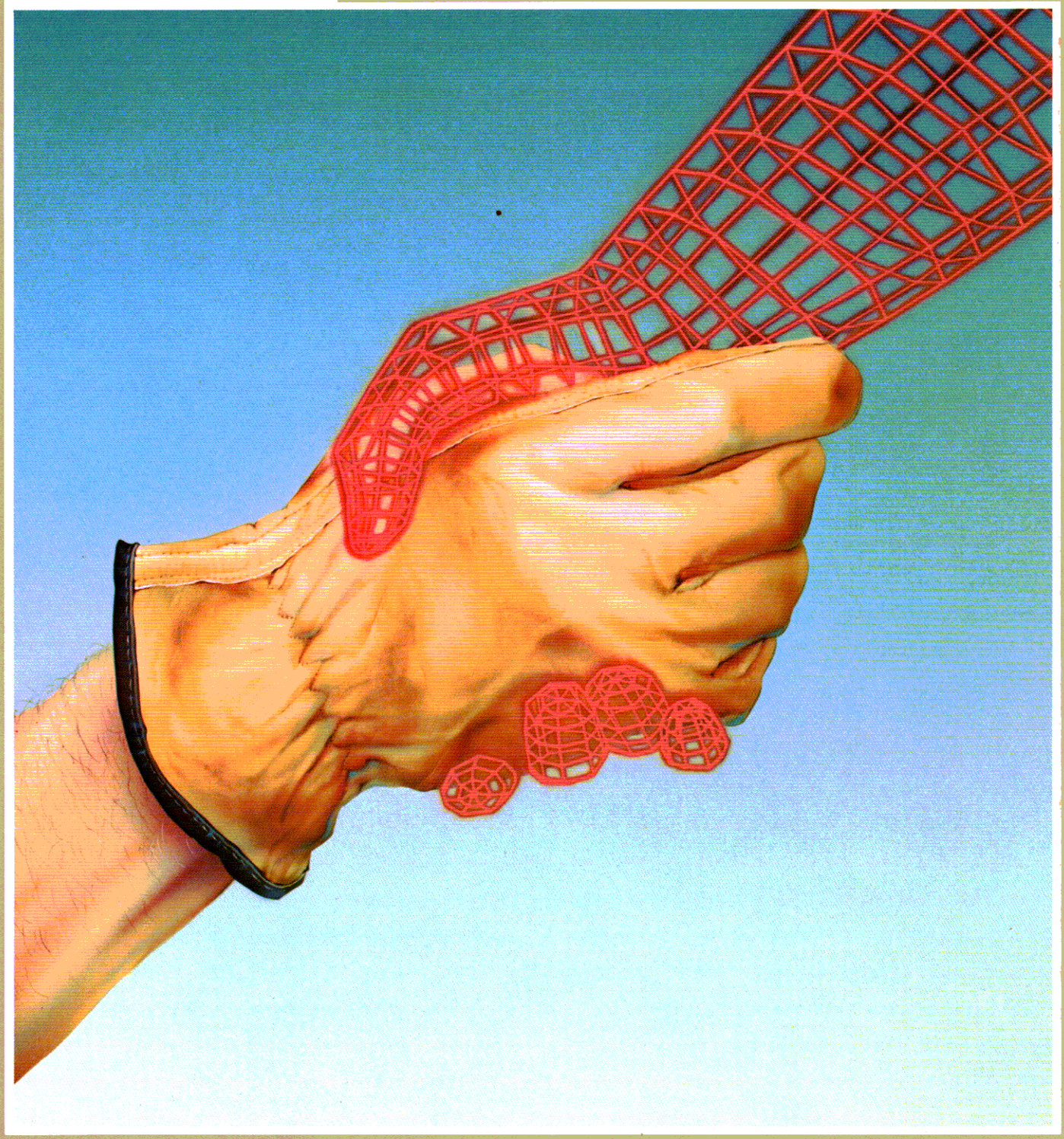
AccuRay® CORPORATION

Annual Report 1983



"Technology for Industry"

Corporate Profile

Sparked by the need to improve product quality and reduce manufacturing costs, a new industrial revolution is taking place in the factories, mills and plants of the world. Basic industry is modernizing and automating existing facilities and processes to survive in today's highly competitive international environment.

With an array of high technology solutions for industry problems, AccuRay Corporation is poised to benefit from the capital spending surge anticipated in many of its markets. By installing AccuRay computer-based process automation systems, companies can reduce raw material and energy consumption, increase productivity, lower production costs and improve product quality. In short, in a world where high quality, cost-effective manufacturing means success, AccuRay is offering systems that help our customers master quality and manage costs.

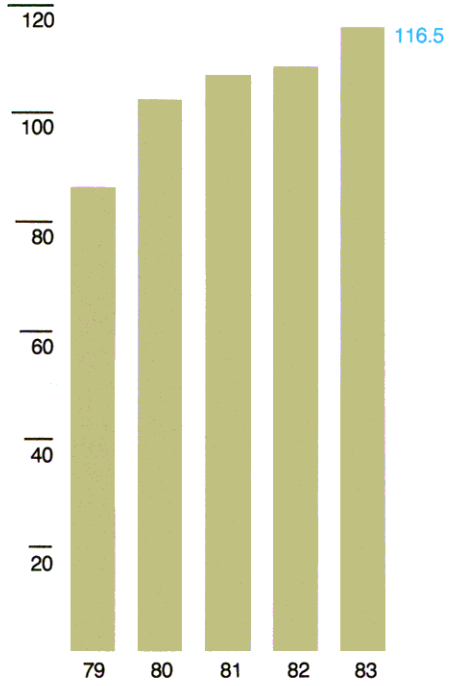
Financial Highlights

Five-Year Comparison of Selected Financial Data

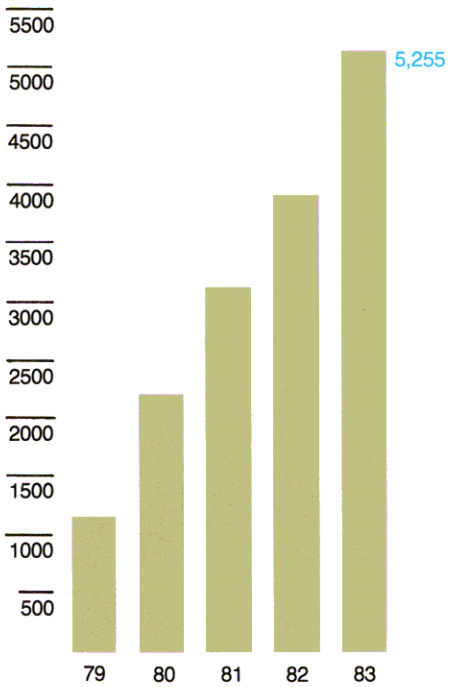
Year Ended December 31,	**1983**	1982	1981	1980	1979
		($ Thousands, except per share amounts)			
For the Year:					
Total operating revenues	**$116,524**	$108,714	$108,533	$102,910	$ 91,658
Net income	**5,255**	3,833	3,170	2,232	1,079
Earnings per share	**1.31**	1.08	.90	.64	.31
Dividends per share	**.16**	.14	.10	—	—
Weighted average number of shares outstanding (000)	**4,010**	3,551	3,535	3,483	3,434
At End of Year:					
Backlog	**$ 41,300**	$ 42,400	$ 50,000	$ 43,500	$ 32,600
Total assets	**86,183**	83,802	96,078	100,781	101,455
Net investment in property, plant, equipment and lease/rental equipment	**16,873**	17,295	17,023	14,919	15,235
Working capital	**47,552**	41,221	43,064	45,021	42,346
Long-term debt and 5½% Convertible Debentures	**21,226**	29,618	36,225	40,820	47,253
Stockholders' equity	**40,003**	25,668	22,254	19,324	16,623
Current ratio	**3.6:1**	2.9:1	2.4:1	2.3:1	2.3:1
Debt-to-equity ratio	**.5:1**	1.2:1	1.6:1	2.1:1	2.8:1
Number of employees	**1,770**	1,790	1,845	1,905	1,900

To Our Stockholders And Associates:

Operating Revenue
(Millions of Dollars)



Net Income
(Thousands of Dollars)



The year 1983 was the best in our history. It was not only our most profitable fiscal year, but marked the first time in our 33 year history that we were essentially free of all bank debt. At year-end the total of remaining long term bank debt and current notes payable on the balance sheet was $1.5 million as compared with a total of $74.4 million nine years ago. In addition, the combination of quality and economic forces at work in our primary industry markets provide excellent business opportunities for AccuRay Corporation.

Financial Highlights

Net income rose to $5,255,000, or $1.31 per share, compared with $3,833,000, or $1.08 per share in 1982. Total operating revenues increased to $116.5 million in 1983, compared with $108.7 million in 1982.

Backlog at December 31, 1983, was $41.3 million, compared with $42.4 million a year earlier. This backlog includes equipment and related commitments for services. New orders for equipment and initial services received in 1983 increased to $70.3 million, versus $57.8 million in 1982.

Research and development expenses were $7.7 million in 1983, compared with $8.2 million in 1982. This R&D investment represented 13.8 percent of sales revenues and 6.6 percent of total operating revenues in 1983.

Total operating revenues per employee increased to $65,500 in 1983, compared with $59,800 a year earlier. At year-end 1983, total employment was 1,770 compared with 1,790 at the end of 1982 and 1,845 in 1981.

1984 Strategic Plan

The 1984 Corporate Strategic Plan, as approved in November 1983 by the AccuRay Board of Directors, was presented in group meetings to all Columbus-based associates in January 1984 and then video-taped for separate presentations to AccuRay associates throughout the world. The plan includes the following four corporate objectives which prioritize and define the strategic charter of AccuRay Corporation as a well-managed growth company.

1. Quality Leader – We plan to position AccuRay as the quality leader in each of our separate markets. By better understanding each customer's business, AccuRay will deliver process automation systems which employ modern technology to meet specific, established performance requirements 100 percent of the time. The result will be an increasingly clear quality difference between AccuRay and our competition in the eyes of our customer.

2. Most Cost-Effective Supplier – We intend to be the most cost-effective supplier to our markets. We will gain a competitive advantage over alternative suppliers by continuing to reduce the total cost of designing, manufacturing and servicing process automation systems over their life in a customer's factory.

3. Annual Growth Rate of 16 Percent – We are formulating growth plans to achieve a compound annual operating revenue growth rate of 16 percent in our major markets. Economic and cost pressures are rapidly increasing the customer need for process automation. AccuRay's quality leadership and cost-effectiveness work together to increase the demand for AccuRay solutions to meet this need.

4. After Tax Profit of 10 Percent – Creating future shareholder value can best be attained by achieving an after tax profit of 10 percent of total revenues. Premium prices for

improved quality and a lower cost structure are necessary to reach this goal.

The above objectives give us a step-by-step approach to our profit goals: Becoming the quality leader means doing things right the first time; doing things right the first time allows AccuRay to become more cost-effective; quality and cost-effectiveness bring higher revenues and higher revenues bring with them the potential for greater profitability.

Key Growth Opportunities

Since improving our quality of performance is the top priority objective in achieving growth in our core markets, we have found it essential to have a corporate report card on the true feelings of our customers. We have now progressed to the point where we are holding regular semi-annual customer performance reviews with more than 40 of our largest customers throughout the world.

Prior to each review, our engineers complete an audit of AccuRay system performance for each installed system which includes system availability, control utilization and results being achieved. An executive summary is presented to each customer which pinpoints potential problems at an early stage and focuses joint attention on obtaining the maximum benefits from every AccuRay installation.

We have received many favorable comments from customers about this review program. Furthermore, in the past year we saw tangible evidence that quality improvement contributed to the 21 percent increase in new orders received for this year over 1982. The concept of the performance review applied equally to customers, suppliers and individual AccuRay associates is being emphasized throughout our entire corporation as the systematic approach to improving AccuRay quality.

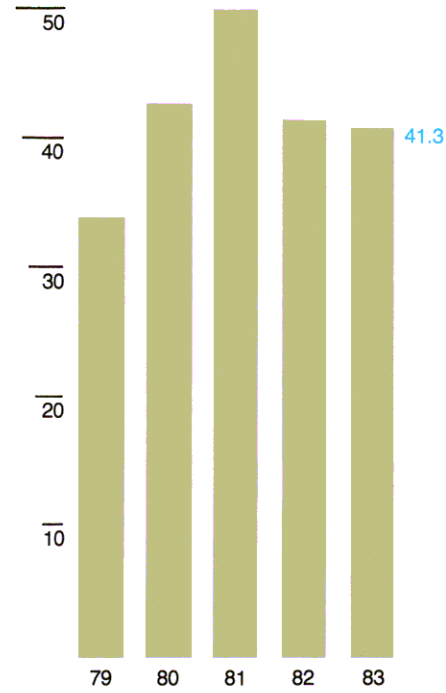
One reason for our strong emphasis on quality is that it represents such a significant growth opportunity in process automation markets. To illustrate the nature of the opportunity, a relevant paper entitled *Control System Performance – Evaluation & Maintenance* was presented at the Third International Pulp and Paper Process Control Symposium held in Vancouver, British Columbia, in May 1983. This was a well attended symposium sponsored by the Instrument Society of America and the Technical Section, Canadian Pulp and Paper Association. The authors of the paper were Mr. J. H. Rogers of the Pulp and Paper Research Institute of Canada and Mr. W. L. Bialkowski of Domtar Inc.

The paper was based, in part, on recent surveys of 400 computer systems installed in the Canadian pulp and paper industry and 25 Canadian systems engineers with design experience. The conclusions were that a "results gap" exists between expected performance and actual performance for many installed process control systems because "system performance degrades with time if adequate attention is not paid in all areas." The study noted the following major causes of poor performance of installed systems:

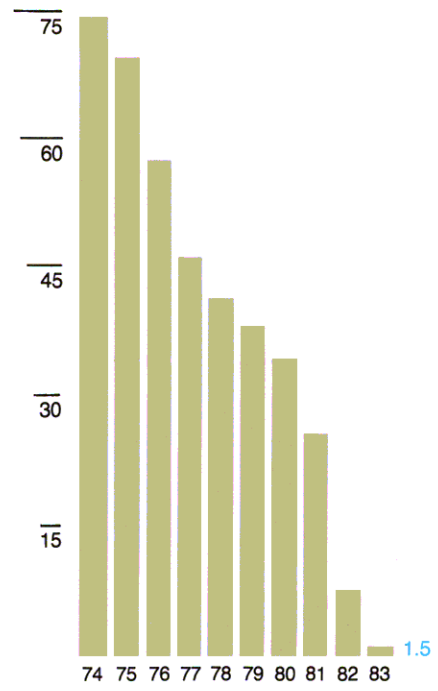
- Complete reliance on suppliers
- Inadequate sensor calibration routines
- Poor regulation performance
- Low availability/utilization
- Inadequate operator training
- Poor assessment of economic returns

It seems obvious that our customers would be much more interested in applying additional

Backlog – End of Year
(Millions of Dollars)



Bank Debt
(Millions of Dollars)



process control systems if they believed that the existing systems always worked well and truly improved the way they run their business. We believe that the supplier who demonstrates the highest quality in products and services will be the one who will capture the dominant share of the market.

In addition to growth through quality, we see significant opportunities in the continuing development of cross-machine control for flat sheet process markets, further penetration of the wood products market, and growth in steel, aluminum and plastic process automation markets.

The major driving force in the paper machine control market in the next few years will be the industry trend toward computer-directed cross-machine controls. Historically, process control systems supplied to the paper industry automatically controlled only the machine direction average value of such key product parameters as weight and moisture. Beginning in the 1980's, we were able to demonstrate that 50-75 percent improvements in product uniformity could be achieved routinely by cross-machine control of basis weight, moisture, caliper and roll hardness. As a result, significant new capital investments are being made by the paper industry in cross-machine control. This kind of dynamic change will have the effect of substantially increasing the size of our market potential.

During 1983, we had a number of extremely important system startups that proved how well we can apply our AccuRay systems with a variety of cross-machine control actuators. For basis weight control at the slice on paper machines, actuator companies are now providing thermal-hydraulic actuators and various motorized slice-jack assemblies. For moisture, these include steam-boxes, spray dampening and infrared drying systems. We also were able to successfully integrate cross-machine controls with the optimizing machine direction controls. This demonstrated to the industry our strength as a systems supplier and enhanced our reputation for being able to handle some of the toughest applications in the industry.

Our challenge during the past year in the wood products market was to expand our customer base for the AccuRay 6000 MICRO™ sawmill automation system outside of the Weyerhaeuser mills where we had made the initial installations of green trimmer optimization systems. As an example of our progress, a 6000 MICRO was installed during 1983 at Bunnell Lumber Division of ITT Rayonier Inc., with AccuRay Corporation taking full turnkey responsibility for the project. The customer summarized the results of the installation in the following letter:

"The installation was accomplished with minimal disruption to the mill's production which reflected the effective installation planning and close attention to detail and resulted in the system being placed in automatic control within 24 hours following the mill's normal startup."

ITT Rayonier Inc.
Bunnell Lumber Division
Bunnell, Florida
October 17, 1983

Also, acceptance trials were completed at our latest sawmill installation in November of this year with the customer reporting:

"System installation and startup were rapid and efficient. Installation was essentially complete within two days of system emplacement. Within six hours of mill startup the system was producing economic results."

New South Forest Industries
Conway, South Carolina
November 17, 1983

Our customer base in the sawmill industry now consists of 16 Green Trimmer Optimizers, 4 Primary Breakdown Control Systems and 14 Sawmill Information Systems which gather information from each of the machine centers for summary reporting and providing alarms about conditions requiring management attention. Every installation has been quite successful and represents a good reference for potential customers to visit.

In 1984, we plan to make available a Green Trimmer Optimizer module which will be supported by an IBM Personal Computer instead of the full minicomputer-based Sawmill Information System. This will provide the customer with a lower-cost entry-level module which can be expanded to a full Sawmill Information System at a future date. The same concept will be utilized for the primary breakdown machine center with a stand-alone Primary Breakdown Control supported by an IBM Personal Computer. Since the IBM Personal Computer can also be used in the sawmill office for other business functions, its use with the AccuRay 6000 MICRO is an attractive entry-level offering for sawmills.

The 1983 introduction of the AccuRay 7000 MICRO™ System for application in steel and aluminum markets was very successful. Our business improved in each quarter of the year and we have now received a total of 50 new orders for these systems. The 7000 MICRO meets the industry's need for quality and productivity through fast, accurate and stable measurements. The system's high reliability and demonstrated

accuracy of ± 0.1 percent helps metals rollers cut product variations up to 50 percent or more. Also, the system is compatible with any modern, computer-based mill control system. Many of our customers have been attracted by a feature of the 7000 MICRO which, through the addition of a single printed circuit board, provides a Statistical Quality Control report on the thickness variability within each coil of steel or aluminum. This report is in the same form frequently being requested by the automotive industry and other end-user's.

In viewing the future, we plan to place increased emphasis on applications for AccuRay systems in plastics for calendering, coating and sheet extrusion. We note growing markets in plastics co-extrusion, extrusion coating and the multi-layer packaging of plastics with other materials, such as in aseptic packaging. The January 16, 1984, issue of *Business Week* described the growing market in the U.S. for aseptic packages which sandwich aluminum foil between laminates of paperboard and plastic to create an airtight container. This process has been widely used in Europe and throughout the rest of the world for many years to package non-carbonated beverages, such as milk and juices, and is now gaining increased acceptance among U.S. food processors. Aseptic packages have several advantages over other packaging methods in that the packages require no refrigeration and have a long shelf-life.

During 1984, we will install two more of our AccuRay 1180 MICRO™ systems on Tetra Pak aseptic packaging lines. The AccuRay system includes a sophisticated measurement with a single sensor capable of simultaneously measuring the layers of polyethylene plastic on the outside and inside of the laminated materials. The primary reason for measurement is product quality. Over past years we have installed 21 other systems at Tetra Pak plants throughout the world.

In addition, we received an order in December 1983 for a similar AccuRay 1180 MICRO System to be installed in the new Combibloc, Inc. manufacturing facility for aseptic packages to be located in Columbus, Ohio. Combibloc is the joint venture business formed by RJR Archer, Inc., a unit of R. J. Reynolds Development Corporation, and PKL, a subsidiary of Jagenberg AG of West Germany, to market aseptic packaging systems in the United States. We expect other companies to be entering the market in the next few years and we believe that our prior specialized experience in this field puts us in an excellent position to supply the measurement and control system needs for this growing market.

The AccuRay 1180 MICRO System utilized in these applications is based upon a hierarchial structure of distributed microprocessors supported by a minicomputer. The 1180 MICRO is designed so it can be multiplexed over several plastics extrusion lines. As an example, Illinois Tool Works Inc., the Chicago-based corporation with a large business segment in packaging products, has ordered nine of these systems which will ultimately provide measurement and control over 15 flat sheet extrusion lines. During 1984, we plan to expand our product capability in extrusion by introducing a scanning AccuRay 7000 MICRO System. The 7000 MICRO, which uses the microprocessor unit in a stand-alone configuration, has previously been applied in the tobacco industry, as well as in the steel and aluminum industries. The introduction of the AccuRay 7000 MICRO as a scanning system will offer a cost-effective solution for the single-line plastics extrusion process.

The majority of economists, business leaders and government specialists seem to agree that 1984 will be a year of solid business gains in the U.S. in all of our primary industry markets. We also note the concerns expressed by our customers over excess production capacity, high interest rates and the strong U.S. dollar in relation to other international currencies. All of these factors increase the pressures on our customers to improve their competitive position in their own markets with respect to quality and cost of manufacturing. AccuRay Corporation is presently in an ideal position to provide solutions to meet these critical customer needs and we are very optimistic about our business prospects for the next several years.

Sincerely,

David L. Nelson

David L. Nelson
President

Quality

After lying dormant for decades, the word *quality* has arisen from dusty dictionary pages to become perhaps the most overused word of the 1980's. Everyone is talking about their quest for quality, but few have been able to turn this talk into meaningful action. Why? Although everyone can agree quality is important, few can agree on how to achieve quality in their products and services.

AccuRay doesn't claim to have a magical solution for achieving quality. We do, however, have some basic guidelines. For example, we know our customers perceive quality as a system that conforms to their requirements. In other words, quality is a control system they can consistently depend upon to keep their production process running at peak efficiency while maintaining high product uniformity. We also know that once the customer requirements have been established, how well we conform to those requirements is a function of designing and building quality into our products and services — not inspecting faults out.

Although quality may be an overused and undersupported goal for many companies, AccuRay has been actively pursuing its goal to be the quality leader and cost-effective supplier in the process control industry since 1978. In that year, AccuRay management announced the important role quality would play in differentiating our products from competitors, increasing market share and boosting profitability by establishing quality as the cornerstone of our long term strategic plan. Since then, this strategy has blossomed into an aggressive corporate-wide quality control program that continually tracks products and services to determine the causes of superior and unsatisfactory performance. This allows AccuRay to pinpoint the cost of non-conforming products and services and eliminate their causes — permanently. It also assures customers that an AccuRay system will cost less and provide a higher return-on-investment during its lifetime than competitive systems.

Through the use of statistical methods, responsibility for the quality of AccuRay products and services has increasingly spread down through the organization from top management to our 1,770 associates. In support of this, AccuRay associates participated in statistical quality control technique training during 1983. This step continues our move away from costly, time consuming quality inspection functions toward an environment where individuals and line management are responsible and accountable for doing things right the first time.

With an array of quality programs (see pages 10 and 11) that have earned domestic and international recognition, it is evident that AccuRay's commitment to quality is no empty statement of intentions. It involves real actions by AccuRay associates to improve our products and services. Simply stated, at AccuRay quality is everyone's business.

Overall effectiveness of the individual Operator Quality Control System implemented by our Dundalk, Ireland, manufacturing facility, earned two awards during 1983 — the Quality Mark, an impartial seal of approval from the Irish Quality Control Association, and the 1983 Irish National Insurance Quality Control Award.

"I didn't know what quality was until I came to AccuRay."

Gerry McGee
Electro-mechanical Assembler
AccuRay Corporation
Dundalk, Ireland

Quality means conformance to customer requirements. These requirements are:

1. Manufacture and delivery of the highest quality system possible.

Final test quality of our two core products, the 1180 MICRO and 7000 MICRO systems, have been improved by 50 percent since 1981.

2. Rapid installation and startup at the customer's site.

1180 MICRO System installation on paper machine #6 at Westvaco Corporation, Luke, Maryland, Pulp and Paper Mill

Thursday September 1 1983	Full system delivered to mill.
Friday September 2 1983	Wet end and dry end operator stations mounted. MICRO System powered-up and checked-out as operational.
Monday September 5 1983	Paper machine #6 shut-down for installation of scanner frames.
Wednesday September 7 1983	Installation of pre-size press, pre-coat and reel scanners completed. Operator training conducted on the system.
Thursday September 8 1983	MICRO System automatic controls implemented.

3. Consistent uptime of 99.8 percent — or better.

Since 1978, we have improved the Mean-Time-Between-Failure for all MICRO systems by 250 percent.

4. Full customer utilization of all system controls and management information features.

"AccuRay Corporation represents a significant resource for state-of-the-art process control systems. Of equal or greater importance, they practice what they preach about quality control. Their concerted efforts have resulted in more effective utilization of the many capabilities built into the 7000 MICRO and realization of our desire to provide cigarettes of the highest quality."

Dr. Preston H. Leake
Assistant Research and Development Director
The American Tobacco Company

5. Constant feedback through performance reviews with customers, suppliers and associates.

Open communication with these groups provides the feedback needed to avoid quality problems, correct what we are doing wrong and further improve what we are doing right.

1978
Senior Management includes Quality as a major corporate objective

1979
Established Senior Executive position dedicated to Quality.
Quality Steering Committee established.
Statistical Quality methods introduced

1980
Quality Audit teams established to audit AccuRay system performance

AccuRay has taken the necessary steps to achieve quality.

The result is a higher return-on-investment over the life of the system.

1981
Productivity Teams and semi-annual customer reviews instituted

Field Specification Engineer position created to improve definition of customer and installation requirements.

1982
January
Quality Programs Group established within Engineering

March
Installation Quality Seminar held. Quality Response System initiated

April
Parts Quality Program introduced

June
Additional Productivity Teams initiated

July
Quality Task Forces established for:
- Engineering/Manufacturing
- Vendors
- Field

October
President Reagan visits AccuRay acknowledging the Company for its exporting excellence and dedication to improving quality

November
Manufacturing Supervisors and Team Leaders complete leadership and statistical training. Established Defect Prevention and Quality Communications Programs. Director of Quality Management position elevated to Vice President level

December
Internalized Vendor Quality and Field Quality task forces into line organization. Launched statistical quality control training for all associates

1983
January
Established worldwide Installation Quality Results Program and Human Productivity Results Program.

February
19 senior managers attend Dr. Juran seminar on Upper Management and Quality

May
Electro-Static Discharge Prevention Program initiated

June
Interdepartment Quality Action Forum Team established

July
Project Management Course introduced for field organization

August
Product histories reviewed to identify areas for improvement

October
New review process for product development emphasizes process diagnosis, seen as quality breakthrough

November
Dundalk manufacturing operation selected for Irish National Quality Control Award

December
40 percent of all associates complete statistical quality control training. Manufacturing completes break from quality inspection to self-inspection.

Great, AccuRay has a working quality program. But as a customer, what does that do for me?

A lot.

First off, we have improved the final test quality of our two core products, the AccuRay 1180 MICRO and AccuRay 7000 MICRO systems, by 50 percent over the past two years. However, as impressive as this statistic may be, the true test of quality is not just how well the system works when it leaves our shipping dock, but how well it works in the customer's facility.

Customers find they can depend on their AccuRay system's ability to whittle down costs and improve product quality virtually 100 percent of the time. Perhaps more importantly, this high uptime frees AccuRay and customer service personnel to progress from a "fix the system" focus to become "system optimizers." This evolution helps customers achieve a higher economic return through better use of their system's control and information capabilities. We call this better *system utilization*.

One unique method we employ to assist customers in utilizing their systems more effectively is the semi-annual performance review. A typical performance review brings together senior management from both AccuRay and the customer company to review recent system performance. Specific achievements and problems are highlighted in this meeting, and action is then initiated to achieve the shared goal of maximum *system utilization*. This "partnership" to maximize the return on capital the customer has already invested benefits both parties. The customer is more satisfied that he chose AccuRay and AccuRay is more likely to receive repeat business.

Another outgrowth of our quality program is the 1983 introduction of a new 12-month warranty that substantially exceeds the standard 90-day warranties offered by other process control suppliers. This EVERGREEN Parts Warranty assures customers that all AccuRay MICRO™ System parts will be free from defects for a period of one year — or AccuRay will replace them at no cost to the user.

All told, the final objectives of these and other programs are to minimize the system's lifetime costs and maximize its lifetime return-on-investment. By doing so, we will better meet the needs of our customers and establish a strong market preference for AccuRay products and services.

A proven method of creating and maintaining open communication between AccuRay and the marketplace, performance reviews help customers use their AccuRay systems more effectively to enhance the quality of their operations and return on system investment.

"The primary reason we bought the AccuRay control system was for quality — to improve the uniformity of our paper."

John McDonald
Manufacturing Manager
Grays Harbor Paper Company/Hammermill

Pulp & Paper

The U.S. pulp and paper industry, followed by the Japanese and European industries, should enjoy a 50 to 100 percent increase in profitability over the next few years, according to many industry analysts. This and other positive economic indicators make AccuRay very optimistic about capital spending prospects in a market that has historically accounted for the largest portion of our annual revenues. Several signs of this industry's resurgence were apparent in 1983.

Although there was only a minimal increase of 3.8 percent in capital expenditure levels for the pulp and paper industry during the past year, AccuRay revenues from this market exceeded expectations due to a surge in paper orders during the second half of 1983. This surge was triggered by profitability increases as pulp and paper mill operating levels exceeded 90 percent of production capacity, well up from the depressed levels of recent years. Increased demand for paper is especially apparent in linerboard, used to make packaging materials, and writing and printing papers, used primarily for photocopying, printing and computer printouts.

More importantly, paper industry capital spending patterns have shifted. A higher proportion of spending is now being directed toward modernizing existing manufacturing plants instead of expanding production capacity through construction of new paper machines. Companies are expected to continue this modernization emphasis as they strive to improve efficiencies and enhance product quality — a scenario tailor-made for AccuRay.

At present, there are about 800 AccuRay 1180 MICRO systems, along with hundreds of our earlier generation systems, controlling paper machines worldwide. This large base of installed systems will continue to grow as 1180 MICRO systems are purchased for new paper machines in the expanding linerboard and printing and writing papers market segments, unequipped machines in the growing Asian market, and as replacements for competitive systems and earlier generation AccuRay systems.

In addition to the market for new systems, intensive research and development programs allow AccuRay to continually provide customers with new state-of-the-art sensor, software and hardware advances that can be added to existing systems. This allows present system owners to cost-effectively bring even the first 1180 MICRO System installed in 1976 up to today's standards. We call this unique approach to system development EVERGREEN Technology™, after the evergreen tree which constantly renews itself to stay green and alive. Through this ability to continually add the latest technology without excluding prior capital investments, AccuRay helps customers overcome the costly problem of system obsolescence. How? EVERGREEN Technology gives AccuRay MICRO systems a longer, more useful product life than any other system available.

AccuRay 1180 MICRO systems help the paper industry reduce production costs, increase production efficiency, perform quality assurance functions and access real-time management information by monitoring the paper-making process virtually 100 percent of the time.

"When we bought an AccuRay system in 1977, we expected to add new features as funding and technology made those features available. Because of this, I have to say AccuRay's EVERGREEN Technology approach has been a definite advantage to us."

Thomas Williscroft
Mill Manager
Weyerhaeuser Containerboard Division

Pulp & Paper — Cross-Machine Control

When analysts look back upon the 1980's, they may rank cross-machine control as one of this decade's most significant process automation developments. This product allows paper manufacturers to assault the largest remaining source of product quality problems.

In essence, the major objective of a process automation system is to measure how much certain product characteristics fluctuate and then control those characteristics so they only fluctuate within a very narrow range. The more tightly these characteristics are controlled, the more uniform the final product quality will be.

When producing a flat sheet product, such as paper or extruded plastic, total fluctuations can be attributed to two sources: machine direction variations, which account for 60 percent of total variations, and cross-machine variations. When the MICRO System was first introduced, papermakers were primarily concerned with attacking the biggest offender, machine direction variations. Due to the ever-increasing quality demands of end-users, there is now a growing industry need to control the largest remaining source of variations. Through a series of product releases over the past four years, AccuRay now has a complete family of Profile Manager™ cross-machine controls that can be used in combination with present machine direction controls to further reduce variations by 50 to 80 percent.

Because we recognize that off-the-shelf solutions won't solve difficult applications, our systems approach to this product line is unique in the industry. Through agreements with other suppliers, AccuRay provides customers with one source responsibility for the entire cross-machine control package. AccuRay provides portions of the package which match its expertise, namely accurate, reliable sensors and sophisticated cross-machine controls. Then customers can select a custom-engineered actuator from several leading suppliers to enact the AccuRay supervisory control commands. The end result is an application-matched Profile Manager package which produces the best results and return-on-investment for the customer.

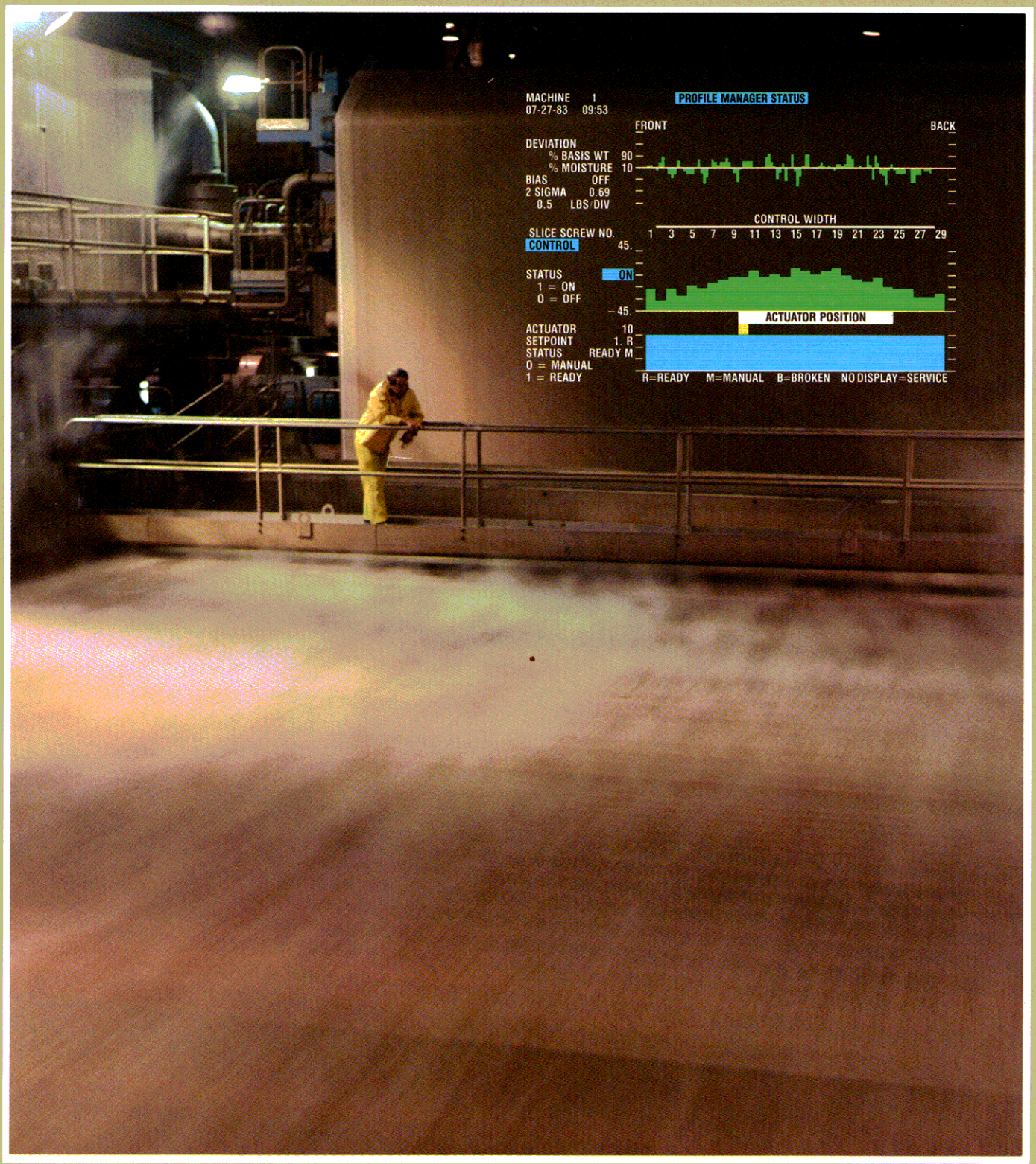
During early 1984, AccuRay will further expand the Profile Manager product line with a new microprocessor-based, stand-alone set point station and automatic control module which can be added to all MICRO and pre-MICRO systems and, for the first time in the industry, competitive systems as well. By allowing customers to purchase the industry's best cross-machine control module without the added expense of a new MICRO System, AccuRay offers a very cost-effective alternative for the cross-machine control needs of the entire paper industry — not just those with 1180 MICRO systems.

The benefits of this product line are so attractive that AccuRay anticipates papermakers will purchase 1,000 of these modules over the next five years. These same projections indicate the market for cross-machine control is as large as the market for new systems, representing an opportunity to double AccuRay pulp and paper industry revenues by 1990. Considering that this technology can eventually be applied in several other markets, cross-machine control is AccuRay's most significant opportunity to increase revenues.

New printing processes and other quality demands have rendered past quality levels for paper unacceptable in today's marketplace. As the most cost-effective control available to the paper industry, cross-machine control helps manufacturers meet stringent quality demands from their customers.

"AccuRay cross-machine controls help us meet ever-tightening quality demands from our customers."

Dipl. - Inq. F. Kaessberger
Technical Director
Haindl Papier GmbH



Paper machine photo courtesy of St. Regis Corporation

Wood Products

Although depressed capital spending levels over the past four years have kept AccuRay from achieving satisfactory sales levels in the lumber segment of the forest products industry, economic recovery makes this another promising market for the coming years.

Fueled by the combination of pent-up consumer demand and slightly reduced mortgage interest rates, housing starts — the main indicator of lumber demand and pricing — reached the 1.7 million unit level in 1983 for the first time in four years. This level of activity was well above the dismal 1.1 million starts recorded in 1982 but short of the robust 2 million-plus annual levels of the early 1970's. The broad consensus for the next few years: housing starts will approximately equal 1983's activity — meaning a stable, but relatively low growth housing market is anticipated.

Given this scenario, sawmill inefficiencies tolerated during the 1970's can no longer be ignored, since sheer volume will not offset high production costs and suboptimal use of raw materials. Therefore, sawmills must turn to sources such as technology to automate and optimize their production process to increase the wood yield from each log, increase overall mill efficiency and enhance the quality of their finished product.

Our major product for sawmills, the AccuRay Trimmer Optimizer, is helping customers achieve this goal. By transforming the operation of green trimmers — which trim the rough ends off dimensional lumber, such as 2X4's — from a manual operation to an automated operation, the average AccuRay Trimmer Optimizer system installation can save a sawmill almost $1 million per year. That's one good reason why there are more AccuRay Trimmer Optimizers installed in North American sawmills than all competitive systems combined.

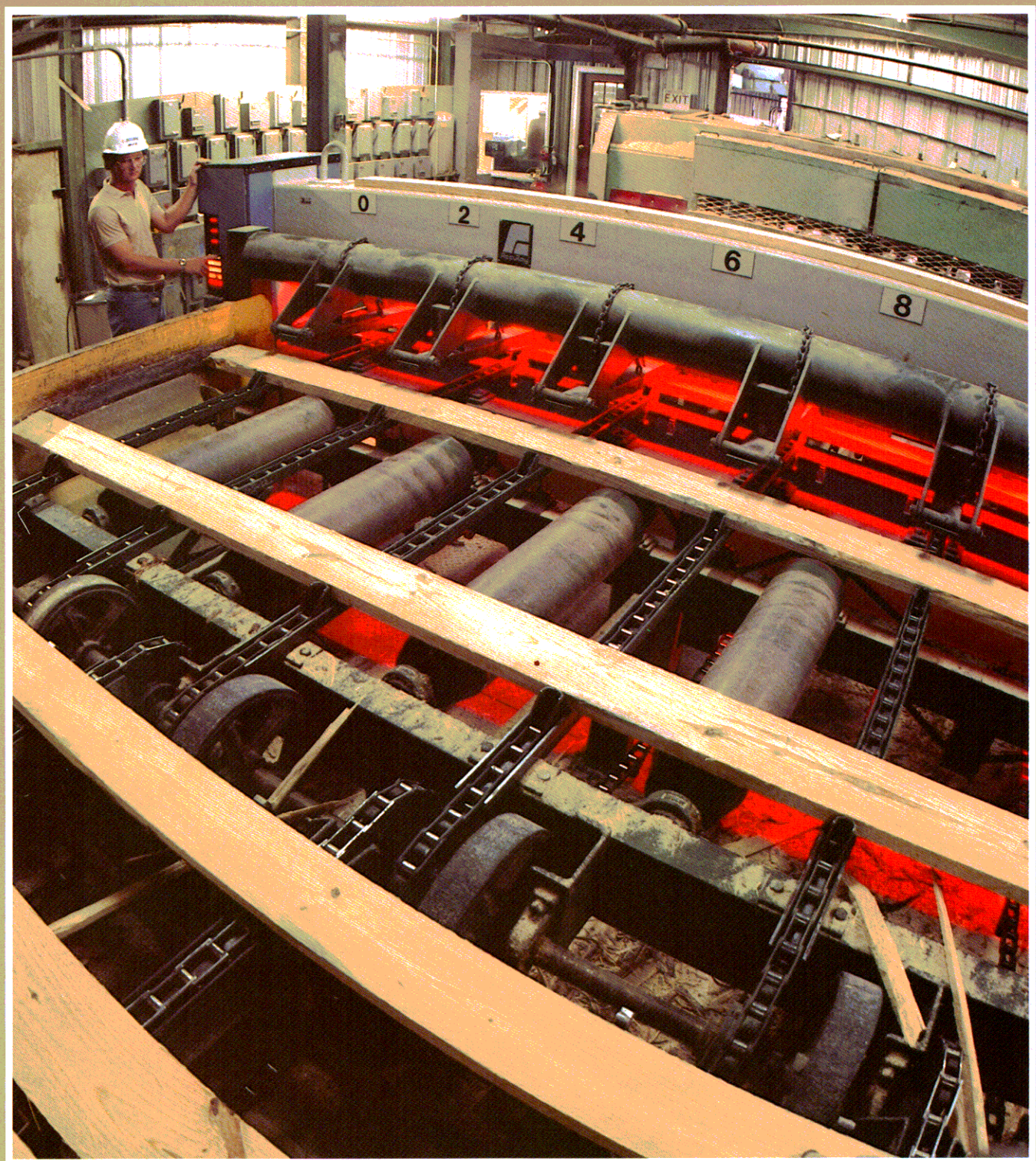
With products that meet industry needs, coupled with the traditional pick-up in capital spending that follows an upswing in business activity, AccuRay has targeted this industry as a growth market for the next several years. In order to concentrate upon this opportunity, a separate wood products sales and service organization reporting directly to the Office of the President has been established. Also, several development programs spanning the next two years will bring new sawmill automation products to market and modify existing offerings to meet growing customer requirements.

All told, AccuRay plans to triple the amount of revenues derived from the wood products market over the next three years as we continue to penetrate the sawmill market in the South and the Pacific Northwest.

By measuring each board and controlling how the ends are trimmed-off, the AccuRay Trimmer Optimizer can save sawmills almost $1 million per year.

"We believe the AccuRay Trimmer Optimizer to be by far the most advanced on the market at this time."

James A. Edson
General Manager
Lake Butler Sawmill
Owens-Illinois
Forest Products Division



Tobacco

For generations, cigarettes were little more than an inexpensive, unconscious purchase. Today they are so exploited as a source of tax revenue that smokers are very conscious of the $1 a pack they now cost in many portions of the world. What impact will this have on the cigarette industry?

Well, despite a small decline in U.S. and European cigarette demand, strong production and consumption trends in developing countries coupled with continuing investments in factory modernization will maintain the historic profitability of cigarette manufacturers. However, as taxes continue to boost prices, consumers will demand consistently high quality or else switch to another brand. Cigarette manufacturers, on the other hand, are not only interested in quality — to achieve market share — but also increased production efficiency: Two needs our products are uniquely suited to meet.

Perhaps the best testimonial to this is the large number of customers who have purchased AccuRay process controls. AccuRay systems are at work in the factories of every major cigarette manufacturer in the world controlling the production of close to two trillion cigarettes a year. In fact, our major product for the tobacco industry, the AccuRay 7000 MICRO System, is the single most successful product in the company's history.

Utilizing microprocessor technology that has continually out-paced competitive offerings, the 7000 MICRO is a powerful, on-machine system that automatically measures, controls and inspects each cigarette as it is produced. The important data accumulated while performing these functions is also made available to operators or can be tied into a production management system, the AccuRay 7500 MICRO INFORMATION SYSTEM™, to compile and analyze information on all cigarette making machines in the factory.

Despite this success, we are not resting on our laurels. One of several new products for the cigarette industry is CIM™, short for Cigarette Inspection Module. Consider that 20 years ago machines rolled cigarettes at 1,200 per minute while today's state-of-the-art machines produce cigarettes at 8,000 per minute. At these high speeds, quality inspection is a formidable task. By adding CIM to present 7000 MICRO systems, cigarettes that fail to meet quality standards because of filter or tobacco rod defects are automatically identified and rejected from normal production. CIM removes over half of the cigarettes consumers would complain about and traces the causes of quality problems to their source — so they can be corrected.

Through our EVERGREEN Technology, tobacco customers can expand their 7000 MICRO systems with CIM and other new products, such as the Logic and Data Module. Designed to expand the MICRO system's input, output and computing capacity, the Logic and Data Module allows other areas of the cigarette fabrication and packing process to be tied into the AccuRay system. By helping cigarette manufacturers better maintain, utilize and, in some cases, replace existing cigarette machine electronics, we expect this module will extend the useful life of production machinery. This is a very attractive option, especially since customers can add about 30 of these modules for the price of one cigarette maker/packer machine.

Using fiber optics to inspect every cigarette for quality defects such as discoloration, holes and protrusions, CIM is the most advanced and the most effective cigarette inspection device available.

"Tests have indicated that AccuRay systems, particularly the Cigarette Inspection Module (CIM), enable us to accomplish our goal of continued quality improvement resulting in better customer satisfaction as measured by reduced consumer complaints relative to sales."

Radford Reel
Director, Quality Audit and Control
Liggett & Myers Tobacco Company, Inc.

Metals

Of all the smokestack industries, the decline of big steel has been the most publicized. Because of this, some may have questioned AccuRay's new foray into the metals rolling industry during 1983. Fortunately, these questions have been resoundingly answered with one of the most successful product introductions in AccuRay history — the application of the 7000 MICRO System to the production of rolled sheet, strip and foil from steel, aluminum, brass and specialty steel.

Why did these manufacturers purchase more AccuRay systems in 1983 than in any year since we perfected our first metal thickness gauge in 1950? In a business where there are few ways to beat the competition other than outperforming or underpricing them, the 7000 MICRO measurement system helps do both.

Probably the most enticing benefit of the 7000 MICRO is measurement accuracy of ±0.1 percent. Exact measurement accuracy allows manufacturers to broaden their market by pursuing customers whose specifications could not be met before. More importantly, it satisfies the most driving force in this industry today: ever-increasing quality demands from end-users. Customers, such as the auto industry, have been pressured to improve quality by both consumers and competition. As AccuRay has done with its suppliers, the auto industry has clamped down on suppliers to improve the quality of purchased materials. In this case that means the thickness of rolled metals must be highly uniform — a requirement perfectly suited for the measurement capabilities of the 7000 MICRO. Also, the data gathered by the system can be compiled into a one-page statistical quality summary which documents the quantity and quality rolled into each metal coil — a report that fits right into the statistical quality reporting systems now emerging in steel and aluminum. In fact, the quality control capabilities of the 7000 MICRO are so attractive that steel service centers and rolling mill inspection lines, where the primary economic benefit is improved quality, have shown a great deal of interest.

Through stable, accurate measurements, the 7000 MICRO System cuts product variations up to 50 percent or more, allowing manufacturers to confidently roll closer to minimum thickness standards. This reduces the materials wasted attempting to remain within a "safe margin" of end-user thickness requirements, thus squeezing more product and profit from raw materials.

With the right product at the right time, we expect the momentum generated this year to continue as we develop new features for the 7000 MICRO, further expand our sales in the new system market and replace the large number of obsolete systems purchased in the sixties and early seventies.

Top-of-the-line measurement accuracy and speed-of-response to thickness variations at a surprisingly affordable price made the 7000 MICRO for the metals rolling industry our most successful product introduction in 1983.

"The 7000 MICRO is an extension of our program to improve quality to meet the growing demands of customers for high quality, no defect steel strip."

Keith Pigney
Manager of Development and Engineering
Teledyne Rodney Metals

Plastics and Others

If the 1960's movie *The Graduate* were filmed today, the hot employment tip given young Dustin Hoffman at a cocktail party could be "Aseptic Packaging."

Look around your grocery store and you will see why. Almost every major brand of fruit juice is now available in new "paper bottle" packages that are expected to capture a third of the fruit juice market. What is the lure of aseptic packaging? It has a distinct cost advantage over cans and bottles, requires no refrigeration and provides convenience for the consumer and retailer alike. If these benefits yield the degree of market penetration anticipated, up to 100 lines will be producing the base sheet for aseptic packaging in the U.S. alone by 1990 — more than twice the number of lines that now exist in the entire world.

To date, AccuRay has captured a major portion of this process control business in Europe, Asia and the Third World where sterile, airtight aseptic packages first caught on by allowing unrefrigerated milk to be stored for months, and fruit juices and semi-solids, such as dessert puddings, a shelf-life measured in years. AccuRay's market position is the result of proprietary measurement sensors and strategies that control each of up to eight plastic, paper and foil layers melded together in this complex extruded sheet. The high cost of waste — since it can't be recycled — and the visibility of consumer goods packaging makes AccuRay control and quality assurance functions very important to this industry.

AccuRay's position in the aseptic packaging market can also be attributed in part to our long association with the plastics industry. For years, AccuRay systems have measured and controlled the thickness of extruded plastic sheet and film, reducing product variations up to 85 percent. And, like the paper industry, there is great potential for the application of cross-machine controls, referred to as auto-die control in the plastics industry. Armed with this and a new system product currently in development, we plan to pursue this worldwide market much more aggressively than in the past. The potential is large. Many production lines presently have no computer control and industry growth will spur the startup of new lines plus an active replacement market for hundreds of control systems now nearing obsolescence.

In a separate market, the resurgence of housing has fiberglass insulation manufacturers using more of their production capacity than in prior years. As demand increases, an AccuRay system's ability to measure and control the amount of glass and binding material used to produce a continuous insulation sheet becomes magnified. The system helps achieve a more uniform sheet with better adherence to specified insulating values, reduces the use of materials to minimal levels and helps get more product out the door — for the same cost.

A natural choice for snacks and lunch boxes, single-serving aseptic packages were well-received by U.S. consumers in 1983. As the world's leading supplier of aseptic packaging control systems, AccuRay plans to benefit from this growing market.

"The AccuRay System is the most impressive control device ever to be installed on any fiberglass insulation manufacturing line."

Jim Kusterer
Manager, Process Engineering
Manville Building Materials

"Only AccuRay provides the measurement accuracy needed to produce a quality, leak-proof package — everytime."

Sven Nilsson
Technical Director
Tetra Pak

Directors and Officers

Directors

Edward McC. Blair
Senior Partner
William Blair & Co.
(Investment Banking)

Christopher J. Campbell
Executive Vice President
AccuRay Corporation

Henry R. Chope
Consultant

John Eckler
Partner
Bricker & Eckler
(Attorneys at Law)

Charles W. Lake, Jr.
Chairman of the
Executive Committee
R.R. Donnelley & Sons Co.

William M. McLaughlin
Chairman
Calibre Corporation

Dr. David L. Morrison
President
IIT Research Institute

David L. Nelson
President
AccuRay Corporation

George F. Schlaudecker
Consultant

Robert E. Swenson
Vice President - Finance
AccuRay Corporation

George B. Young
Director & Trustee
Various Organizations

Operating Officers of AccuRay Corporation And Subsidiaries

William L. Adams
Senior Vice President

Walter H. Canter, Jr.
Vice President

Maxwell L. Close
Vice President

Donald D. Danison
Vice President

John E. DeWitt
Senior Vice President

Mark K. Duyck
European Controller

John E. Eickelberg
Vice President

John T. Fleckenstein
Vice President

David J. Foster
Vice President

Ladd R. Grapski
Controller

Herbert J. Kahn
Senior Vice President

James D. Mitchell
Senior Vice President

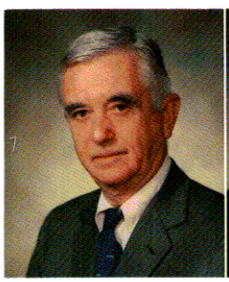
Dennis A. Orwig
Vice President

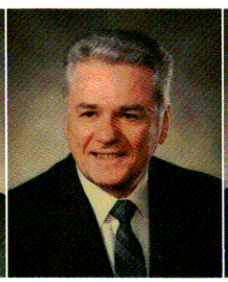
Ronald F. Shuff
Secretary and
General Counsel

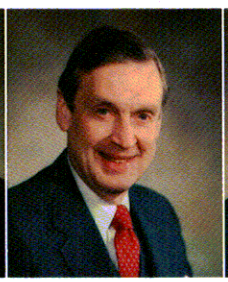
Douglas J. Spence
Vice President

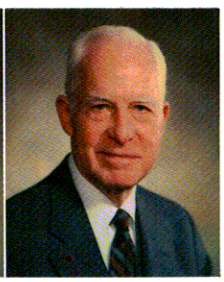
John C. Witherspoon
Vice President

Robert F. Zust
Treasurer


Edward McC. Blair

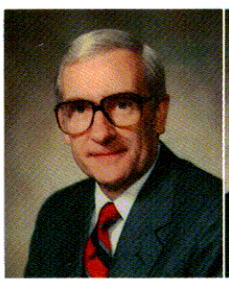

Christopher J. Campbell

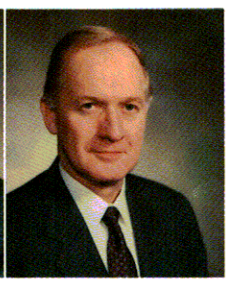

Henry R. Chope

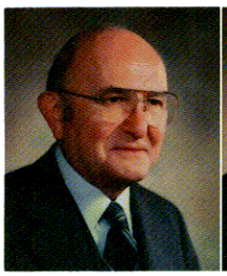

John Eckler

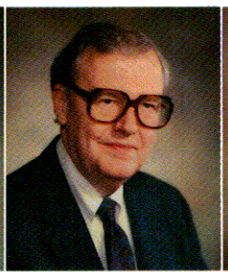

Charles W. Lake, Jr.

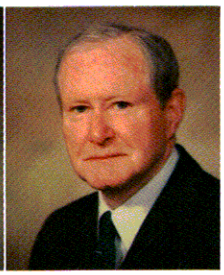

William M. McLaughlin


Dr. David L. Morrison


David L. Nelson


George F. Schlaudecker


Robert E. Swenson


George B. Young

AccuRay Corporation Principal Offices

Corporate Headquarters and Manufacturing
650 Ackerman Rd.
Columbus, Ohio 43202
Tel: (614) 261-2000

Manufacturing
Finnabair Industrial Park
Dundalk
County Louth
Republic of Ireland
Tel: (353) 042-36201

About half of AccuRay's 1770 employees are involved in research and development, manufacturing and administrative functions at the Company's worldwide headquarters in Columbus, Ohio.

The remainder of the Company's associates are employed at AccuRay's manufacturing facility in the Republic of Ireland and in marketing and customer service functions throughout the world.

Argentina:
Maipu 812 Piso 3 Office L
1006 Buenos Aires
Tel: (54) 1-392-4438

Australia:
Suite 5, Forum Centre
522/24 Kingsway
Miranda
New South Wales 2228
Tel: (61) 2-525-6688

Benelux Countries:
Genevestraat 10
1140 Brussels
Tel: (32) 2-2162440

Brazil:
Rua Beneficencia Portuguesa, 24
S/411
CEP 01033
Sao Paulo
Tel: (55) 11-2285250

Canada:
1890 Beaulac
Ville St. Laurent
Quebec H4R 1R9
Tel: (514) 331-5670

Finland:
Salomonkatu 17 A 12
00100 Helsinki 10
Tel: (358) 0-6940844

France:
8, Rue Auguste-Renoir
78400 Chatou
Tel: (33) 3-9521754

Germany:
Holzgasse 29-33
52 Siegburg
Tel: (49) 2241-64087

Italy:
Via A. Volta 16
20093 Cologno Monzese
Milano
Tel: (39) 2-2538051

Japan:
New Kudan Building No. 7
3-Chome Kanda-Jimbocho
Chiyoda-ku
Tokyo 101
Tel: (81) 3-2659465

Korea:
Room 1105, Lions Building
50-6 Chung Moo Ro 2KA
Chung-ku
Seoul
Tel: (82) 267-1180

Mexico:
Avenida de las Palmas 731-704
Piso 7
Lomas de Chapultepec
Mexico 10 D.F.
Tel: (905) 520-6058

New Zealand:
65 Marquerita Street
P.O. Box 1643
Rotorua
Tel: (64) 73-476928

Singapore:
55 Ayer Rajah Crescent #07-17/19
Ayer Rajah Industrial Estate
Singapore 0513
Tel: (65) 779-3811

South Africa:
7th Floor
Standard Bank Building Arcade
4th Street
Springs
Tel: (27) 11-568828/568826

Spain:
Calle Milanesado 21-23
Barcelona 17
Tel: (34) 3-203-2254
(34) 3-203-2208

Sweden:
Bergshojden 32
Box 7102
S-17207 Sundbyberg
Tel: (46) 8-980835

United Kingdom:
Coronation Road
Cressex Industrial Estates
High Wycombe HP12 3TA
Tel: (44) 494-442171

United States:
Suite N
2866 Dauphin Street
Mobile, Alabama 36606
Tel: (205) 476-2580

Suite 303
Suffield Center
Suffield, Connecticut 06078
Tel: (203) 668-1217

Suite 240
4800 S.W. Macadam Avenue
Portland, Oregon 97201
Tel: (503) 248-1191

Piedmont Center Building
33 Villa Road, Suite 400A
Greenville, South Carolina 29615
Tel: (803) 271-8730

711 North Lynndale Drive
Appleton, Wisconsin 54914
Tel: (414) 739-2383