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Celebrating 100 Years
 1904-2004

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he year 2004

marks the Company's
35th anniversary,
a tribute to our
perseverance
and adaptability
in the face of
market shifts and
technological
change.

DEAR STOCKHOLDERS, CUSTOMERS AND EMPLOYEES:

The year 2004 marks the Company's 35th anniversary, a tribute to our perseverance and adaptability in the face of market shifts and technological change. Throughout Spire's history, we have demonstrated the ability to innovate, translating advanced technology into commercially viable products. This ability has enabled us to adjust as market conditions dictate and persevere where others may have failed.

Today, we provide products and services to many customers in a wide range of industries. We operate in biomedical, solar energy and semiconductor markets with a number of different product lines, all based upon a common technology platform:

Biomedical Products

principally for vascular access catheters

Biomedical Services

for orthopedic and other devices

Solar Equipment

for manufacturing photovoltaic modules/cells

Solar Systems

to provide point-of-use electricity

Compound Semiconductor Services

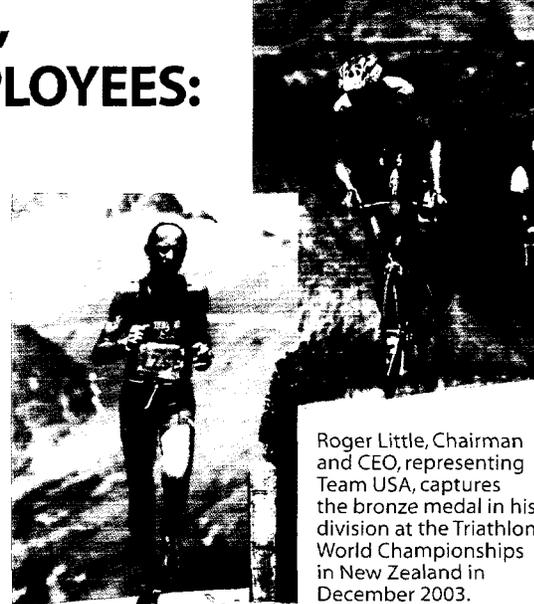
for optoelectronic devices

Research and Development

to develop advanced technology for commercialization

Highlights of the year included gains in biomedical processing services, catheter products and solar equipment, as well as our return to compound semiconductor processing services through the acquisition of Bandwidth Semiconductor.

Our revenues rose for the fourth consecutive year reaching \$15.8 million, a 7% increase from 2002 not including \$5 million and \$4.5 million, respectively, of other income received in 2003 and 2002 for the sale of a license. Revenues grew sequentially from quarter to quarter throughout 2003 passing the \$5 million mark for the fourth quarter, the highest quarterly performance attained since the fourth quarter of 1997.



Roger Little, Chairman and CEO, representing Team USA, captures the bronze medal in his division at the Triathlon World Championships in New Zealand in December 2003.

Although revenues were up and we were profitable for the year, our operational costs were higher in 2003 due to the Bandwidth Semiconductor foundry, cost-share of our solar equipment development contract and expenses from the roll-out of new vascular access catheter products. We also had higher indirect costs due to increased accounting and legal expenses, associated with an unusual level of regulatory compliance and the conversion to a new more efficient accounting system. Earnings, including the gain on the sale of a license in both 2003 and 2002, were \$9,000, or \$0.00 per share, compared with net income of \$2,237,000 or \$0.33 per share for 2002. We are concentrating on the operations of our core product lines and carefully monitoring our operating expenses.

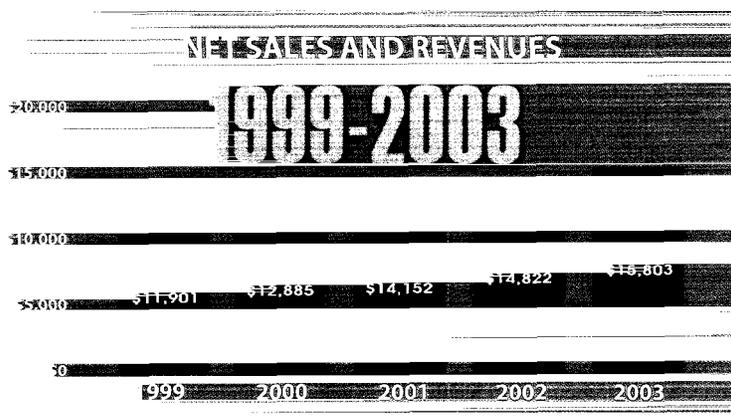
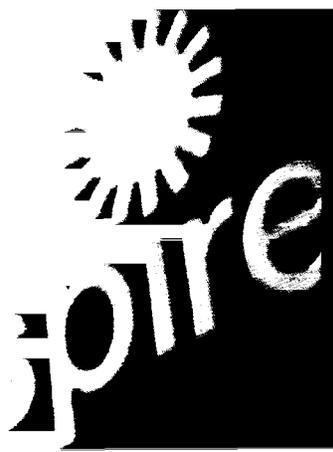
We begin 2004 with a strong balance sheet with approximately \$6 million in cash, total assets of more than \$22 million and no bank debt.

Looking ahead, we anticipate progress on a number of fronts. In solar, advanced equipment for making super-sized modules is under development. In biomedical, we are working on nano-coatings for orthopedic implants, new vascular access products, and surface treatments for enhanced performance in catheters. Our contract R&D efforts are pursuing next-generation, micro-surgical and molecular imaging instruments that have the potential to improve the quality of life for many.

With our proven ability to shape emerging technologies into commercial applications and solid balance sheet, we are confident about our future.

Roger G. Little
Chairman of the Board,
CEO and President

CELEBRATING THIRTY-FIVE YEARS OF INNOVATION

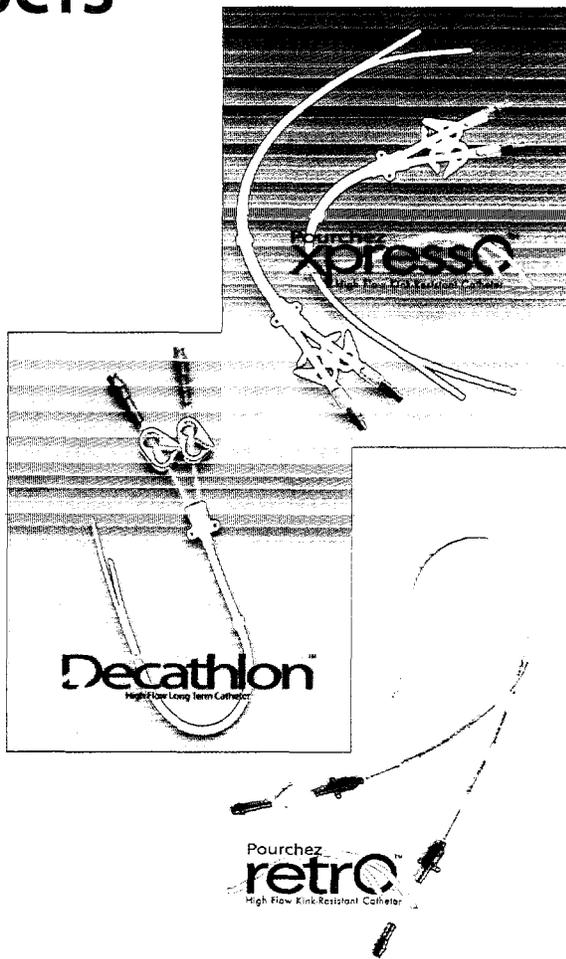


BIOMEDICAL PRODUCTS

Spire Biomedical develops, manufactures and markets premium vascular access products specifically targeted towards renal disease state management and intervention. The Company's vision is to leverage its core competencies in surface engineering to produce next generation devices that combine superior mechanical designs with enhanced biological function.

In 2003, the Company's Pourchez split-tip catheters, designed to improve therapy for dialysis patients, gained widening acceptance in the U.S. renal care market attaining a four-fold increase in revenues. This growth was partially driven by the launch of its RetrO™ catheter early in the year. Late in the year, the Company added its third premium split-tip catheter, the Decathlon™, which complements its existing hemodialysis catheters. The Company is aggressively developing new products on newly licensed intellectual property and expects to launch at least one additional product in the coming year.

To gain access to the second largest market for its products outside of the U.S., the Company entered into a distribution agreement with Gambro Renal Products AB, a subsidiary of Gambro AB, late in the fourth quarter. Gambro is a leading worldwide supplier of dialysis products and services.



BIOMEDICAL SERVICES

Spire ion implanted its first commercial orthopedic knee in 1984. Today, IonGuard® surface treatments, which extend the life of orthopedic implants such as hips and knees, comprise Spire Biomedical's single largest activity. To meet growing demand from orthopedic customers, the Company added additional capacity in 2003.

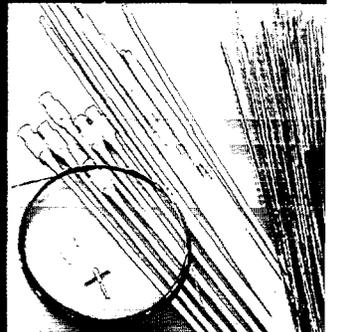
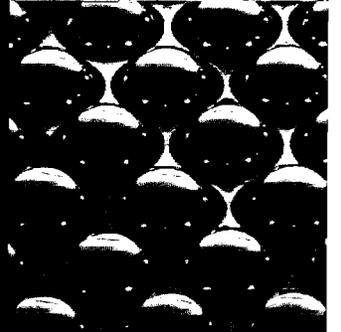
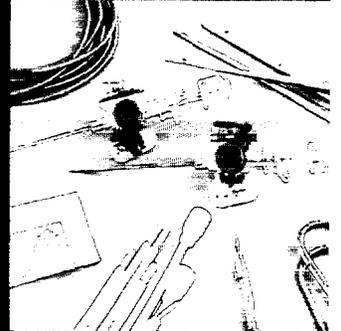
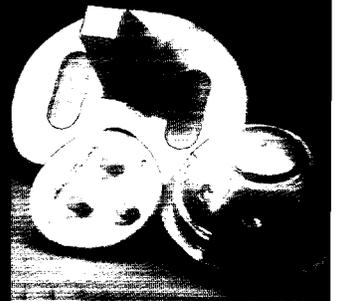
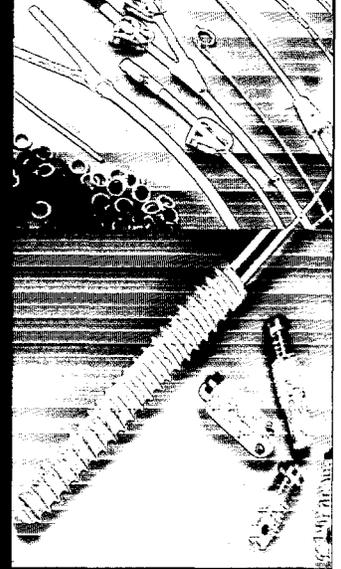
Spire enjoys a relatively strong customer base serving an aging but active population that is expanding in numbers both at home and abroad. Approximately 700,000 joint replacement procedures are performed each year in the U.S., and this number is growing rapidly.

Spire's surface treatments for medical devices utilize ion beam-based processes derived from semiconductor technologies. The high controllability and low temperature characteristics of these processes make them ideally suited for medical applications. In addition to orthopedic prostheses, the Company treats surgical and cardiovascular products including catheters, stents and vascular grafts, for

reduced wear and enhanced biological compatibility. Spire's biomedical services segment continues to innovate by developing new technologies to address surface-related issues in medical devices, such as nano-phase coatings to reduce wear and promote bone integration in orthopedic prostheses.

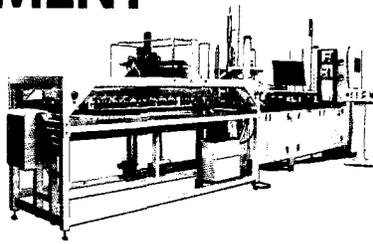


CELEBRATING THIRTY-FIVE YEARS OF INNOVATION



SOLAR EQUIPMENT

Developing technology that converts sunlight to electrical energy has been a focus of Spire's innovative efforts since the Company's inception. Spire entered the photovoltaic ("PV") industry in the early 1970s by developing solar cells for space satellites and then shifted into the terrestrial PV business by developing low-cost, high-volume module manufacturing methods. Today, Spire Solar is in the forefront of PV manufacturing technology, offering advanced machinery, training, and process know-how for establishing and supporting successful module manufacturing businesses around the globe.



more than 30% from the prior year, with sizeable deliveries to customers in the U.S., China, North Africa and India. Exports, which accounted for more than 80% of total sales, spanned the range of Spire's product line, from module

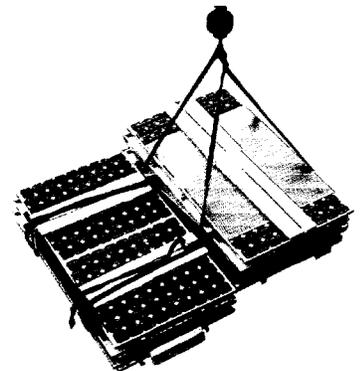
testers and laminators to turnkey production lines. Responding to China's growing demand for renewable energy, Spire shipped a \$1.35 million turnkey module production line to Huangshan Ho Tin Solar Technology Development Ltd. in Huangshan City, Anhui Province, China.

With its PV manufacturing and testing equipment in more than 150 facilities in 42 countries, Spire has earned a reputation for quality, service, and cutting-edge technology. Customers range from major module manufacturers in Europe, the U.S., and Japan to smaller start-up enterprises in developing nations. The Company's SPI-LINE™ turnkey production lines can handle a variety of solar cell types, including thin film, to produce modules at rates of up to 25 megawatts or more per year. These production lines start with solar cells, which are then laminated, framed and tested as modules before being installed as PV systems. Sales of PV manufacturing equipment rose by

In 2003, Spire continued its success in gaining government support for advancing the art of solar module manufacturing. Spire entered into a \$5.4 million cost-sharing contract with the Department of Energy to develop next-generation machinery for fabricating large-scale modules five times the size of today's standard units. The three-year research and development contract will strengthen Spire's capabilities for making automated equipment that will bring new technologies and greater economies of scale to module makers.

SOLAR SYSTEMS

Spire Solar Chicago ("SSC"), established in 1999 with assistance from the City of Chicago, the local utility ComEd, and the State of Illinois, is a one-stop turnkey supplier of PV systems. SSC assembles solar modules, provides system integration engineering and project management oversight for the installation process, and maintains the systems.



To date, SSC has installed over 800 kilowatts of generating capacity in the Chicago area, reducing air pollution and helping more than 30 public schools, museums and commercial customers reduce their dependency on the electrical grid during peak usage periods.

In 2003, SSC placed increased emphasis on meeting the special demands of architects interested in embodying PV modules as aesthetic elements in building applications. By producing customized panels with clear backsheets and powder coated frames in a variety of colors, SSC is opening up promising new markets in building integrated photovoltaics.

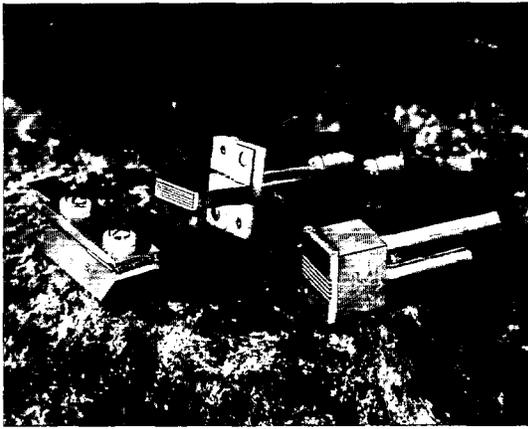


CELEBRATING THIRTY-FIVE YEARS OF INNOVATION



COMPOUND SEMICONDUCTOR SERVICES

Bandwidth Semiconductor develops and makes compound semiconductor wafers and components for the biomedical and telecommunications markets. These specialized wafers, which are at the heart of almost all optoelectronic systems, are extremely efficient at generating light from electricity and converting light back into electricity. They are widely used for data transmission, satellite power, optical amplifiers, medical x-ray detection, and materials processing applications.



foundry, Bandwidth Semiconductor purchases substrates, grows the epitaxial layers which define the basic device structure, and provides the wafers to device manufacturers for fabrication, test and marketing. Bandwidth engineers design the process steps and conditions to meet desired optoelectronic characteristics, saving customers development time and the expense of maintaining a dedicated internal fabrication line. Bandwidth's thin film area offers customers an extensive array of custom hybrid circuit and resistors.



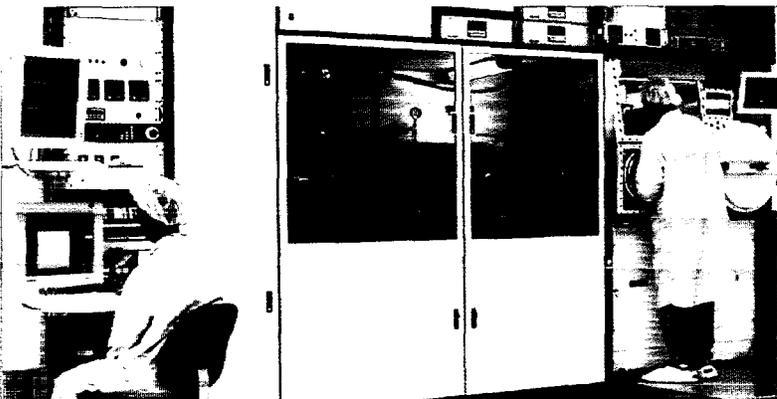
As the former optoelectronics segment of Spire, Bandwidth has a 20-year history of innovation in the development of metalorganic chemical vapor deposition ("MOCVD") reactor capabilities and deposition processes used for the epitaxial growth of thin films. In these processes, atomic layers are deposited on a variety of substrates with their thickness and chemical composition precisely controlled to create epitaxial wafers with desired electronic properties. The principal wafer growth substrates are III-V materials such as gallium arsenide and indium phosphide as well as silicon.

Bandwidth's activities focus on three primary areas: MOCVD wafers, device foundry services, and thin-film hybrid circuits. In its role as wafer

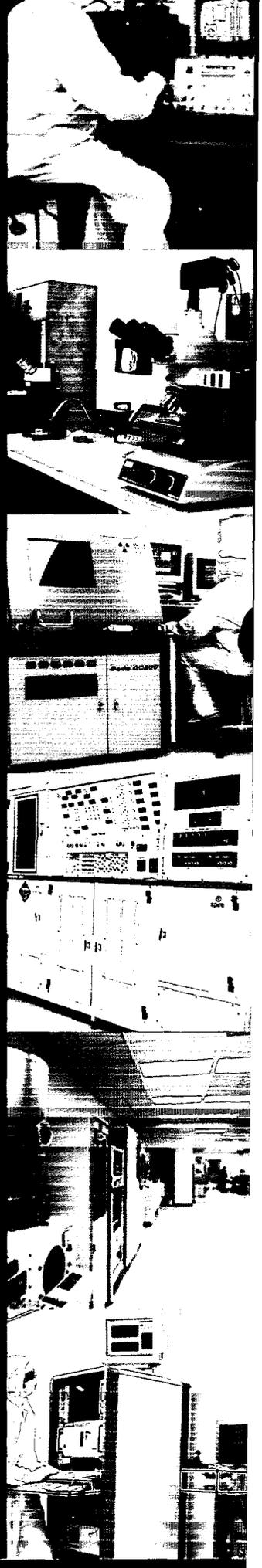
Bandwidth maintains its leadership position through its advanced technology including three dedicated MOCVD reactors and ultra-clean laboratories, as well as fast turnaround service and strict quality controls. As a part of Spire, Bandwidth will continue to expand its core defense and telecommunications business while providing key building blocks for optoelectronic devices that will support Spire's important lifesciences initiative.

Bandwidth operates out of a state-of-the-art facility in Hudson, New Hampshire equipped with advanced MOCVD and fabrication equipment. Opened in 2001, the new foundry is housed in a 90,000 sq. ft. building with Class 100/1000 cleanrooms. It can make large production volumes of wafers and devices on

an OEM basis, as well as support customer research and development programs including Spire's own biophotonics R&D.



CELEBRATING THIRTY-FIVE YEARS OF INNOVATION



RESEARCH & DEVELOPMENT

Over the course of 35 years, Spire has created a valuable intellectual property portfolio with expertise in biomaterials surface engineering, optoelectronics and photovoltaics. These assets are represented by more than forty patents, a skilled technical staff, and research and development and manufacturing facilities. A broad range of thin film semiconductor fabrication and modification techniques, including ion implantation, ion beam assisted deposition, and metalorganic chemical vapor deposition are the core of Spire's technology base. These semiconductor technologies have been applied to the development of advanced materials, devices, and products in four major industries: biomedical, defense, electronics, and renewable energy. In optoelectronics, Spire has developed novel epitaxial wafers engineered for specific uses such as solar cells, medical lasers, and sensors for night vision optics. In photovoltaics, Spire has been a pioneer in developing automated production equipment for fabricating PV modules and turnkey production lines. In biomaterials, Spire's innovative ion-beam processing has enhanced the performance of orthopedic and other medical implants.

As a technology-driven company, Spire has a strong commitment to R&D, both as a way to add value to existing products, and to create new revenue sources for the future. The vast majority of the Company's R&D programs have been funded by government grants and contract awards. As a testament to its success, Spire received approximately \$2.5 million in new R&D grants and awards during 2003. A growing portion of these projects represents third-party R&D sponsored by companies seeking Spire's know-how in such areas as coatings for fuel cell membranes and medical implants.

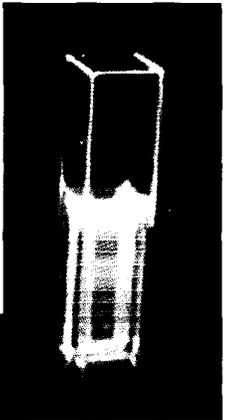
BIOPHOTONICS LIFESCIENCES

Drawing on its in-depth knowledge of optoelectronics, the Company has established a major biophotonics lifesciences R&D initiative aimed at developing new types of laser-based components and semiconductor-related services for the lifesciences instruments market. As a key technology for genomics and optical instruments that characterize DNA and biological agents, biophotonics offers exciting growth opportunities for Spire. This initiative, led by a dedicated lifesciences research team, is supported by Bandwidth's capabilities in biochip design and processing, as well as device

fabrication. Efforts to gain federal funding for this initiative bore fruit in 2003 with several contract awards. Two of the most significant were a Centers for Disease Control grant for designing a portable optical instrument for plague detection and a National Institutes of Health ("NIH") grant to develop a new fiber, laser-based instrument for glaucoma surgery.

NANOTECHNOLOGY

Nanotechnology is the science of things very small, on the order of one to one hundred-billionth of a meter or about one ten-thousandth of the size of a human hair. At these dimensions, many materials, in particular metals, semiconductors, and ceramics, exhibit unique properties that, if exploited, may have profound implications on the state of science in medicine, electronics, and optoelectronics. Realizing the importance of nanotechnology to its core businesses, Spire has launched a robust R&D initiative to build its intellectual property and know-how, and secure a leading position in this rapidly growing market. In 2003, the Company secured two key NIH funded grants to explore the advantages of nanostructured coatings for orthopedic implants. Another grant, supported by the National Science Foundation ("NSF"), investigated the use of a biocompatible nanostructured semiconductor as a smart neural scaffold and nerve guide. In continuation of these efforts, Spire R&D has applied for a number of government research grants involving the use of nanotechnology in other areas of biophotonics and lifesciences. Furthermore, Spire is in the process of forming, or is seeking to form, strategic partnerships with leading medical and biomedical companies aimed at commercializing its nanotechnology-related initiatives.



Spire R&D investigates the use of silicon quantum dots as biomarkers and carbon nanofibers as neural scaffolds.

Drug Discovery

Medical Imaging & Diagnostics

Homeland Security

Outpatient Laser Surgery

THIRTY-FIVE YEARS OF INNOVATION

CORPORATE DATA

EXECUTIVE OFFICERS

Stephen J. Hogan

Executive Vice President and General Manager
Spire Solar

Rodger W. LaFavre

Chief Operating Officer
Spire Solar

David R. Lipinski, CFA

Vice President of Corporate Development

Mark C. Little

Chief Executive Officer
Spire Biomedical

Roger G. Little

Chairman of the Board, CEO and President

James F. Parslow, CPA

Chief Financial Officer

Gregory G. Towle

Financial Controller and Treasurer

BOARD OF DIRECTORS

Udo Henseler, Ph.D., CPA

CEO and Director
BioCal Technology, Inc.
Orange, CA

David R. Lipinski, CFA

Vice President of Corporate Development
Spire Corporation
Bedford, MA

Roger G. Little

Chairman of the Board, CEO and President
Spire Corporation
Bedford, MA

Michael J. Magliochetti, Ph.D.

President, CEO and Director
Rehab Medical Holdings, Inc.
North Andover, MA

Guy L. Mayer

Chairman and CEO
VisEn Medical, Inc.
Woburn, MA

Roger W. Redmond, CFA

Senior Vice President
Windsor Financial Group, LLC
Minneapolis, MN

John A. Tarello

Senior Vice President, Treasurer and CFO (retired)
and Director
Analogic Corporation
Peabody, MA

SELECTED FINANCIALS

Year ended December 31

2003 2002 2001 2000 1999

(in thousands, except per share amounts)

Consolidated Statements of Operations:

Net sales and revenues	\$ 15,803	\$ 14,822	\$ 14,152	\$ 12,885	\$ 11,901
Gain on sale of a license	4,989	4,465	—	—	—
Earnings (loss) before income taxes	42	2,569	(2,176)	(1,398)	6,437
Income tax expense (benefit)	33	332	(13)	(598)	1,070
Net income (loss)	9	2,237	(2,163)	(800)	5,367
Earnings (loss) per share of common stock - basic	\$ 0.00	\$ 0.33	\$ (0.32)	\$ (0.12)	\$ 0.83
Earnings (loss) per share of common stock - diluted	0.00	0.33	(0.32)	(0.12)	0.82
Weighted average number of common and common equivalent shares outstanding - basic	6,764	6,750	6,695	6,629	6,492
Weighted average number of common and common equivalent shares outstanding - diluted	6,870	6,842	6,695	6,629	6,549

Consolidated Balance Sheets:

Working capital	\$ 8,182	\$ 10,524	\$ 6,759	\$ 9,024	\$ 9,718
Cash and cash equivalents	5,999	7,799	5,583	7,463	10,709
Total assets	22,792	17,772	14,815	16,442	17,363
Stockholders' equity	11,796	11,775	9,268	11,331	11,853

The Company's Form 10-KSB for the year ended December 31, 2003, filed with the Securities and Exchange Commission, contains audited consolidated balance sheets of Spire Corporation and subsidiaries as of December 31, 2003 and 2002 and the related consolidated statements of operations, stockholders' equity and cash flows for each of the years in the three-year period ended December 31, 2003.

INDEPENDENT AUDITORS

Vitale, Caturano & Company, P.C.
Boston, MA

LEGAL COUNSEL

Greenberg Traurig, LLP
Boston, MA

TRANSFER AGENT AND REGISTRAR

American Stock Transfer and Trust Company
New York, NY

COMMON STOCK MARKET INFORMATION

The Company's Common Stock is traded on the Nasdaq National Market under the symbol "SPIR". On March 1, 2004, the Common Stock was held by approximately 220 persons or entities of record, including significant amounts of stock held in "street name". The Company did not pay any cash dividends during 2003 and currently does not intend to pay dividends in the foreseeable future so that we may reinvest our earnings in the development of our business.

ANNUAL MEETING INFORMATION

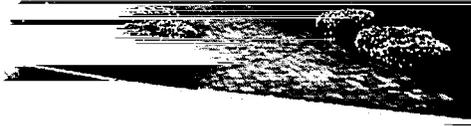
The Annual Meeting of Stockholders is scheduled to be held on Wednesday, May 19, 2004, 10:00 a.m. at Spire Corporation, One Patriots Park, Bedford, Massachusetts.

Celebrating Thirty-Five Years



spire

of Innovation



Spire Corporation

One Patriots Park, Bedford, MA 01730-2396

tel: 781-275-6000 / Fax: 781-275-7470

www.spirecorp.com

Spire Corporation's financial statements and related information may be forward-looking statements subject to the risks and uncertainties that are described in the risk factors set forth in the section entitled "Risk Factors" in the prospectus supplement to the prospectus filed with the Securities and Exchange Commission on March 10, 2010. The forward-looking statements are not intended to be a contract and are not intended to be a guarantee of performance. The forward-looking statements are based on current expectations and are subject to change. The forward-looking statements are not intended to be a contract and are not intended to be a guarantee of performance. The forward-looking statements are based on current expectations and are subject to change. The forward-looking statements are not intended to be a contract and are not intended to be a guarantee of performance. The forward-looking statements are based on current expectations and are subject to change.