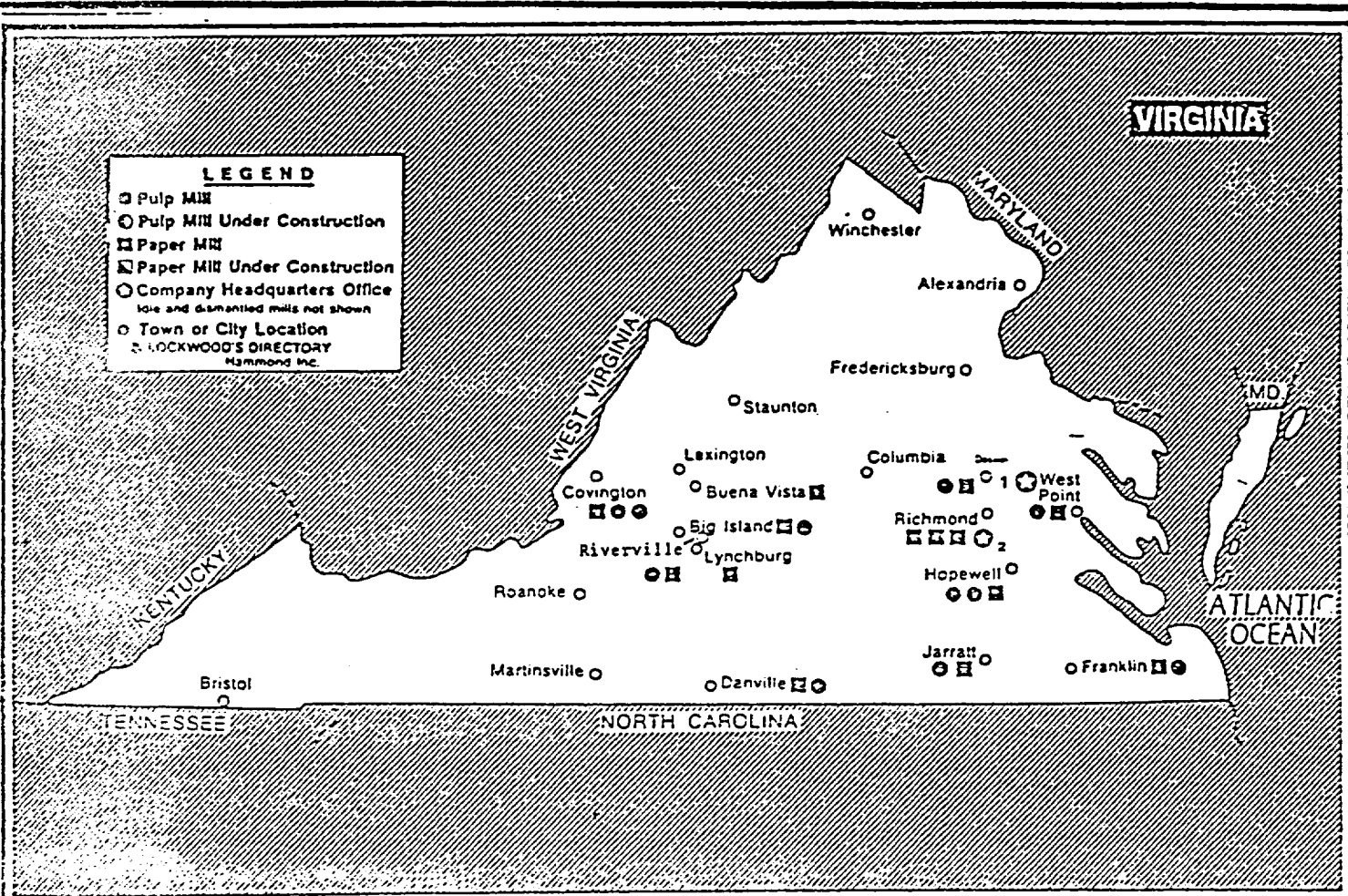
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
LIST OF PULP AND PAPER MILLS BY STATEVIRGINIA

Bear Island Paper Co.	Ashland	530 TPD newsprint
Owens-Illinois	Big Island	620 TPD corrugating medium
Westvaco Corporation	Covington	1450 TPD coated and uncoated carton board
Union Camp Corporation	Franklin	1800 TPD printing and fine paper, envelope, tablet, bristol, coated packaging board
Hercules, Inc.	Hopewell	240 TPD bleached chemical cotton pulp
Stone Container Corporation	Hopewell	1000 TPD kraft linerboard
Mead Corporation	Lynchburg	360 TPD polyethylene coated board
Federal Paper Board Co.	Richmond	230 TPD clay coated, folding boxboard
James River Paper Co.	Richmond	22 TPD plain and blotting paper
Manchester Board & Paper	Richmond	115 TPD bleached manila and specialties
Virginia Fibre Corp.	Riverville	610 TPD semi-chemical corrugating medium
Chesapeake Corp. of Virginia	West Point	350 TPD newsprint 775 TPD linerboard 375 TPD kraft market pulp



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 <p><b>Sandwell</b></p> <p><small>This drawing is the property of Sandwell and shall be returned to Sandwell upon completion of the project. No part of this drawing may be reproduced or transmitted in any form or by any means electronic or mechanical, including photocopying, recording, or by any information storage and retrieval system, without the prior written permission of Sandwell.</small></p>		70			<p align="center">GOVERNMENT OF CANADA</p> <p align="center">DEPARTMENT OF EXTERNAL AFFAIRS</p> <p align="center">G6879-12</p> <p align="right">REV </p>				



REPORT G6879/1  
MARKETING STUDY

DEPARTMENT OF EXTERNAL AFFAIRS  
OTTAWA CANADA

MARKETING STUDY OF CANADIAN PULP AND  
PAPER MILL MACHINERY AND EQUIPMENT  
IN THE SOUTHEASTERN UNITED STATES

APPENDIX 3 - LIST OF CORPORATE HEADQUARTERS FOR FIRMS WITH PULP  
AND PAPER OPERATIONS IN THE SOUTHEASTERN STATES

ALTON PACKAGING CORPORATION  
410 Alton Street, Alton, IL 62002

R. G. Duffy, VP Planning

AMERICAN CAN COMPANY  
American Lane, Greenwich, CT

BOISE CASCADE CORPORATION  
One Jefferson Square, Boise, ID 83728

C. A. Morton, VP Planning

BOWATER NORTH AMERICAN CORPORATION  
P. O. Box 1028, Greenville, SC 29602

R. Herdman, VP Manufacturing

BUCKEYE CELLULOSE CORPORATION  
P. O. Box 8407, Memphis, TN 38108

F. P. Smith, VP Manufacturing

CAROTELL PAPER BOARD CORPORATION  
P. O. Box 655, Taylors, SC 29687

CELLU PRODUCTS COMPANY  
1985 Tate Boulevard SE, Hickory, NC 28601

J. L. McAfee, VP Engineering

CHAMPION INTERNATIONAL CORPORATION  
1 Champion Plaza, Stamford, CT 06921

K. C. Nichols, Sr. VP Planning

CHESAPEAKE CORPORATION  
P. O. Box 311, West Point, VA 23181

F. V. Ernst, VP Pulp & Paper

CONTAINER CORPORATION OF AMERICA  
1 First National Plaza, Chicago, IL 60603

J. E. Butler, Sr. VP Planning



LIST OF CORPORATE HEADQUARTERS FOR FIRMS WITH PULP  
AND PAPER OPERATIONS IN THE SOUTHEASTERN STATES

## CONTINENTAL FOREST INDUSTRIES

21 Harbor Plaza, Stamford, CT 06904

## CROWN ZELLERBACH CORPORATION

1 Bush Street, San Francisco, CA 94104

E. A. Helfert, Dir. Corp.  
Planning

## FEDERAL PAPER BOARD COMPANY

75 Chestnut Ridge Rd., Montvale, NJ 07645

C. C. Peters, VP Riegelwood Ops.

## GEORGIA KRAFT COMPANY

P. O. Box 1551, Rome, GA 30161

J. G. Lee, Executive VP

## GEORGIA-PACIFIC CORPORATION

P. O. Box 56267, Atlanta, GA 30348

R. A. Schumacher, Executive VP

## GILMAN PAPER COMPANY

111 West 50th St., New York, NY 10020

B. A. Warner, VP Corp. Planning

## GREAT NORTHERN NEKOOSA CORPORATION

75 Prospect St., Stamford, CT 66904

W. R. Laidig, Executive VP

## GULF STATES PAPER CORPORATION

P. O. Box 3199, Tuscaloosa, AL 35401

W. R. Adams, Sr. VP, Pulp &  
Paper

## HAMMERMILL PAPER GROUP

P. O. Box 1440, Erie, PA 16533

R. W. Brown, VP Technology

## INLAND CONTAINER CORPORATION

151 N. Delaware St., Indianapolis, IN 46206

W. E. Babin, Group VP

## INTERNATIONAL PAPER COMPANY

77 W. 45th St., New York, NY 10036

J. R. Goode, VP Engineering

## INTERSTATE CONTAINER CORPORATION

1 Cherry Hill, Cherry Hill, NJ 08002

M. I. Bricker, President



LIST OF CORPORATE HEADQUARTERS FOR FIRMS WITH PULP  
AND PAPER OPERATIONS IN THE SOUTHEASTERN STATES

ITT RAYONIER INC. 1177 Summer St., Stamford, CT 06904	K. S. O'Brien, Dir. Planning and Development
JAMES RIVER CORPORATION P. O. Box 2218, Richmond, VA 23217	E. L. Showalter, Sr. VP Planning
KIMBERLY-CLARK CORPORATION 128 N. Lake St., Neenah, WI 54956	F. E. Coffman, Jr., VP Corp. Planning
MANVILLE FOREST PRODUCTS CORPORATION P. O. Box 488, West Monroe, LA 71291	J. L. Stephens, VP Paper Products
MEAD CORPORATION World Headquarters Plaza, Dayton, OH 45463	C. W. Spalding, VP Technology
NEKOOSA PAPERS 100 Wisconsin River Dr., Port Edwards, WI 54469	J. G. Crump, Jr., VP Manu- facturing
OWENS ILLINOIS INC. P. O. Box 1035, Toledo, OH 43666	C. W. Pawlicki, VP Technology
PACKAGING CORPORATION OF AMERICA 1603 Orrington Ave., Evanston, IL 60204	R. H. Harlow, VP Planning
PROCTER & GAMBLE PAPER PRODUCTS P. O. Box 599, Cincinnati, OH 45201	
ROCK-TENN COMPANY P. O. Box 98, Norcross, GA 30071	W. D. Griffin, Pres. Mill Group
ST. JOE PAPER COMPANY P. O. Box 1380, Jacksonville, FL 32201	
ST. REGIS CORPORATION 237 Park Avenue, New York, NY 10017	R. W. Kollmeyer, VP Engineering





LIST OF CORPORATE HEADQUARTERS FOR FIRMS WITH PULP  
AND PAPER OPERATIONS IN THE SOUTHEASTERN STATES

SCOTT PAPER COMPANY Scott Plaza, Philadelphia, PA 19113	J. L. Shane, Exec. VP Strategic Planning
SONOCO PRODUCTS COMPANY North Second St., Hartsville, SC 29550	T. C. Coxe III, Sr. VP Corp. Development
SOUTHWEST FOREST INDUSTRIES, INC. P. O. Box 7548, Phoenix, AZ 85011	J. Hixon, Dir. Corp. Planning
STONE CONTAINER CORPORATION 360 North Michigan Ave., Chicago, IL 60601	A. Koleff, Dir. Technology
TEMPLE-INLAND CORPORATION P. O. Drawer N, Diboll, TX 75941	J. C. Denman, CEO
UNION CAMP CORPORATION 1600 Valley Road, Wayne, NJ 07470	J. H. Ballengee, VP Corp. Engineering
WEYERHAEUSER COMPANY Tacoma, WA 98401	A. M. Fiskens, Sr. VP Planning



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MARKETING STUDY

DEPARTMENT OF EXTERNAL AFFAIRS  
OTTAWA CANADA

MARKETING STUDY OF CANADIAN PULP AND  
PAPER MILL MACHINERY AND EQUIPMENT  
IN THE SOUTHEASTERN UNITED STATES

APPENDIX 4 - LIST OF TRADE JOURNALS AND PERIODICALS

CONTROL ENGINEERING, 1301 South Grove Avenue	Barrington	IL 60010
FOREST INDUSTRIES, 500 Howard Street	San Francisco	CA 94105
INTECH, 67 Alexander Drive, P. O. Box 12277	Research Triangle Park	NC 27709
JOURNAL OF PULP AND PAPER SCIENCE, 570 St. John's Boulevard	Pointe Claire, Quebec	H9R 3J9
NONWOVENS, P. O. Box 555	Ramsey	NJ 07446
PACKAGING (formerly PACKAGE ENGINEERING), 221 Columbus Avenue	Boston	MA 02116
PAPER AGE, 101 West Street	Hillsdale	NJ 07642
PAPER BOARD PACKAGING, 7500 Old Oak Boulevard	Cleveland	OH 44130
PAPER INDUSTRY EQUIPMENT, P. O. Box 2268	Montgomery	AL 36197
PAPER INDUSTRY NEWS DIGEST, P. O. Box 397	Neenah	WI 54956
PAPER TRADE JOURNAL, 300 West Adams Street	Chicago	IL 60606
PIMA MAGAZINE, 2400 East Oakton Street	Arlington Heights	IL 60005
POWER, 1221 Avenue of the Americas	New York	NY 10020
PPMA NEWS LETTER, 7297-M Lee Highway	Falls Church	VA 22042
PULP AND PAPER, 500 Howard Street	San Francisco	CA 94105
PULP AND PAPER JOURNAL, 777 Bay Street	Toronto, Ontario	M5W 1A7
SOUTHERN PULP AND PAPER, 75 Third Street, N.W.	Atlanta	GA 30308
TAPPI JOURNAL, P. O. Box 105113	Atlanta	GA 30348
WATER ENGINEERING & MANAGEMENT, 380 Northwest Highway	Des Plaines	IL 60016





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DEPARTMENT OF EXTERNAL AFFAIRS  
OTTAWA CANADA

MARKETING STUDY OF CANADIAN PULP AND  
PAPER MILL MACHINERY AND EQUIPMENT  
IN THE SOUTHEASTERN UNITED STATES

APPENDIX 5 - LIST OF TAPPI DIVISIONS AND COMMITTEES

TAPPI COMMITTEES

COATING AND GRAPHIC ARTS DIVISIONS

Basestock Committee  
Coating Additives Committee  
Coating Binders Committee  
Coating Process Committee  
Fillers and Pigments Testing Committee  
Printing Committee  
Reprography Committee

CORRUGATED CONTAINERS DIVISION

Technical Service Committee  
Fiberboard Shipping Container Testing Committee  
Industrial Engineering Committee  
Printing Committee  
Process and Quality Control Committee  
Production Committee

ENGINEERING DIVISION

Electrical Engineering Committee  
Energy Management Committee  
Engineering Economics and Management  
Field Mechanics Committee  
Maintenance and Mechanical Engineering Committee

OPERATING DIVISIONS

Pressing and Drying Committee  
Process Control Committee  
Process Engineering Committee  
Process Simulation Committee  
Steam and Power Committee

ENVIRONMENTAL

Air Quality  
Solid Waste  
Water Quality



LIST OF TAPPI DIVISIONS AND COMMITTEES

NON-WOVEN DIVISION

Bidders End Additives Committee  
Building Products Committee  
High Purity and Specialty Pulps  
Non-Woven Fibers Committee  
Non-Woven Testing Committee

PAPER AND PAPERBOARD DIVISION

Fourdrinier Papermakers  
Multi-Ply Paperboard  
Papermaking Additives  
Stock Preparation

PAPER FINISHING AND CONVERTING DIVISION

Calendering  
Packaging  
Sheeting  
Shipping, Receiving, and Warehousing  
Winding

PULP MANUFACTURING DIVISION

Alkaline Pulping  
Fiber Raw Material Supply  
Mechanical Pulping  
Non-Wood Plant Fibers  
Oxygen Deliquification  
Pulp Bleaching

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MARKETING STUDYDEPARTMENT OF EXTERNAL AFFAIRS  
OTTAWA CANADAMARKETING STUDY OF CANADIAN PULP AND  
PAPER MILL MACHINERY AND EQUIPMENT  
IN THE SOUTHEASTERN UNITED STATESAPPENDIX 6 - LIST OF CONSULTING ENGINEERING FIRMS BY DISCIPLINEProcess Controls

A & ESO, GENERAL ELECTRIC CO., Building 2, Room 113 B	Schenectady	NY 12205
ADVANCED FOREST AUTOMATION, 4035 Presidential Parkway	Atlanta	GA 30340
HARTRAMPF, POWELL INC., 180 Allen Road, Suite 217	Atlanta	GA 30328
INSTRUMENT CONTROL SERVICE, Box 7126	Pensacola	FL 32504
KAJAANI INC., 2179 Northlake Parkway	Tucker	GA 30084
PROCESS EVALUATION & DESIGN, 3400 Interfirst Two Bldg.	Dallas	TX 75270

Process Design

BE & K INC., Box 2332	Birmingham	AL 35201
BLOUNT INTERNATIONAL, Box 4577	Montgomery	AL 36195
BROWN & ROOT INC., Box 3	Houston	TX 77001
COATING CONSULTANTS INTERNATIONAL, Box 693	Delano	FL 32720
COWAN INTERNATIONAL, 956 Montclair Road	Birmingham	AL 35213
DANIEL INTERNATIONAL, Daniel Building	Greenville	SC 29602
DRAVO ENGINEERS INC., Box 450169	Atlanta	GA 30345
FORD, BACON & DAVIS, Box 1894	Monroe	LA 71210
HOFF & ASSOCIATES, 3125 Independence Drive	Birmingham	AL 35259
LAMB/CARGATE, 532 Boulevard Park West	Mobile	AL 36609
LOCKWOOD GREENE ENGINEERS, 1330 West Peachtree Street	Atlanta	GA 30367
MID-SOUTH ENGINEERING CO., 2814 Malvern Road, Box 1399	Hot Springs	AR 71901
POYRY-BEK INC., Box 12718, 200 Park Offices Research Triangle Park		NC 27709
RICHMOND ENGINEERING, Box 526	Mulberry	FL 33860
RUST INTERNATIONAL, Box 101	Birmingham	AL 35201
SANDWELL INTERNATIONAL, 6425 Powers Ferry Road	Atlanta	GA 30339
SIMONS-EASTERN CO., Box 1286	Atlanta	GA 30301
J. E. SIRRINE COMPANY, Box 5456, Station B	Greenville	SC 29606
TEMPLE ASSOCIATES, 700 North Temple Drive	Diboll	TX 75941

Power/Energy Consultants

EBASCO SERVICES, 2 World Trade Center	New York	NY 10048
REYNOLD, SMITH & HILL, Box 4850	Jacksonville	FL 32201



LIST OF CONSULTING ENGINEERING FIRMS BY DISCIPLINE

Environmental

ATI CONSULTING ENGINEERS, Box 1222	Fond Du Lac	WI 54935
BAYMONT ENGINEERING, 10051 Fifth Street	St. Petersburg	FL 33702
CH2M HILL, 229 Peachtree Street, Suite 300, Cam Tower	Atlanta	GA 30303
DAMES & MOORE, 455 East Paces Ferry Road	Atlanta	GA 30339
ENVIRONMENTAL SYSTEMS CORP., 200 Tech Center Drive	Knoxville	TN 37912
GREELEY & HANSEN, 1100 Spring Street	Atlanta	GA 30303
HAVENS & EMERSON, 270 Technology Parkway	Atlanta	GA 30093
HENSLEY-SCHMIDT, P. O. Box 723308	Atlanta	GA 30339

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