

SPIRE CORP  
Form 10KSB  
March 31, 2005  
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**UNITED STATES**  
**SECURITIES AND EXCHANGE COMMISSION**

Washington, D.C. 20549

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**FORM 10-KSB**

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**x Annual Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934**

For the fiscal year ended December 31, 2004 or

**.. Transition Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934**

For the transition period from to

Commission file number: 0-12742

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**Spire Corporation**

(Name of small business issuer as specified in its charter)

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Massachusetts  
(State or other jurisdiction of incorporation or organization)

04-2457335  
(I.R.S. Employer Identification Number)

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**One Patriots Park**

**Bedford, Massachusetts 01730-2396**

(Address of principal executive offices)

**(781) 275-6000**

(Issuer's telephone number, including area code)

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**Securities registered under Section 12(g) of the Act:**

**Common Stock, \$0.01 par value; Registered on The Nasdaq National Market**

(Title of class)

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Check whether the issuer: (1) filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the past 12 months (or for such shorter period that the issuer was required to file such reports); and (2) has been subject to such filing requirements for the past 90 days. Yes  No

Check if there is no disclosure of delinquent filers in response to Item 405 of Regulation S-B contained in this form, and no disclosure will be contained, to the best of issuer's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-KSB or any amendment to this Form 10-KSB.

The issuer's revenues for its most recent fiscal year: \$17,278,000.

The aggregate market value of the voting stock held by non-affiliates of the issuer based on the last sale price of such stock as reported by The Nasdaq National Market on March 1, 2005, was approximately \$23,213,314.

The number of shares outstanding of the issuer's common stock, as of March 1, 2005, was 6,856,616.

Transitional Small Business Disclosure Format (Check One): Yes  No

**DOCUMENTS INCORPORATED BY REFERENCE**

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Portions of the definitive proxy statement for the Special Meeting in Lieu of 2005 Annual Meeting of Stockholders to be held on May 17, 2005, are incorporated by reference in Part III of this Report.

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**Form 10-KSB**

**For the Year Ended December 31, 2004**

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**FORWARD-LOOKING STATEMENTS**

*This report contains forward-looking statements that involve risks and uncertainties. These statements relate to our future plans, objectives, expectations and intentions. These statements may be identified by the use of words such as expects, anticipates, intends, plans and similar expressions. Our actual results could differ materially from those discussed in these statements. Factors that could contribute to these differences include those discussed under Risk Factors, Management's Discussion and Analysis of Financial Condition and Results of Operations, and elsewhere in this report. The cautionary statements made in this report should be read as being applicable to all forward-looking statements wherever they appear in this report.*

**PART I**

***Item 1. Description of Business***

Spire Corporation ( Spire or the Company ) is a Massachusetts corporation incorporated in 1969. Our principal offices are located at One Patriots Park, Bedford, Massachusetts, and our phone number is (781) 275-6000. Our SEC filings are available through our website, www.spirecorp.com. Our common stock trades on the Nasdaq National Market under the symbol SPIR .

On May 23, 2003, the Company acquired from Stratos Lightwave, Inc. all of the ownership interests of Bandwidth Semiconductor, LLC ( Bandwidth ), a Delaware limited liability company, located in Hudson, New Hampshire. Bandwidth is a compound semiconductor foundry providing material and device fabrication services to defense, telecommunications and biomedical instrument industries.

In October 15, 2002, the Company sold an exclusive patent license for a hemodialysis split-tip catheter to Bard Access Systems, Inc., a wholly owned subsidiary of C. R. Bard, Inc., in exchange for a first payment upon the execution of the agreement and three subsequent payments each due upon the achievement of certain additional milestones by Bard Access Systems. Through December 31, 2004, the Company has received three payments in accordance with the terms of this purchase contract. In conjunction with the sale, the Company received a sublicense, which permits the Company to continue to manufacture and market hemodialysis catheters for the treatment of chronic kidney disease. In addition, the Company granted Bard Access Systems a right of first refusal should the Company seek to sell the catheter business.

In 2002, the Company, through its business unit Spire Solar Chicago, began module production at its new facility in the Chicago Center for Green Technology, after operating for two years in temporary space. The agreement with the City of Chicago, Illinois (the City ) and Commonwealth Edison ( ComEd ), a subsidiary of Exelon Corporation, as amended and extended to December 15, 2003, specified the terms under which the City would purchase solar electric systems from the Company, up to a maximum dollar amount. The agreement with ComEd, as amended and extended to December 31, 2004, obligated ComEd to make incentive payments to the Company for solar electric systems manufactured, assembled and delivered by the Company in the City, up to specified annual amounts. The amended agreement with ComEd also set forth the terms under which ComEd may purchase solar electric systems from the Company. Purchasers of the Company's systems have received a subsidy from the State of Illinois of up to 60%. In 2003, the Company also amended its business agreement with BP Solar (a British Petroleum Company) under which BP Solar supplies components for solar systems and invested in certain capital equipment for the Chicago business.

**Principal Products and Services**

*Overview*

The Company develops, manufactures and markets highly-engineered products and services in four principal business areas: biomedical, solar equipment, solar systems and optoelectronics, generally bringing to bear expertise in materials technologies, surface science and thin films across all four business areas. In some cases, such as IONGUARD® processing of orthopedic devices, commercial services are well established, while in other cases, commercialization is just beginning.

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In the biomedical area, the Company provides value-added surface treatments to manufacturers of orthopedic and other medical devices that enhance the durability, antimicrobial characteristics or other material characteristics of their products; develops and markets hemodialysis catheters and related devices for the treatment of chronic kidney disease and performs sponsored research programs into practical applications of advanced biomedical and biophotonic technologies.

In the solar equipment area, the Company develops, manufactures and markets specialized equipment for the production of terrestrial photovoltaic modules from solar cells. The Company's equipment has been installed in more than 150 factories in 43 countries.

In the solar systems area, the Company provides custom and building integrated photovoltaic (BIPV) modules, stand-alone emergency power back up and electric power grid-connected distributed power generation systems employing photovoltaic technology developed by the Company.

In the optoelectronics area, the Company provides custom compound semiconductor foundry and fabrication services on a merchant basis to customers involved in biomedical/biophotonics instruments, telecommunications and defense applications. Services include compound semiconductor wafer growth, other thin film processes and related device processing and fabrication services. The Company also provides materials testing services and performs services in support of sponsored research into practical applications of optoelectronic technologies.

### *Spire Biomedical*

Spire Biomedical is both a manufacturer of medical devices and a provider of advanced medical device surface treatment processes. Spire Biomedical's medical device business develops, manufactures, and sells premium products for vascular access in chronic kidney disease patients. Spire Biomedical's surface treatment business modifies the surfaces of medical devices to improve their performance.

Spire Biomedical's line of long-term hemodialysis catheters is defined to combine high level performance with increased catheter placement options. The Company's proprietary catheter products provide higher flow at lower pressures and superior kink-resistance. Its patented separated distal tip design minimizes recirculation and provides a wider margin of functionality compared to conventional staggered tip designs. The Company believes that these key features present the renal care community with attractive value and performance for patient care.

The Company offers its medical customers a family of process services utilizing ion beam technologies to enhance both the surface characteristics and the performance of medical devices. The Company's advanced surface modification technology services employ proprietary Ion Implantation and Ion Beam Assisted Deposition (IBAD) techniques to improve the performance of medical components. Spire's customized surface treatments meet a variety of needs, including reduced friction, wear and abrasion, infection resistance, enhanced tissue and bone growth, increased thromboresistance, conductivity, improved radiopacity and the improvement of other performance characteristics. Spire-treated products currently include orthopedic prostheses (such as replacement hips, knees, elbows), catheters, guidewires, ear-nose-throat devices, stents, and other specialty medical devices.

### *Solar Equipment*

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Solar photovoltaics, the direct conversion of sunlight into electricity, is an important source of distributed power that can be employed locally or connected to a power grid. Spire believes that it is one of the world's leading suppliers of the manufacturing equipment and technology needed to manufacture solar photovoltaic power systems. Spire's individual items of manufacturing equipment and its SPI-LINE integrated turn-key wafer, cell, and module production lines are designed to meet the needs of a broad range of customers ranging from small manufacturers relying on mostly manual processes to the largest photovoltaic manufacturing companies in the world.



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Spire equipment spans the full process for fabricating photovoltaic modules including:

Sorting solar cells into performance groups (current groups at load voltage);

Assembling and soldering strings of cells interconnected with metal ribbons or tabs ;

Completing the module circuit by soldering bus ribbons to connect the strings together;

Cutting polymer, fiberglass, and back cover to length and assembling them with the glass and module circuit in preparation for encapsulation;

Laminating the module assembly and curing the encapsulating polymer;

Final assembly, including edge trimming, installing an edge gasket and frame, and attaching a junction box;

Performing a high voltage isolation test to guarantee voltage isolation between the cell circuit and the module frame; and

Electrically testing the module performance by measuring a current-voltage curve under simulated sunlight.

The fabrication of photovoltaic modules uses solar cells and module materials as input and produces functional PV modules, ready for use. The Company provides the necessary equipment and training for implementing these process steps as individual equipment items and as fully integrated production lines.

*Spire Solar Chicago*

Spire Solar Chicago is the principal business unit of the Company's solar systems business segment. Spire Solar Chicago provides clients in the Chicago metropolitan area with grid-connected distributed photovoltaic ( PV ) systems and custom modules to meet their demand for solar electricity. The business is a vertically integrated manufacturing and system design company whose team of experienced professionals offers complete project management, installation coordination, and customer service.

Through collaboration with the City of Chicago Department of Environment and ComEd, Spire Solar Chicago has developed approximately \$12 million in PV systems. In addition, the State of Illinois has a renewable energy subsidy program that funds up to 60% of the total cost for an installed PV system. Spire Solar Chicago provides its customers with grant application services, as well as utility interconnect service, to take advantage of this subsidy program. Spire Solar Chicago has a business relationship with BP Solar for acquisition of manufacturing materials and has assisted BP Solar in its local systems design. Spire Solar Chicago also utilizes the products and services of many Chicago area suppliers and contractors. Local inspectors and electricians have been trained through special PV code workshops to increase their knowledge and opportunities in the field. The Company has also expanded into providing systems integration activities through the establishment of Spire Solar Florida, Inc. and the successful sales and integration of a PV system for Roger Williams University in Rhode Island.

*Bandwidth Semiconductor*

Bandwidth Semiconductor, the principal business unit of the Company's optoelectronics business segment, operates in a new state-of-the-art semiconductor foundry and fabrication facility in Hudson, New Hampshire equipped with the most advanced and sophisticated metal-organic chemical vapor deposition (MOCVD) and fabrication equipment. Our fabrication facility has been designed to have the flexibility to engage in quick-turn research and prototyping as well as for economical full-rate volume production services in three primary areas: MOCVD epitaxial wafers, device foundry services, and thin film circuits.

Our MOCVD epitaxial wafer services include a wide range of compound semiconductor (chiefly gallium arsenide and indium phosphide-based compounds) epitaxial structures fabricated to our customers' designs or in

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some cases to our own designs. We recognize that time-to-market is critical to our customers' success, so we strive to provide the fastest turnaround times possible. Bandwidth Semiconductor has a number of standard structures available to meet many device needs and speed prototype development. Our epitaxial engineers work closely with customers to develop and improve proprietary structures for specific applications. Typical applications include: Vertical Cavity Surface Emitting Lasers ( VCSEL ), optical waveguides, high power edge emitting lasers, photocathodes, high electron mobility transistors ( HEMT ), field effect transistors ( FET ), PIN photodetectors, avalanche photo-detectors ( APD ) and other gallium arsenide-on-silicon, lattice mismatched indium gallium arsenide photodetectors, strained quantum well and other compound semiconductor material structures.

Our foundry services can take compound semiconductor wafers up to 4 inches in diameter through processing, on-wafer test, and die separation. We can use customer-supplied photomasks or develop a new set of masks for an entire process sequence. We design the process steps and conditions to meet the desired device characteristics and implement the process in our fabrication facility, saving our customers development time and providing a source of proprietary devices without the expense of a dedicated internal fabrication. Typical OEM devices we have fabricated include single-element photodetectors, photodetector arrays, VCSELs, edge-emitting lasers, thermo-photovoltaic ( TPV ) cells and communications-quality light emitting diodes ( LED ).

Our thin film circuit services include the fabrication of custom structures, chip resistors and resistor arrays to customer orders using thin film technology on alumina ceramic, aluminum nitride, ferrite, glass, quartz, sapphire and silicon substrates using a variety of metals and alloys.

## **Principal Distribution Methods**

The Company's products and services are sold primarily by its direct, internal sales staff with four notable exceptions: in certain offshore markets, the Company's solar equipment is sold via independent sales representatives, the Company's hemodialysis catheter products are sold via independent distributors, proposals for sponsored research and development work are prepared by the Company's scientists and researchers, and, in certain locations, the Company has granted exclusive licenses to third parties to sell their products.

## **Physician Relationships**

We have engaged certain physicians to serve as consultants to the Company. These physicians enter into written contracts that specify their duties and fix their compensation for periods of one or more years. The compensation for these consultants is the result of arm's length negotiations and generally depends upon competitive factors in the local market, the physician's professional qualifications and the specific duties and responsibilities of the physician.

## **Competitive Conditions**

The markets in which the Company operates are highly competitive and characterized by changes due to technological improvements and developments. The Company competes with many other manufacturers and service providers in each of its product and service areas; many of these competitors have greater resources and sales. Additionally, the Company's products and services compete with products and services utilizing alternative technologies. For example, the Company's solar photovoltaic systems compete with other forms of renewable energy such as wind, solar thermal, and geo-thermal. Price, service and product performance are significant elements of competition in the sale of each of the Company's products. The Company believes that there are considerable barriers to entry into the markets it serves, including a significant

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investment in specialized capital equipment and product design and development, and the need for a staff with sophisticated scientific and technological knowledge.

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### **Sources and Availability of Raw Materials**

Principal raw materials purchased by the Company include polymer extrusions, molded plastic parts, silicon photovoltaic cells, compound semiconductor wafer substrates, high purity industrial gases, custom metal welded structures, fasteners, position sensors, electrical motors, electrical power conditioning inverters, and electrical controls. All of these items are available from several suppliers and the Company generally relies on more than one supplier for each item. There has been increased demand for semiconductor grade silicon during the past year. To date, the Company has not experienced any adverse effects as a result of this increased demand.

### **Sources and Availability of Manufacturing Services**

The Company employs an outsourcing-model supply chain in its biomedical products business by which certain manufacturing services, such as polymer extrusion, assembly, packaging and sterilization; are obtained from third party contractors. The Company has identified multiple potential sources for the services it requires; however, certain elements of the supply chain currently involve only one qualified contractor. As sales volume expands, the Company plans to reassess its supply chain to eliminate potential bottlenecks and reduce dependence on sole-source, single site contract services.

### **Dependence on Major Customers**

During the year ended December 31, 2004, sales of biomedical services to Stryker Orthopaedics, Inc. (formerly known as Howmedica, Inc.) were 15% of consolidated net sales and revenues. In addition, funding of our solar system projects from ComEd amounted to approximately 11% of consolidated net sales and revenues.

### **Key Licenses and Patents, Government Rights to Intellectual Property**

In October 2002, the Company sold an exclusive patent license for its hemodialysis split-tip catheter to Bard Access Systems, Inc. ( Bard ), a wholly owned subsidiary of C.R. Bard, Inc., in exchange for \$5 million upon the execution of the agreement, with another \$5 million due upon the attainment of certain milestones no later than 18 months after signing, and a total of \$6 million upon achievement of certain milestones by Bard through 2005. In addition, the Company received a sublicense that permits the Company to continue to manufacture and market hemodialysis catheters for the treatment of chronic kidney disease.

Through over 30 years of research and development, the Company has accumulated extensive scientific and technological expertise. The Company protects its technological advances as trade secrets, in part through confidentiality agreements with employees, consultants and third parties. The Company also seeks and enforces patents as appropriate. The Company currently has 40 issued United States patents, one of which is jointly owned, eleven patents pending in the United States, six foreign patents and six foreign patents pending, all of which cover elements of its materials and processing technologies.

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The United States government retains the right to obtain a patent on any invention developed under government contracts as to which the Company does not seek and obtain a patent, and may require the Company to grant a third party license of such invention if steps to achieving practical application of the invention have not been taken. The United States government also retains a non-exclusive, royalty-free, non-transferable license to all technology developed under government contracts, whether or not patented, for government use, including use by other parties to United States government contracts. Furthermore, the Company's United States government contracts prohibit the Company from granting exclusive rights to use or sell any inventions unless the grantee agrees that any product using the invention will be manufactured substantially in the United States.

### **Government Regulation of Medical Products**

The Company's hemodialysis catheters and accessory products require the approval of the United States Food & Drug Administration ( FDA ) prior to sale within the United States. Sales within the European Union ( EU ) require the CE Mark certification and sales within Canada require approval from the Medical Device Bureau of Canada.

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Within the United States, the process requires that a pre-market notification (the 510(k) Submission ) be made to the FDA to demonstrate that the device is as safe and effective, substantially equivalent to a legally marketed device that is not subject to pre-market approval. Applicants must compare this device to one or more similar devices commercially available in the United States, known as the predicate device(s), and make and support their substantial equivalency claims. Applicants must submit descriptive data and, when necessary, performance data to establish that the device is substantially equivalent to a predicate device. In some instances, data from human clinical trials must also be submitted in support of a 510(k) Submission. If so, the data must be collected in a manner that conforms to specific requirements in accordance with federal regulations. The FDA must issue an order finding substantial equivalence before commercial distribution can occur. This process can be lengthy and there can be no assurance that a particular product proposal will be approved.

The Company currently holds all required approvals and certifications to market its hemodialysis catheters and accessory products in the USA, EU and Canada. The Company is committed to maintaining these critical approvals and certifications and the stringent quality requirements applicable to the development, testing, manufacturing, labeling, marketing and distribution of these products.

## **Government Regulation of Contracts**

The Company's United States government contracts are subject to a large number of federal regulations and oversight requirements. Compliance with the array of government regulations requires extensive record keeping and the maintenance of complex policies and procedures relating to all aspects of the Company's business, as well as to work performed for the Company by any subcontractors. The Company believes that it has put in place systems and personnel to ensure compliance with all such federal regulations and oversight requirements.

## **Research and Development**

The Company's policy is to support as much of its research and development as possible through government contract funding, which it recognizes as revenue. Revenues from the Company's research and development contracts funded by the United States government, and their percent of consolidated net sales and revenues were \$2,837,000, or 16%, and \$2,393,000, or 15%, for the years ended December 31, 2004 and 2003, respectively. All contracts with United States government agencies have been audited by the government through December 2002. The governmental audits for the years ended December 31, 2004 and 2003 have not yet been performed. The Company has not incurred substantial losses as a result of government audits.

The Company's contracts with the United States government grant to the Company proprietary rights in any technology developed pursuant to such contracts and grant to the United States government a non-exclusive license to utilize the technology for its benefit. The United States government retains the right to obtain the patent on any inventions made under these contracts as to which patent protection is not sought and obtained by the Company. The Company's rights to technology developed under contracts with private companies vary, depending upon negotiated terms.

The Company's internally funded research and development expenditures were \$1,406,000 and \$1,087,000 for the years ended 2004 and 2003, respectively.

## **Environmental Quality**

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Compliance with federal, state and local provisions regulating the discharge of materials into the environment has not materially affected the Company's capital expenditures, earnings or its competitive position. Currently there are no lawsuits related to the environment or material administrative proceedings pending against the Company.



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### **Employees**

At December 31, 2004, the Company had approximately 116 employees, of whom 107 worked full time. The Company also from time to time employs part-time employees and hires independent contractors. The Company's employees are not represented by any collective bargaining agreement, and the Company has never experienced a work stoppage. The Company believes that its employee relations are good.

### **Risk Factors**

In addition to the other information in this Form 10-KSB, the following risk factors inherent in and affecting the business of the Company should be considered. The descriptions in this Form 10-KSB contain forward-looking statements that involve risks and uncertainties. The Company's actual results and the timing of certain events may differ materially from the results and timing described in the forward-looking statements. Factors that could cause or contribute to such differences include, but are not limited to, those described below and in Management's Discussion and Analysis of Financial Condition and Results of Operations and above in Business.

### *Overview*

We believe that our continued success will depend upon our ability to create or acquire scientifically advanced technology, apply our technology cost-effectively across product lines and markets, develop or acquire proprietary products, attract and retain skilled development personnel, obtain patent or other protection for our products, obtain required regulatory approvals, manufacture and successfully market our products either directly or through outside distributors and sales representatives and supply sufficient inventory to meet customer demand. There can be no assurance that we will realize financial benefit from our technology development and application efforts, will continue to be successful in identifying, developing and marketing new products or enhancing our existing products, or that products or technologies developed by others will not render our products or technologies non-competitive or obsolete.

*We have experienced losses from operations, before the sale of a technology license, for several quarters, and we expect that our operating results will fluctuate in the future.*

We have experienced losses from operations, before the sale of a technology license, in each of the past two full years. While our revenues have steadily increased since fiscal 2000, they are still not sufficient to cover our operating expenses, and we anticipate that we may sustain future losses from operations as a result. Future fluctuations in operating results may also be caused by a number of factors, many of which are outside our control. Additional factors that could affect our future operating results include the following:

Availability of raw materials required to perform the manufacturing or services we provide, particularly in the silicon wafer and solar cell markets;

Delays, postponements or cancellations of orders and shipments of our products, particularly in our solar equipment and solar systems businesses where individual order sizes may be large and thus may represent a significant portion of annual revenue;

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Changes in our receipt of license fees, milestone payments, and royalty payments relating to our intellectual property, some receipts of which are based on the attainment of milestones and licensee sales that are beyond our control;

Loss of major customers, particularly as a result of customers changing their own product designs in such ways as reduce or eliminate the need for the manufacturing services we provide;

Reductions in the selling prices of our products and services as a result of competitive pressures;

Delays in introducing and gaining physician acceptance for new products and product improvements, particularly in our biomedical products business;

Disruption in the distributor sales channels by which we bring our biomedical products to market;

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Variation in capacity, capacity utilization and manufacturing yields within the third party medical contract manufacturing service providers that constitute the supply chain for our biomedical products that, in turn, cause variation in our ability to timely ship our products;

Increased competition from current and future competitors; and

Variation in the timing of customer orders and inventory levels at our customers, particularly within our biomedical manufacturing services business.

Termination of existing grants with government agencies or delays in funding of grants awarded.

If we are unable to reach and sustain profitability from our operations, we risk depleting our working capital balances and our business may not continue as a going concern.

*Our ability to expand revenue and sustain profitability depends substantially on the stability and growth of the various markets for our products and services. Should we be unable to expand our revenue, our ability to reach and sustain profitability would be impaired.*

The world demand for photovoltaic manufacturing equipment depends on sustained expansion in the demand for decentralized power sources, especially in developing countries, and on domestic and foreign government funding of initiatives to invest in solar energy as an alternative to the burning of fossil fuels and other energy production methods. There can be no assurance that government funding for such initiatives will be available, or that solar energy will prove to be a cost-effective alternative to other energy sources and thus gain acceptance where traditional energy sources continue to be available. Should demand for solar photovoltaic power sources not increase, demand for new photovoltaic manufacturing equipment would not materialize and our business would be adversely effected.

Most of our research and development revenues are generated by contracts with the United States government. There can be no assurance that the United States government will fund our research and development projects at the same level as it has in the past. Should federal research funding priorities change, and should we be unable to adjust our research focus to reflect the shift, our business could be adversely affected.

Our solar systems business unit is dependent on continued and increased order activity from the development of other industrial and residential sales opportunities. Should we be unable to capture a significant stream of new solar system installation projects from a more diverse group of project sponsors, our solar systems business could be adversely affected.

The growth of our biomedical products business depends on increased physician acceptance of our hemodialysis catheter products, our ability to manage the production of higher unit volumes of catheter products and our ability to effectively distribute those products. Should our hemodialysis catheters not gain market acceptance or should we not be able to meet demand for our products, our biomedical products business could be adversely affected.

The growth of our biomedical services business depends upon our customers' ability to serve demand for the end-use items, such as orthopedic prostheses, on which our services are performed and thus is substantially beyond our control.

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Our ability to expand our Biomedical business depends upon our ability to introduce new products and services. The marketing of new biomedical products requires pre-approval of government regulatory authorities, the completion of which can be lengthy and more costly than originally planned.

The growth of our optoelectronics business depends upon growth in demand for compound semiconductor wafers from manufacturers of microwave and optoelectronic circuits and sensors that, in turn, are used in diverse biomedical, telecommunications and aerospace products. Should these end-use markets not experience anticipated levels of growth and, in the case of telecommunications uses, experience a recovery from currently depressed business levels, our optoelectronics business could be adversely affected.

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*Our liquidity position will suffer significantly if Bard Access Systems is unable to achieve certain milestones during the next year with respect to the hemodialysis patent license we previously sold to Bard.*

The Company's liquidity position has benefited significantly as a result of cumulative cash receipts of \$13,000,000 through December 31, 2004 arising from the sale of a hemodialysis patent license to Bard Access Systems in October 2002. Under the terms of the license sale agreement, the Company has the opportunity to receive an additional contingent payment of \$3,000,000 upon the completion of certain milestones by Bard during 2005. There can be no assurance that these milestones will be achieved, and such attainment is beyond the control of the Company. If Bard is unable to achieve these milestones and we do not receive the additional contingent payments, then our future cash flows and liquidity position will be adversely affected, which could have serious consequences to our business and operations.

*We have not consistently complied with Nasdaq's Marketplace rules for continued listing, which exposes us to the risk of delisting from the Nasdaq National Market.*

Our stock is currently listed on the Nasdaq National Market. In August 2003, we received notice from Nasdaq that the Company was not in compliance with Nasdaq's Marketplace Rules as a result of filing its second quarter Form 10-QSB prior to the completion of the review by the Company's independent auditors and, accordingly, was subject to possible delisting. In September 2003, the Company held an oral hearing before a Nasdaq Listing Qualifications Panel (the "Panel") to request continued inclusion on Nasdaq until it became current in its periodic filings. The Panel granted the Company's request for continued listing, subject to certain conditions, including the filing of a second quarter Form 10-QSB/A and a third quarter Form 10-QSB reviewed pursuant to Statement of Auditing Standards No. 100 ("SAS 100 Review") by an independent auditor. The Company subsequently filed its second quarter Form 10-QSB/A Amendment Number 2 and its third quarter Form 10-QSB which had been reviewed by its independent auditor and was able to maintain continued listing on the Nasdaq National Market. However, the Panel informed the Company that, in order to maintain continued listing on Nasdaq, it must timely file all periodic reports with the SEC and Nasdaq for all reporting periods ending on or before December 31, 2004. The Company has timely filed all periodic reports with the SEC and Nasdaq for all reporting periods ending on or before December 31, 2004.

In addition, as of December 31, 2004, the Company was not in compliance with the minimum stockholders' equity level of \$10,000,000 required for continued listing on the Nasdaq National Market. If our common stock is delisted from the Nasdaq National Market, there could be a number of negative implications, including reduced liquidity in our common stock as a result of the loss of market efficiencies associated with the Nasdaq National Market, the loss of federal preemption of state securities laws, the potential loss of confidence by suppliers, customers and employees, as well as the loss of analyst coverage and institutional investor interest, fewer business development opportunities and greater difficulty in obtaining financing.

*Our business relies in part on a limited number of customers, and unfavorable developments in relation to a major customer may adversely affect our revenues, operating results and cash flows.*

During the year ended December 31, 2004, sales of biomedical services to Stryker Orthopaedics, Inc. (formerly Howmedica, Inc.) were 15% of consolidated net sales and revenues. In addition, funding of our solar system projects in accordance with our ComEd agreement that expired December 31, 2004, amounted to approximately 11% of consolidated net sales and revenues. If an unfavorable development were to occur with respect to any significant customer it would likely have a material adverse affect on our business, financial condition, operating results, cash flows and future prospects.

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*We sell our products and services against established competitors, and entities now operating in related markets may enter our markets. Some of our current and potential competitors have greater financial and technical resources than ours. Should we be unable to offer our customers products and services that represent attractive price versus value, our business would suffer.*

Although we believe that there are considerable barriers to entry into the markets we serve, including a significant investment in specialized capital equipment, product design and development, and the need for a staff with sophisticated scientific and technological knowledge, there can be no assurance that new or existing entities would not seek to enter our markets or that we would be able to compete effectively against such entities.

In our biomedical products business, our hemodialysis catheter products directly compete against the already established product offerings of larger competitors. Although we believe that our catheter products offer significant advantages, widespread physician acceptance of these products in preference to the more established products of competitors cannot be assured.

In our optoelectronics business, our manufacturing services may compete against the internal manufacturing capabilities of our customers. Although we believe that we offer significant advantages in terms of timely response, reduced total cost and reduced capital investment over the captive fabrication facilities of our customers, customers may elect to maintain their internal capabilities despite economic incentives to outsource these services from us.

*If we are unable to develop and introduce new products successfully or to achieve market acceptance of our new products, our operating results would be adversely affected.*

We compete in markets characterized by technological advances and improvements in manufacturing efficiencies. Our ability to operate profitably depends in large part on our timely access to, or development of, technological advances, and on our ability to use those advances to improve existing products, develop new products and manufacture those products efficiently. There can be no assurance that we will realize financial benefit from our development programs, will continue to be successful in identifying, developing and marketing new products or enhancing our existing products, or that products or technologies developed by others will not render our products or technologies non-competitive or obsolete. The failure to introduce new or enhanced products on a timely and cost competitive basis, or to attain market acceptance for commercial products, could have a material adverse effect on our business, results of operations or financial condition.

*If we are not successful in protecting our intellectual property rights, our ability to compete may be harmed.*

We rely on a combination of patent, copyright, trademark and trade secret protections as well as confidentiality agreements and other methods, to protect our proprietary technologies and processes. For example, we enter into confidentiality agreements with our employees, consultants and business partners, and control access to and distribution of our proprietary information. We have been issued 40 U.S. patents and 6 foreign patents and have a number of pending patent applications. However, despite our efforts to protect our intellectual property, we cannot assure that:

The steps we take to prevent misappropriation or infringement of our intellectual property will be successful;

Any existing or future patents will not be challenged, invalidated or circumvented;

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Any pending patent applications or future applications will be approved;

Others will not independently develop similar products or processes to ours or design around our patents; or

Any of the measures described above would provide meaningful protection.

A failure by us to meaningfully protect our intellectual property could have a material adverse effect on our business, financial condition, operating results and ability to compete. In addition, effective patent, copyright, trademark and trade secret protection may be unavailable or limited in certain countries.

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*We depend on others, particularly on agencies of the United States Government, for funding our research and development effort.*

Substantially all of our research and development work is funded by agencies of the United States government either directly or via their contractors. Loss of outside funding may materially adversely affect our ability to further develop our proprietary technologies and to apply these technologies to our current products and products under development. If we are unable to maintain our current level of such funding for any reason, we would need to generate funds for such research from other sources, reduce our research and development effort or increase our internal funding for research and development. An increase in internally funded research and development would have a negative impact on our profitability.

Additionally, the process of bidding for, obtaining, retaining and performing United States government contracts is subject to a large number of United States government regulations and oversight requirements. Compliance with these government regulations requires extensive record keeping and the maintenance of complex policies and procedures relating to all aspects of our business, as well as to work performed for us by any subcontractors. Any failure to comply with applicable regulations, or to require our subcontractors so to comply, could result in a variety of adverse consequences, ranging from remedial requirements to termination of contracts, reimbursement of fees, reduction of fees on a going forward basis and prohibition from obtaining future United States government contracts. While we believe that we have in place systems and personnel to ensure compliance with all United States government regulations relating to contracting, we cannot assure that we will at all times be in compliance or that any failure to comply will not have a material adverse effect on our business, results of operations or financial condition.

*We depend on third-party contractors to manufacture substantially all of our current biomedical products.*

We depend on third-party subcontractors in the U.S. for the manufacturing, assembly and packaging of our biomedical products. Any difficulty in obtaining parts or services from these subcontractors could affect our ability to meet scheduled product deliveries to customers, which could in turn have a material adverse effect on our customer relationships, business and financial results. Several significant risks are associated with reliance on third-party subcontractors, including:

The lack of assured product supply and the potential for product shortages;

Reduced control over inventory located at contractors' premises;

Limited control over delivery schedules, manufacturing yields, production costs;

Direct control over product quality; and

The temporary or permanent unavailability of, or delays in obtaining, access to key process technologies.

*Our success depends on our ability to hire and retain qualified technical personnel, and if we are unable to do so, our product development efforts and customer relations will suffer.*



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Our products require sophisticated manufacturing, research and development, marketing and sales, and technical support. Our success depends on our ability to attract, train and retain qualified technical personnel in each of these areas. Competition for personnel in all of these areas is intense and we may not be able to hire or retain sufficient personnel to achieve our goals or support the anticipated growth in our business. The market for the highly trained personnel we require is very competitive, due to the limited number of people available with the necessary technical skills and understanding of our products and technology. If we fail to hire and retain qualified personnel, our product development efforts and customer relations will suffer.

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*We are subject to environmental laws and other legal requirements that have the potential to subject us to substantial liability and increase our costs of doing business.*

Our properties and business operations are subject to a wide variety of federal, state, and local environmental, health and safety laws and other legal requirements, including those relating to the storage, use, discharge and disposal of toxic, volatile or otherwise hazardous substances used in our manufacturing processes. We cannot assure that these legal requirements will not impose on us the need for additional capital expenditures or other requirements. If we fail to obtain required permits or otherwise fail to operate within these or future legal requirements, we may be required to pay substantial penalties, suspend our operations or make costly changes to our manufacturing processes or facilities. Although we believe that we are in compliance and have complied with all applicable legal requirements, we may also be required to incur additional costs to comply with current or future legal requirements.

*Our international sales subject us to risks that could adversely affect our revenue and operating results.*

Sales to customers located outside the U.S. have historically accounted for a significant percentage of our revenue (approximately 15% in 2004) and we anticipate that such sales will continue to be a significant percentage of our revenue. International sales involve a variety of risks and uncertainties, including risks related to:

Reliance on strategic alliance partners such as representatives and licensees;

Compliance with changing foreign regulatory requirements and tax laws;

Reduced protection for intellectual property rights in some countries;

Longer payment cycles to collect accounts receivable in some countries;

Political instability;

Economic downturns in international markets; and

Changing restrictions imposed by United States export laws.

Failure to successfully address these risks and uncertainties could adversely affect our international sales, which could in turn have a material and adverse effect on our results of operations and financial condition.

*The use of our catheter and other medical related products entails a risk of physical injury; the defense of claims arising from such risk may exceed our insurance coverage and distract our management.*

The use of orthopedic and other medical devices may entail a risk of physical injury to patients. To the extent we have been involved in the design and manufacturing of these products, we may be exposed to potential product liability and other damage claims. Furthermore, the use of our photovoltaic module manufacturing equipment could result in operator injury. Except for those cases brought against us in which it is alleged that we engaged in the manufacture and sale of defective heart valves with other defendants, no other claims of product liability or other damages have been initiated against us. We maintain product liability and umbrella insurance coverage; however, there can be no assurance that any product liability claim assessed against us would not exceed our insurance coverage, or that insurance coverage would continue to be available. While we typically obtain agreements of indemnity from manufacturers of biomedical products for which we provide manufacturing services, there can be no assurance that any such indemnity agreements will be enforceable or that such manufacturers will have adequate funds to meet their obligations under such agreements. The cost of defending a product liability, negligence or other action, and/or assessment of damages in excess of insurance coverage, could have a material adverse effect on our business, results of operations, or financial condition.

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*Our Company is subject to control by principal stockholder.*

Roger G. Little, the founder, Chairman of the Board, Chief Executive Officer and President of the Company, controls approximately 34.4% of the Company's outstanding Common Stock. As a result, Mr. Little is in a position to exert significant influence over actions of the Company which require stockholder approval and generally to direct the affairs of the Company, including potential acquisitions, sales and changes in control of the Company.

*We do not pay dividends and we may not pay dividends in the future.*

We have paid no cash dividends since the Company's inception. We anticipate retaining any future earnings for reinvestment in operations and do not anticipate that dividends will be paid in the foreseeable future. Thus, the return on investment should be expected to depend on changes in the market price of our common stock.

*The market price for our common stock has been volatile and future volatility could cause the value of investments in the Company to fluctuate.*

Our stock price has experienced significant volatility. While our revenues have increased since 2000, we expect that uncertainty regarding demand for our products will cause our stock price to continue to be volatile. In addition, the value of your investment could decline due to the impact of any of the following factors, among others, upon the market price of our common stock:

Additional changes in investment analysts' estimates of our revenues and operating results;

Our failure to meet investment analysts' performance expectations; and

Changes in market valuations of other companies in the biomedical, alternative energy or semiconductor industries.

In addition, many of the risks described elsewhere in this section could materially and adversely affect our stock price, as discussed in those risk factors. U.S. financial markets have recently experienced substantial price and volume volatility. Fluctuations such as these have affected and are likely to continue to affect the market price of our common stock.

## ***Item 2. Description of Property***

Our corporate headquarters are located at One Patriots Park, Bedford, Massachusetts. This 74,000 square foot facility is leased and contains our administrative offices, sales and marketing offices, research and development facilities and the manufacturing facilities of the Company's biomedical and solar equipment businesses. The lease expires in November 2005. We lease an approximately 90,000 square foot facility located at 25 Sagamore Park Road, Hudson, New Hampshire that contains a semiconductor wafer growth and fabrication facility and administrative offices used primarily by our Optoelectronics business unit including Bandwidth Semiconductor. The lease expires in May 2008. In addition, the

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Company leases approximately 16,750 square feet of factory and warehouse space located at the Chicago Center for Green Technology, 445 North Sacramento Boulevard, Chicago, Illinois, that contains administrative offices, sales and marketing offices and manufacturing facilities for its solar systems business including Spire Solar Chicago. The lease expires in February 2006. The Company believes that its facilities are suitable for their present intended purposes and adequate for the Company's current level of operations.

### *Item 3. Legal Proceedings*

From time to time, the Company is subject to legal proceedings and claims arising from the conduct of its business operations. The Company does not expect the outcome of these proceedings, either individually or in the aggregate, to have a material adverse effect on its financial position, results of operations or cash flows.

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The Company has been named as a defendant in 58 cases filed from August 2001 to July 2003 in state courts in Texas by persons claiming damages from the use of allegedly defective mechanical heart valves coated by a process licensed by the Company to St. Jude Medical, Inc., the valve manufacturer, which has also been named as a defendant in the cases. In June 2003, a judge in a state court in Harris County, Texas agreed to grant the Company's motion for summary judgment based upon the principle of federal preemption with regard to 57 of those cases and to order that the cases against the Company be dismissed with prejudice. An order to this effect was signed in late July 2003. The remaining case is still pending, and due to aspects of its fact situation is not subject to the principle of federal preemption. From August 2003 to date, a total of seven new cases were filed against the Company in courts in Harris County. Activity with regard to these cases is likely to occur only after the disposition of the original 57 cases is finally settled. The plaintiffs whose cases were dismissed have filed appeals with the Texas appellate court. A decision on these appeals is pending and is expected soon. Attorneys who represent the Company with respect to these cases in Texas do not believe at this time that the actions of a federal district court judge in Minnesota in denying St. Jude Medical's request for summary judgment will materially affect the Company's position in the Texas complaints.

***Item 4. Submission of Matters to a Vote of Security Holders***

No matters were submitted to a vote of the Company's security holders in the fourth quarter of 2004.

**Table of Contents****PART II*****Item 5. Market for Common Equity and Related Stockholder Matters*****Market Information**

The Company's Common Stock, \$0.01 par value ( Common Stock ), is traded on the Nasdaq National Market under the symbol SPIR. The following chart sets forth the high and low bid prices for the Common Stock for the periods shown:

	<u>High Bid</u>	<u>Low Bid</u>
<i>2004</i>		
First Quarter	\$ 6.57	\$ 4.51
Second Quarter	7.62	4.80
Third Quarter	5.79	3.95
Fourth Quarter	5.80	4.11
<i>2003</i>		
First Quarter	\$ 2.86	\$ 1.78
Second Quarter	3.30	2.21
Third Quarter	5.80	2.63
Fourth Quarter	6.25	4.03

These prices do not reflect retail mark-ups, mark-downs or commissions and may not reflect actual transactions. The closing price of the Common Stock on March 1, 2005 was \$5.68, and on that date, there were approximately 211 stockholders of record.

**Dividends**

The Company did not pay any cash dividends during 2004 or 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. The payment of dividends in the future will be at the discretion of the Board of Directors.

**Equity Compensation Plan Information**

The table below describes the securities authorized for issuance under the Company's equity incentive plans as of December 31, 2004:

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	Number of securities to be issued upon exercise of outstanding options, warrants and rights	Weighted-average exercise price of outstanding options, warrants and rights	Number of securities remaining available for future issuance
Equity compensation plans approved by security holders	707,697	\$ 3.82	541,727
Equity compensation plans not approved by security holders			
<b>Total</b>	<b>707,697</b>	<b>\$ 3.82</b>	<b>541,727</b>

**Item 6. Management's Discussion and Analysis of Financial Condition and Results of Operations**

*This Management's Discussion and Analysis of Financial Condition and Results of Operations section and other parts of this Report contain forward-looking statements that involve risks and uncertainties. The Company's actual results and the timing of certain events may differ significantly from the results and timing described in the forward-looking statements. Factors that could cause or contribute to such differences include,*



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*but are not limited to, those described below and above in Risk Factors and Business. The following description is qualified in its entirety by, and should be read in conjunction with, the detailed information and the Consolidated Financial Statements, including the Notes thereto, appearing elsewhere or incorporated by reference in this Report. Management's Discussion and Analysis includes the following sections:*

*Overview;*

*Results of Operations;*

*Liquidity and Capital Resources;*

*Contractual Obligations, Commercial Commitments and Off-Balance Sheet Arrangements;*

*Recent Accounting Pronouncements;*

*Impact of Inflation and Changing Prices;*

*Foreign Currency Fluctuation;*

*Related Party Transactions; and*

*Critical Accounting Policies.*

**Overview**

The Company develops, manufactures and markets highly-engineered products and services in four principal business areas: biomedical, solar equipment, solar systems and optoelectronics bringing to bear expertise in materials technologies across all four business areas.

In the biomedical area, the Company provides value-added surface treatments to manufacturers of orthopedic and other medical devices that enhance the durability, antimicrobial characteristics or other material characteristics of their products; develops and markets hemodialysis catheters and related devices for the treatment of chronic kidney disease and performs sponsored research programs into practical applications of advanced biomedical and biophotonic technologies.

In the solar equipment area, the Company develops, manufactures and markets specialized equipment for the production of terrestrial photovoltaic modules from solar cells. The Company's equipment has been installed in more than 150 factories in 43 countries.

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In the solar systems area, the Company provides electric power grid-connected distributed power generation systems employing photovoltaic technology.

In the optoelectronics area, the Company provides compound semiconductor foundry services on a merchant basis to customers involved in biomedical/biophotonic instruments, telecommunications and defense applications. Services include compound semiconductor wafer growth, other thin film processes and related device processing and fabrication services. The Company also provides materials testing services and performs services in support of sponsored research into practical applications of optoelectronic technologies.

Operating results will depend upon product mix, as well as the timing of shipments of higher priced products from the Company's solar equipment line and delivery of solar systems. Export sales, which amounted to 15% of net sales and revenues for 2004, continue to constitute a significant portion of the Company's net sales and revenues.

**Table of Contents****Results of Operations**

The following table sets forth certain items as a percentage of net sales and revenues for the periods presented:

	<b>Year Ended December 31,</b>	
	<b>2004</b>	<b>2003</b>
Net sales and revenues	100.0%	100.0%
Cost of sales and revenues	(84.6)	(80.0)
Gross profit	15.4	20.0
Selling, general and administrative expenses	(46.9)	(43.4)
Internal research and development expenses	(8.1)	(6.9)
Gain on sale of license	17.4	31.6
Earnings (loss) from operations	(22.2)	1.3
Interest expense, net	(1.6)	(1.0)
Earnings (loss) before income taxes	(23.8)	0.3
Income tax expense (benefit)		0.2
Net earnings (loss)	(23.8)%	0.1%

*Overall*

The Company's total net sales and revenues for the year ended December 31, 2004 ( 2004 ) increased 9% compared to the year ended December 31, 2003 ( 2003 ). The increase was attributable to the biomedical business unit (14%) and, to a lesser extent, the optoelectronics business unit (4%). These increases were partially offset by a decrease within the solar business unit (9%).

*Solar Business Unit*

Sales in the Company's solar business unit decreased 18% during 2004 as compared to 2003 primarily due to a 64% decrease in solar equipment sales compared to 2003 primarily due to the sales of a 5 megawatt SPI-LINE turn-key photovoltaic module production line. These decreases were substantially offset by a 65% increase in solar systems sales resulting from the temporary permitting challenges experienced in 2003 in the metro Chicago area that the Company did not encounter in 2004 and to a 77% increase in revenue from government-funded research and development activities associated with the Company's cost sharing agreement with the Department of Energy National Renewable Energy Laboratory ( NREL ).

*Biomedical Business Unit*

Revenues of the Company's biomedical business unit increased 32% during 2004 as compared to 2003 as a result of a 91% increase in revenue from the Company's line of hemodialysis catheters, a 25% increase in revenue from the Company's IONGUARD implant process services and, to a lesser extent, a 15% increase in revenue from government-funded research and development activities.

*Optoelectronics Business Unit*

Sales in the Company's optoelectronics business unit increased 36% during 2004 as compared to 2003, due to a full year of Bandwidth operations in 2004 as compared to seven months in 2003. Bandwidth was acquired on May 23, 2003 and merged into the Optoelectronics business unit.

**Table of Contents****Year Ended December 31, 2004 Compared to Year Ended December 31, 2003***Net Sales and Revenues*

The following table categorizes the Company's net sales and revenues for the periods presented:

	Year Ended December 31,		%
	2004	2003	Change
Contract research, services and licenses	\$ 10,273,000	\$ 8,029,000	28.0%
Sales of goods	7,005,000	7,774,000	(9.9)%
	\$ 17,278,000	\$ 15,803,000	9.3%

The increase in contract research, services and licenses was propelled by continued strong demand for the Company's biomedical processing services (11%), increased government research and development activities (8%) and a full year of Bandwidth operations (8%). Revenue from Spire's biomedical processing services increased 25% in 2004 compared to 2003 as a result of continued strong demand for Spire's IONGUARD implant process services. Revenues from Spire's research and development activities increased 27% in 2004 as compared to 2003 primarily due to an increase in revenue from activities associated with our cost sharing agreement with NREL and, due to an increase in the number of contracts associated with government-funded research and development.

The decline in sales of goods was primarily due to a decrease in equipment revenues (39%) partially offset by increases in solar systems revenue (17%) and biomedical product sales (12%). Solar equipment sales decreased 64% in 2004 as compared to 2003 primarily due to the sale of a 5-megawatt SPI-LINE turn-key photovoltaic module production line in 2003. Solar systems revenues increased 65% in 2004 as compared to 2003 resulting from the temporary permitting challenges experienced in 2003 in the metro Chicago area that Spire did not encounter in 2004. Biomedical product sales increased 91% in 2004 as compared to 2003 as a result of increased demand for Spire's line of hemodialysis catheters and the introduction of Spire's Decathlon product line, which was introduced in December 2003.

*Cost of Sales and Revenues*

The following table categorizes the Company's cost of sales and revenues for the periods presented, stated in dollars and as a percentage of related sales and revenues:

	December 31,	%	December 31,	%
	2004		2003	
Cost of contract research, services and licenses	\$ 8,264,000	80%	\$ 5,940,000	74%

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Cost of goods sold	6,355,000	91%	6,689,000	86%
Total cost of sales and revenues	\$ 14,619,000	85%	\$ 12,629,000	80%

The \$2,324,000 (39%) increase in cost of contract research and service revenues in 2004 is primarily attributable to a full year of operations at Bandwidth (24%), a 31% increase in the Company's biomedical processing services direct cost associated with its 25% increase in revenues (13%) and, to a lesser extent, an 8% increase in direct cost associated with the 27% increase in government funded research and development revenue (2%). The increase in cost of contract research and service revenues as a percentage of revenues is the direct result of the Bandwidth acquisition, which recorded a -42% gross margin in 2004.

The \$334,000 (5%) decrease in cost of goods sold is primarily due to a 38% decrease in the Company's solar equipment direct cost resulting from its 64% decrease in revenues (20%). This decrease was substantially offset by increases in the Company's solar systems and biomedical products units due to increased sales levels. The increase in cost of goods sold as a percentage of revenue is the result of the decrease in solar equipment sales discussed above resulting in reduced absorption of fixed costs.

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### *Selling, General and Administrative Expenses*

Selling, general and administrative expenses for 2004 increased \$1,224,000 to \$8,097,000, and increased to 47% of net sales and revenues, compared to \$6,873,000, or 43% of net sales and revenues, for 2003. The increase was due primarily to increased cost associated with sales and marketing efforts of the Company's biomedical products and solar business units, increased cost associated with legal and auditing expenses in connection with increased compliance requirements and the addition of Bandwidth. The increase in selling, general and administrative expenses as a percentage of sales and revenues was primarily due to the dollar increases described above partially offset by the increase in sales and revenue.

### *Internal Research and Development Expenses*

Internal research and development for 2004 increased \$319,000, or 29%, to \$1,406,000, compared to \$1,087,000 for 2003. The increase was primarily a result of the Company's continued investment in its semiconductor foundry and the next generation solar energy module manufacturing equipment under a cost-sharing contract with NREL. These increases were partially offset by decreased research and development efforts within the biomedical products group. As a percentage of sales and revenues, internal research and development increased 1% primarily due to the investments discussed above partially offset by the increase in sales and revenue.

### *Interest Expense, Net*

The Company earned \$52,000 in interest income for 2004 from the investment of the proceeds from the sale of the license in short-term debt securities, compared to \$56,000 for 2003. The Company incurred interest expense of \$328,000 in 2004, compared to \$217,000 in 2003. The interest expense is primarily associated with interest incurred on capital leases associated with the semiconductor foundry.

### *Income Taxes*

The Company did not record a tax provision for 2004, compared to a tax expense of \$33,000 for 2003. The Company's effective tax rate was 0% and 79% in 2004 and 2003, respectively. The decrease in the 2004 effective tax rate is substantially due to a valuation allowance being established against the current year income tax benefit due to uncertainty regarding the realization of the net operating loss in the future. At December 31, 2004, the Company had gross deferred tax assets of \$2,315,000, against which a valuation allowance of \$2,157,000 had been applied. Gross deferred tax liabilities of \$158,000 were applied against the net deferred tax asset.

### *Net Income (Loss)*

The Company reported a net loss for 2004 of \$4,120,000, compared to net income of \$9,000 for 2003. Net income (loss) for 2004 and 2003 included gains on the sale of a license of \$3,000,000 and \$4,989,000, respectively, arising from the sale of the Company's hemodialysis patent license to Bard Access Systems. The net income (loss) decreased \$4,129,000 primarily due to the \$1,989,000 decrease in the gain on sale of license, the \$1,224,000 increase in selling, general and administration expenses outlined above and, to a lesser extent, the increased fixed costs

associated with the Company's semiconductor foundry.

### **Liquidity and Capital Resources**

The Company has cash and cash equivalents of \$4,165,000, including \$828,000 of short- and long-term restricted cash, at December 31, 2004. Cash, cash equivalents and short- and long-term restricted cash decreased \$2,497,000 to \$4,165,000, from \$6,662,000 at December 31, 2003, primarily due to \$4,197,000 of cash used in operations and, to a lesser extent, investments in patents and licenses and payments on capital leases. These decreases were partially offset by the \$3,000,000 proceeds from the sale of a license.



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The Company has historically funded its operating cash requirements using operating cash flow and proceeds from the sale and licensing of technology. The Company's liquidity position benefited as a result of a cash receipt of \$3,000,000 in 2004 and \$5,000,000 in 2003 arising from the sale of a hemodialysis patent license to Bard Access Systems. The license sale agreement provides for the Company to receive one additional contingent cash payment of \$3,000,000 upon the completion of certain milestones by Bard Access Systems in 2005. There can be no assurance that this milestone will be attained and attainment is beyond the control of the Company.

On June 23, 2003, the Company entered into a \$2,000,000 Loan Agreement (the "Agreement") with Citizens Bank of Massachusetts). The Agreement provides Standby Letter of Credit Guarantees for foreign and domestic customers and are 100% secured with cash. The Agreement had an original expiration date of June 30, 2004 and was amended in June 2004 to extend the expiration date to June 28, 2005. The amendment also suspended the Agreement's revolving line of credit conversion feature for one year. At December 31, 2004, the Company had \$828,000 of restricted cash associated with outstanding letters of credit. Standby Letters of Credit under this Agreement bear interest at 1%. A commitment fee of .25% is charged on any unused portion of the borrowing base. The Agreement contains covenants including certain financial reporting requirements. At December 31, 2004, the Company was in compliance with its financial reporting requirements and cash balance covenants. Letters of Credit issued with an expiration date beyond June 28, 2005 are required to be 100% secured by cash.

To date, there are no material commitments by the Company for capital expenditures. At December 31, 2004, the Company's accumulated deficit was \$1,649,000, compared to retained earnings of \$2,470,000 as of December 31, 2003. Working capital as of December 31, 2004 decreased 51% to \$3,996,000, compared to \$8,182,000 as of December 31, 2003.

The Company believes it has sufficient resources to finance its current operations for the foreseeable future from operating cash flow, working capital and the license payment described above.

**Contractual Obligations, Commercial Commitments and Off-Balance Sheet Arrangements**

The following table summarizes the Company's gross contractual obligations at December 31, 2004 and the maturity periods and the effect that such obligations are expected to have on its liquidity and cash flows in future periods:

<b>Contractual Obligations</b>	<b>Payments Due by Period</b>				
	<b>Total</b>	<b>Less than 1 Year</b>	<b>2 - 3 Years</b>	<b>4 - 5 Years</b>	<b>More Than 5 Years</b>
<i>Purchase obligations</i>	\$ 2,331,000	\$ 1,835,000	\$ 496,000	\$	
<i>Capital leases:</i>					
Unrelated party capital lease	\$ 933,000	\$ 437,000	\$ 496,000	\$	
Related party capital lease	3,195,000	728,000	1,972,000	495,000	
<i>Operating leases:</i>					
Unrelated party operating leases	\$ 253,000	\$ 119,000	\$ 98,000	\$ 36,000	
Related party operating lease	1,055,000	1,055,000			

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Purchase obligations include all open purchase orders outstanding regardless of whether they are cancelable or not.

Capital lease obligations outlined above include both the principal and interest components of these contractual obligations. Included in the related party operating lease is the accrued lease obligation in the amount of \$473,000.

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On October 8, 1999, the Company entered into an Agreement with BP Solarex ( BPS ) in which BPS agreed to purchase certain production equipment built by the Company, for use in the Company's Chicago factory ( Spire Solar Chicago ) and in return the Company agreed to purchase solar cells of a minimum of two megawatts per year over a five-year term for a fixed fee from BPS (the Purchase Commitment ). BPS has the right to reclaim the equipment should the Company not meet its obligations in the Purchase Commitment. The proceeds from the sale of the production equipment purchased by BPS have been classified as an unearned purchase discount in the accompanying consolidated balance sheets. The Company will amortize this discount as a reduction to cost of sales as it purchases solar cells from BPS. During the quarter ended September 30, 2003, the Company and BPS retroactively amended the agreement to include all purchases of solar modules, solar systems, inverter systems and other system equipment purchased by the Company from BPS in the purchase commitment calculation. Amortization of the purchase discount amounted to \$160,000 for the year ended December 31, 2004.

In addition, the agreement contains a put option for BPS to have the Company create a separate legal entity for Spire Solar Chicago and for BPS to convert the value of the equipment and additional costs, as defined, into equity of the new legal entity. The percentage ownership in the joint venture would be determined based on the cumulative investments by BPS and the Company.

The amended agreement also allows the Company to terminate the agreement on 30 days notice in consideration for a termination payment based on the aggregate amount of Spire purchases of BPS products and the fair market value of the production equipment purchased by BPS at the time of the termination election. As of December 31, 2004, the Company has no intention of terminating the agreement.

In October 2002, the Company sold an exclusive patent license for a hemodialysis split-tip catheter to Bard Access Systems, Inc. ( Bard ), a wholly owned subsidiary of C. R. Bard, Inc., in exchange for \$5,000,000 upon the execution of the agreement, with another \$5,000,000 due upon the earlier to occur of: (a) the date of the first commercial sale of a licensed product by Bard; or (b) no more than 18 months after signing. The agreement further provided for two additional contingent cash payments of \$3,000,000 each upon the completion of certain milestones by Bard in 2004 and 2005. Bard has the right to cancel the agreement at any time subsequent to the second payment. There can be no assurances that these milestones will be attained and attainment is beyond the control of the Company. During the year ended December 31, 2002, the Company recorded the initial payment under the agreement, resulting in a gain of \$4,464,929, net of direct costs. Due to the potential length of time between the first and second payments and the cancellation provisions within the agreement, the Company did not record the potential remaining payments at that time. During June 2003, in accordance with the agreement, the Company received notification from Bard of the first commercial sale, collected the \$5,000,000 payment due and recorded a gain of \$4,989,150, net of direct costs. In June 2004, the Company received the first contingent milestone payment and recorded a gain of \$3,000,000. There were no direct costs associated with this payment. These gains have been recorded in the accompanying consolidated statements of operations for the years ended December 31, 2004 and 2003, respectively. The Company believes that the sale of the license does not reflect the day-to-day operations of the Company. Therefore, the net proceeds received has been classified under investing activities in the consolidated statements of cash flows for the years ended December 31, 2004 and December 31, 2003, respectively.

Outstanding letters of credit totaled \$828,000 at December 31, 2004. The letters of credit principally secure performance obligations, and allow holders to draw funds up to the face amount of the letter of credit if the Company does not perform as contractually required. These letters of credit expire through 2007 and are 100% secured by cash.

## **Recent Accounting Pronouncements**

In January 2003, the FASB issued FASB Interpretation No. 46, Consolidation of Variable Interest Entities ( FIN 46 ) which requires the consolidation of variable interest entities by the primary beneficiary of the entity if the equity investors in the entity do not have the characteristics of a controlling financial interest or do not have



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sufficient equity at risk for the entity to finance its activities without additional subordinated financial support from other parties. In December 2003, the FASB issued FASB Interpretation No. 46R, *Consolidation of Variable Interest Entities* ( FIN 46R ). FIN 46R superseded FIN 46 and defers the effective date for small business filers until the first reporting period that ends after December 15, 2004 (fourth quarter of 2004). The Company adopted FIN 46R on January 1, 2004 and adoption did not have a material impact on the Company's financial position or results of operation.

The Company provides warranties on certain of its products and services. The Company warranty programs are described below.

Spire Solar Equipment warrants solar energy module manufacturing equipment sold for a total of 360 days, the first 90 days of which include the replacement of defective component parts and the labor to correct the defect and the next 270 days of which include only the cost of defective component parts.

Spire Solar Systems warrants photovoltaic electric power systems sold against defective components for 360 days to include the replacement of defective component parts and the labor to correct the defect. Spire Solar Systems also warrants that its photovoltaic electric power systems will achieve a minimum of 80% of rated electrical power output for 20 years.

Spire Biomedical warrants that any of its catheter products found to be defective will be replaced. No warranty is made that the failure of the product will not occur, and Spire disclaims any responsibility for any medical complications. Spire Biomedical warrants that its services only will meet the agreed upon specifications.

Bandwidth Semiconductor warrants that its products will meet the agreed upon specifications.

The Company provides for the estimated cost of product warranties determined primarily from historical information, at the time product revenue is recognized. Should actual product failure warranties differ from the Company's estimates, revisions to the estimated warranty liability would be required.

In November 2004, the FASB issued FASB Statement No. 151, *Inventory Costs* an Amendment of ARB No. 43, Chapter 4 ( FAS 151 ). FAS 151 amends ARB 43, Chapter 4, to clarify that abnormal amounts of idle facility expense, freight, handling costs, and wasted materials (spoilage) should be recognized as current-period charges. In addition, this Statement requires that allocation of fixed production overheads to the costs of conversion be based on the normal capacity of the production facilities. The provisions of this Statement are effective for inventory costs incurred during fiscal years beginning after June 15, 2005. The adoption of the provisions of FAS 151 is not expected to have a material impact on the Company's financial position or results of operations.

In December 2004, the FASB issued SFAS No. 123R, *Share-Based Payment*. SFAS No. 123R requires companies to expense the value of employee stock option and similar awards. SFAS No. 123R is effective as of the beginning of the first interim or annual reporting period that begins after December 15, 2005. As of the effective date, the Company will be required to expense all awards granted, modified, cancelled or repurchased as well as the portion of prior awards for which the requisite service has not been rendered, based on the grant-date fair value of those awards as calculated for pro forma disclosures under SFAS No. 123. SFAS No. 123R permits public companies to adopt its requirements using one of two methods: A modified prospective method in which compensation cost is recognized beginning with the effective date (a) based on the requirements of SFAS No. 123R for all share-based payments granted after the effective date and (b) based on the requirements of SFAS

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No. 123R for all awards granted to employees prior to the effective date of SFAS No. 123R that remain unvested on the effective date. A prospective method which includes the requirements of the modified prospective method described above, but also permits entities to restate based on the amounts previously recognized under SFAS No. 123R for purposes of pro forma disclosures either (a) all prior periods presented or (b) prior interim periods of the year of adoption. SFAS No. 123R also requires the benefits of tax deductions in excess of recognized compensation cost to be reported as a financing cash flow, rather than as an operating cash

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flow as required under current literature. This requirement will reduce net operating cash flows and increase net financing cash flows in periods after adoption. The adoption of SFAS No. 123R's fair value method will have an impact on the Company's results of operations. The Company is currently in the process of determining the effects on its financial position, results of operations and cash flows that will result from the adoption of SFAS No. 123R under the modified prospective method.

### **Impact of Inflation and Changing Prices**

Historically, the Company's business has not been materially impacted by inflation. Manufacturing equipment and solar systems are generally quoted, manufactured and shipped within a cycle of approximately nine months, allowing for orderly pricing adjustments to the cost of labor and purchased parts. The Company has not experienced any negative effects from the impact of inflation on long-term contracts. The Company's service business is not expected to be seriously affected by inflation because its procurement-production cycle typically ranges from two weeks to several months, and prices generally are not fixed for more than one year. Research and development contracts usually include cost escalation provisions.

### **Foreign Exchange Fluctuation**

The Company sells only in U.S. dollars, generally against an irrevocable confirmed letter of credit through a major United States bank. Therefore the Company is not directly affected by foreign exchange fluctuations on its current orders. However, fluctuations in foreign exchange rates do have an effect on the Company's customers' access to U.S. dollars and on the pricing competition on certain pieces of equipment that the Company sells in selected markets.

### **Related Party Transactions**

The Company subleases 74,000 square-feet in a building leased by Mykrolis Corporation, who in turn leases the building from a Trust of which Roger G. Little, Chairman of the Board, Chief Executive Officer and President of the Company, is sole trustee and principal beneficiary. The Company believes that the terms of the third-party sublease are commercially reasonable. The 1985 sublease originally was for a period of ten years, was extended for a five-year period expiring on November 30, 2000 and was further extended for a five-year period expiring on November 30, 2005. The agreement provides for minimum rental payments plus annual increases linked to the consumer price index. Rent expense under this sublease for the year ended December 31, 2004 was \$1,151,000. In connection with this sublease, the Company is invoiced and pays certain trust related expenses, including building maintenance and insurance. The Company invoices the Trust on a monthly basis and the Trust reimburses the Company for all such costs. No amounts were due from the Trust as of December 31, 2004.

In conjunction with the acquisition of Bandwidth by the Company, the Company released Bandwidth from the lease agreement that had existed between Bandwidth and the Company. In November 2001, Bandwidth, under its previous owner, abandoned the space being subleased from the Company in Bedford, Massachusetts, to move to a new building and wafer fabrication lab in Hudson, New Hampshire. At that time, there were 48 months left on the lease. Subsequent to the move to Hudson, New Hampshire, Bandwidth was unable to sublease the Bedford, Massachusetts space, and was paying the Company for the unused space. In conjunction with the acquisition of Bandwidth in May 2003, the Company released Bandwidth from the remaining lease payments. However, the Company continues to be obligated to Mykrolis Corporation for the entire amount of the remaining lease agreement. As a result, the present value of the remaining lease obligation associated with the unused space was recorded as an assumed liability of \$1,247,241 in the purchase accounting. As of December 31, 2004, the remaining lease obligation is \$473,000, which is reflected as accrued lease obligation related party in the December 31, 2004 consolidated balance sheet. The difference between the actual rent payment and the discounted rent payment will be accreted to the consolidated statements of operations as interest expense. Interest of 4.75% has

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been assumed on this obligation. Interest expense recorded related to this obligation was \$54,000 in 2004.



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Also in conjunction with the acquisition of Bandwidth by the Company, SPI-Trust, a Trust of which Roger G. Little, Chairman of the Board, Chief Executive Officer and President of the Company, is sole trustee and principal beneficiary, purchased from Stratos (Bandwidth's owner) the building that Bandwidth occupies in Hudson, New Hampshire for \$3.7 million. Subsequently, the Company entered into a lease for the building (90,000 square feet) with SPI-Trust whereby the Company will pay \$4.1 million to the SPI-Trust over an initial five year term expiring in 2008 with a Company option to extend for five years. In addition to the rent payments, the lease obligates the Company to keep on deposit with SPI-Trust the equivalent of three months rent (\$168,750 as of December 31, 2004.) The lease agreement does not provide for a transfer of ownership at any point. Interest costs were assumed at 7%. For the twelve months ended December 31, 2004, interest expense was approximately \$213,000. This lease has been classified as a related party capital lease and a summary of payments (including interest) follows:

<u>Year</u>	<u>Rate Per Square Foot</u>	<u>Annual Rent</u>	<u>Monthly Rent</u>	<u>Security Deposit</u>
June 1, 2003 - May 31, 2004	\$ 6.00	\$ 540,000	\$ 45,000	\$ 135,000
June 1, 2004 - May 31, 2005	7.50	675,000	56,250	168,750
June 1, 2005 - May 31, 2006	8.50	765,000	63,750	191,250
June 1, 2006 - May 31, 2007	10.50	945,000	78,750	236,250
June 1, 2007 - May 31, 2008	13.50	1,215,000	101,250	303,750
		<u>\$ 4,140,000</u>		

At December 31, 2004, \$548,000 and \$2,248,000 are reflected as the current and long-term portions of capital lease obligation related party, respectively, consolidated balance sheet.

**Critical Accounting Policies**

The preparation of financial statements in accordance with accounting principles generally accepted in the United States requires us to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Among the significant estimates affecting our consolidated financial statements are those relating to revenue recognition, reserves for doubtful accounts and sales returns and allowances, reserve for excess and obsolete inventory, impairment of long-lived assets, acquisition accounting, income taxes, and warranty reserves. We regularly evaluate our estimates and assumptions based upon historical experience and various other factors that we believe to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. To the extent actual results differ from those estimates, our future results of operations may be affected. We believe the following critical accounting policies affect our more significant judgments and estimates used in the preparation of our consolidated financial statements. Refer to Footnote 2 of our notes to consolidated financial statements for a description of our accounting policies for income taxes and warranties.

*Revenue Recognition*

The Company derives its revenues from three primary sources: (1) commercial products including, but not limited to, solar energy manufacturing equipment, solar energy systems and hemodialysis catheters; (2) biomedical and semiconductor processing services; and (3) United States government funded research and development contracts.

We generally recognize product revenue upon shipment of products provided there are no uncertainties regarding customer acceptance, persuasive evidence of an arrangement exists, the sales price is fixed or determinable, and collectibility is reasonably assured. These criteria are generally met at the time of shipment when the risk of loss and title passes to the customer or distributor, unless a consignment arrangement exists. Revenue from consignment arrangements is recognized based on product usage indicating sales are complete.

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Gross sales reflect reductions attributable to customer returns and various customer incentive programs including pricing discounts and rebates. Product returns are permitted in certain sales contracts and an allowance is recorded for returns based on the Company's history of actual returns. Certain customer incentive programs require management to estimate the cost of those programs. The allowance for these programs is determined through an analysis of programs offered, historical trends, expectations regarding customer and consumer participation, sales and payment trends, and experience with payment patterns associated with similar programs that had been previously offered. If sufficient history to make reasonable and reliable estimates of returns or rebates does not exist, revenue associated with such practices is deferred until the return period lapses or a reasonable estimate can be made. This deferred revenue will be recognized as revenue when the distributor reports to us that it has either shipped or disposed of the units (indicating that the possibility of return is remote).

The Company's OEM capital equipment solar energy business builds complex customized machines to order for specific customers. Substantially all of these orders are sold on a FOB Bedford, Massachusetts (or EXW Factory) basis. It is the Company's policy to recognize revenues for this equipment as the product is shipped to the customer, as customer acceptance is obtained prior to shipment and the equipment is expected to operate the same in the customer's environment as it does in the Company's environment. When an arrangement with the customer includes future obligations or customer acceptance, revenue is recognized when those obligations are met or customer acceptance has been achieved. The Company's solar energy systems business installs solar energy systems on customer-owned properties on a contractual basis. Generally, revenue is recognized once the systems have been installed and the title is passed to the customer. For arrangements with multiple elements, the Company allocates fair value to each element in the contract and revenue is recognized upon delivery of each element. If the Company is not able to establish fair value of undelivered elements, all revenue is deferred.

The Company recognizes revenues and estimated profits on long-term government contracts on the accrual basis where the circumstances are such that total profit can be estimated with reasonable accuracy and ultimate realization is reasonably assured. Profit estimates are revised periodically based upon changes and facts, and any losses on contracts are recognized immediately. Some of the contracts include provisions to withhold a portion of the contract value as retainage until such time as the United States government performs an audit of the cost incurred under the contract. The Company's policy is to take into revenue the full value of the contract, including any retainage, as it performs against the contract since the Company has not experienced any substantial losses as a result of audits performed by the United States government.

*Impairment of Long-lived Assets*

Long-lived assets, including fixed assets and intangible assets, are continually monitored and are evaluated at least annually for impairment. The determination of recoverability is based on an estimate of undiscounted cash flows expected to result from the use of an asset and its eventual disposition. The estimate of cash flows is based upon, among other things, certain assumptions about expected future operating performance. Our estimates of undiscounted cash flows may differ from actual cash flows due to, among other things, technological changes, economic conditions, changes to our business model or changes in our operating performance. If the sum of the undiscounted cash flows (excluding interest) is less than the carrying value, we recognize an impairment loss, measured as the amount by which the carrying value exceeds the fair value of the asset.

*Acquisition Accounting*

Through its acquisition, the Company has accumulated assets the valuation of which involves estimates based on fair value assumptions. Estimated lives assigned to the assets acquired in a business purchase also involve the use of estimates. These matters that are subject to judgments and estimates are inherently uncertain, and different amounts could be reported using different methodologies. Management uses its best estimate in determining the appropriate values and estimated lives to reflect in the consolidated financial statements, using historical experience, market data, and all other available information.



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*Item 7. Financial Statements*

**Consolidated Financial Statements**

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**REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM**

To the Board of Directors and Stockholders  
of Spire Corporation:

We have audited the consolidated balance sheet of Spire Corporation and subsidiaries as of December 31, 2004 and the related consolidated statements of operations, stockholders' equity, and cash flows for the years ended December 31, 2004 and 2003. These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these consolidated financial statements based on our audits.

We conducted our audits in accordance with the standards of the Public Company Accounting Oversight Board (United States of America.) Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes consideration of internal control over financial reporting as a basis for designing audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe our audits provide a reasonable basis for our opinion.

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of Spire Corporation and subsidiaries as of December 31, 2004, and the results of their operations and their cash flows for the years ended December 31, 2004 and 2003, in conformity with accounting principles generally accepted in the United States of America.

/s/ VITALE, CATURANO & COMPANY, LTD.

Boston, Massachusetts

March 24, 2005

**Table of Contents****SPIRE CORPORATION AND SUBSIDIARIES****CONSOLIDATED BALANCE SHEET**

	<b>December 31, 2004</b>
<b>Assets</b>	
<i>Current assets</i>	
Cash and cash equivalents	\$ 3,336,867
Restricted cash	609,889
	<u>3,946,756</u>
Accounts receivable trade, net	4,227,878
Inventories, net	2,724,438
Refundable income taxes	47,092
Prepaid expenses and other current assets	507,322
	<u>11,453,486</u>
Net property and equipment	6,741,245
	<u>732,726</u>
Intangible and other assets (less accumulated amortization of \$610,270 in 2004)	732,726
Available-for-sale investments at quoted market value	790,926
Restricted cash long-term	217,800
Deposit related party	168,750
	<u>1,910,202</u>
Total other assets	1,910,202
Total assets	<u>\$ 20,104,933</u>
<b>Liabilities and Stockholders Equity</b>	
<i>Current liabilities</i>	
Current portion of capital lease obligation	\$ 401,681
Current portion of capital lease obligation related party	548,365
Accounts payable	1,987,259
Accrued liabilities	1,448,743
Current portion of accrued lease obligation related party	472,699
Advances on contracts in progress	2,598,746
	<u>7,457,493</u>
Total current liabilities	7,457,493
Long-term portion of capital lease obligation	446,684
Long-term portion of capital lease obligation related party	2,247,982
Accrued lease obligation related party	790,926
Deferred compensation	790,926
Unearned purchase discount	1,270,311
	<u>4,755,903</u>
Total long-term liabilities	4,755,903

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Total liabilities	12,213,396
<i>Commitments and Contingencies:</i>	
<i>Stockholders' equity</i>	
Common stock, \$0.01 par value; shares authorized 20,000,000; issued 6,848,541 shares in 2004	68,485
Additional paid-in capital	9,447,886
Accumulated deficit	(1,649,390)
Accumulated other comprehensive income	24,556
Total stockholders' equity	7,891,537
Total liabilities and stockholders' equity	\$ 20,104,933

The accompanying notes are an integral part of these consolidated financial statements.



**Table of Contents****SPIRE CORPORATION AND SUBSIDIARIES****CONSOLIDATED STATEMENTS OF OPERATIONS**

	<b>Years Ended December 31,</b>	
	<b>2004</b>	<b>2003</b>
<i>Net sales and revenues</i>		
Contract research, service and license revenues	\$ 10,273,191	\$ 8,028,504
Sales of goods	7,004,845	7,774,364
<b>Total net sales and revenues</b>	<b>17,278,036</b>	<b>15,802,868</b>
<i>Costs and expenses</i>		
Cost of contract research, services and licenses	8,263,816	5,940,488
Cost of goods sold	6,355,439	6,688,932
Selling, general and administrative expenses	8,096,773	6,873,121
Internal research and development expenses	1,405,981	1,086,588
<b>Total costs and expenses</b>	<b>24,122,009</b>	<b>20,589,129</b>
Gain on sale of a license	3,000,000	4,989,150
Earnings (loss) from operations	(3,843,973)	202,889
Interest expense, net	(275,589)	(160,525)
<i>Earnings (loss) before income taxes</i>	(4,119,562)	42,364
Income tax expense		33,432
<b>Net income (loss)</b>	<b>\$ (4,119,562)</b>	<b>\$ 8,932</b>
<i>Earnings (loss) per share of common stock basic</i>	\$ (0.60)	\$ 0.00
<i>Earnings (loss) per share of common stock diluted</i>	\$ (0.60)	\$ 0.00
Weighted average number of common and common equivalent shares outstanding basic	6,809,462	6,764,394
Weighted average number of common and common equivalent shares outstanding diluted	6,809,462	6,869,668

The accompanying notes are an integral part of these consolidated financial statements.



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## SPIRE CORPORATION AND SUBSIDIARIES

## CONSOLIDATED STATEMENTS OF STOCKHOLDERS EQUITY

Years Ended December 31, 2004 and 2003

	Common Stock		Additional Paid-in Capital	Accumulated Other Comprehensive Income	Retained Earnings/ (Accumulated Deficit)	Total	Comprehensive Income/(Loss)
	Shares	Amount					
Balance, December 31, 2002	6,759,660	\$ 67,597	\$ 9,246,381	\$	\$ 2,461,240	\$ 11,775,218	\$ 2,236,651
Exercise of stock options	1,000	10	1,305			1,315	
Stock grant	5,000	50	10,850			10,900	
Net income					8,932	8,932	8,932
Balance, December 31, 2003	6,765,660	67,657	9,258,536		2,470,172	11,796,365	\$ 8,932
Exercise of stock options	82,881	828	189,350			190,178	
Net unrealized gains on available for sale marketable securities, net of tax				24,556		24,556	24,556
Net loss					(4,119,562)	(4,119,562)	(4,119,562)
Balance, December 31, 2004	6,848,541	\$ 68,485	\$ 9,447,886	\$ 24,556	\$ (1,649,390)	\$ 7,891,537	\$ (4,095,006)

The accompanying notes are an integral part of these consolidated financial statements.

**Table of Contents****SPIRE CORPORATION AND SUBSIDIARIES****CONSOLIDATED STATEMENTS OF CASH FLOWS**

	<b>Years Ended December 31,</b>	
	<b>2004</b>	<b>2003</b>
<i>Cash flows from operating activities:</i>		
Net income (loss)	\$ (4,119,562)	\$ 8,932
Adjustments to reconcile net income (loss) to net cash used in operating activities:		
Depreciation and amortization	2,579,972	1,630,319
Deferred income taxes		32,000
Gain on sale of a license	(3,000,000)	(4,989,150)
Loss on disposal of license and fixed assets	130,269	
Deferred compensation	24,556	
Unearned purchase discounts	(159,571)	(39,241)
Stock grant		10,900
Changes in assets and liabilities (excluding business acquisition):		
Restricted cash	53,000	(662,889)
Accounts receivable, net	12,459	(31,817)
Inventories	(1,293,449)	835,815
Prepaid expenses and other current assets	118,875	554,443
Refundable income taxes	475,908	(523,000)
Accounts payable, accrued liabilities and other liabilities	(51,624)	(1,154,525)
Other assets	(217,800)	(2,001)
Deposit related party	(168,750)	
Advances on contracts in progress	1,418,953	120,941
<b>Net cash used in operating activities</b>	<b>(4,196,764)</b>	<b>(4,209,273)</b>
<i>Cash flows from investing activities:</i>		
Net proceeds from sale of a license	3,000,000	4,989,150
Additions to property and equipment	(407,455)	(1,017,759)
Acquisition, net of cash acquired		(954,351)
Increase in intangible and other assets	(467,292)	(213,602)
<b>Net cash provided by investing activities</b>	<b>2,125,253</b>	<b>2,803,438</b>
<i>Cash flows from financing activities:</i>		
Principal payment on capital lease obligations related parties	(406,289)	(187,761)
Principal payment on capital lease obligations	(374,602)	(207,344)
Exercise of stock options	190,178	1,315
<b>Net cash used in financing activities</b>	<b>(590,713)</b>	<b>(393,790)</b>
<b>Net decrease in cash and cash equivalents</b>	<b>(2,662,224)</b>	<b>(1,799,625)</b>
Cash and cash equivalents, beginning of year	5,999,091	7,798,716
<b>Cash and cash equivalents, end of year</b>	<b>\$ 3,336,867</b>	<b>\$ 5,999,091</b>

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<i>Supplemental disclosures of cash flow and non-cash flow information</i>		
Acquisition of Bandwidth Semiconductor:		
Assets acquired	\$	\$ 3,998,595
Liabilities assumed (including related party obligation of \$1,247,241)	\$	\$ (3,044,244)
Cash paid, including acquisition costs	\$	\$ 954,351
Non-cash financing activities:		
Capital lease obligation related party	\$	\$ 3,390,397
Cash paid during the period for:		
Interest	\$ 61,227	\$ 63,545
Interest related party	\$ 266,879	\$ 138,238
Income taxes paid (received)	\$ (559,908)	\$ 695,000

The accompanying notes are an integral part of these consolidated financial statements.

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**SPIRE CORPORATION AND SUBSIDIARIES**

**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

**December 31, 2004 and 2003**

**1. Description of the Business**

The Company develops, manufactures and markets highly-engineered products and services in four principal business areas: biomedical, solar equipment, solar systems and optoelectronics, generally bringing to bear expertise in materials technologies, surface science and thin films across all four business areas.

In the biomedical area, the Company provides value-added surface treatments to manufacturers of orthopedic and other medical devices that enhance the durability, antimicrobial characteristics or other material characteristics of their products; develops and markets hemodialysis catheters and related devices for the treatment of chronic kidney disease; and performs sponsored research programs into practical applications of advanced biomedical and biophotonic technologies.

In the solar equipment area, the Company develops, custom manufactures and markets specialized equipment for the production of terrestrial photovoltaic modules from solar cells. The Company's equipment has been installed in more than 150 factories in 43 countries.

In the solar systems area, the Company provides custom and BIPV modules, stand alone emergency power backup and electric power grid-connected distributed power generation systems employing photovoltaic technology developed by the Company.

In the optoelectronics area, the Company provides compound semiconductor foundry and fabrication services on a merchant basis to customers involved in biomedical/biophotonic instruments, telecommunications and defense applications. Services include compound semiconductor wafer growth, other thin film processes and related device processing and fabrication services. The Company also provides materials testing services and performs services in support of sponsored research into practical applications of optoelectronic technologies.

**2. Summary of Significant Accounting Policies**

*(a) Principles of Consolidation*

The consolidated financial statements include the accounts of the Company and its wholly-owned subsidiaries. All significant intercompany balances and transactions have been eliminated in consolidation.

*(b) Revenue Recognition*

The Company derives its revenues from three primary sources: (1) commercial products including, but not limited to, solar energy manufacturing equipment, solar energy systems and hemodialysis catheters; (2) biomedical and semiconductor processing services; and (3) United States government funded research and development contracts.

We generally recognize product revenue upon shipment of products provided there are no uncertainties regarding customer acceptance, persuasive evidence of an arrangement exists, the sales price is fixed or determinable, and collectibility is reasonably assured. These criteria are generally met at the time of shipment when the risk of loss and title passes to the customer or distributor, unless a consignment arrangement exists. Revenue from consignment arrangements is recognized based on product usage indicating sales are complete. Gross sales reflect reductions attributable to customer returns and various customer incentive programs including pricing discounts and rebates. Product returns are permitted in certain sales contracts and an allowance is recorded for returns based on the Company's history of actual returns. Certain customer incentive programs require management to estimate the cost of those programs. The allowance for these programs is determined through an analysis of programs offered, historical trends, expectations regarding customer and consumer

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**SPIRE CORPORATION AND SUBSIDIARIES**

**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)**

**December 31, 2004 and 2003**

participation, sales and payment trends, and experience with payment patterns associated with similar programs that had been previously offered. If sufficient history to make reasonable and reliable estimates of returns or rebates does not exist, revenue associated with such practices is deferred until the return period lapses or a reasonable estimate can be made. This deferred revenue will be recognized as revenue when the distributor reports to us that it has either shipped or disposed of the units (indicating that the possibility of return is remote.)

The Company's OEM capital equipment solar energy business builds complex customized machines to order for specific customers. Substantially all of these orders are sold on a FOB Bedford, Massachusetts (or EXW Factory) basis. It is the Company's policy to recognize revenues for this equipment as the product is shipped to the customer, as customer acceptance is obtained prior to shipment and the equipment is expected to operate the same in the customer's environment as it does in the Company's environment. When an arrangement with the customer includes future obligations or customer acceptance, revenue is recognized when those obligations are met or customer acceptance has been achieved. The Company's solar energy systems business installs solar energy systems on customer-owned properties on a contractual basis. Generally, revenue is recognized once the systems have been installed and the title is passed to the customer. For arrangements with multiple elements, the Company allocates fair value to each element in the contract and revenue is recognized upon delivery of each element. If the Company is not able to establish fair value of undelivered elements, all revenue is deferred.

The Company recognizes revenues and estimated profits on long-term government contracts on the accrual basis where the circumstances are such that total profit can be estimated with reasonable accuracy and ultimate realization is reasonably assured. Profit estimates are revised periodically based upon changes and facts, and any losses on contracts are recognized immediately. Some of the contracts include provisions to withhold a portion of the contract value as retainage until such time as the United States government performs an audit of the cost incurred under the contract. The Company's policy is to take into revenue the full value of the contract, including any retainage, as it performs against the contract since the Company has not experienced any substantial losses as a result of audits performed by the United States government.

*(c) Cash and Cash Equivalents*

Cash and cash equivalents include cash, time deposits and all highly liquid debt instruments with an original maturity of three months or less. These investments are carried at cost, which approximates market value.

*(d) Available-for-sale Investments*

At December 31, 2004, the Company's available for sale securities consisted of \$539,000 of equity investments, \$148,000 of government bonds and \$104,000 of money market funds. These investments have been classified as available-for-sale and are reported at fair value, with unrealized



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gains and losses included in accumulated other comprehensive income, net of related tax effect. As of December 31, 2004, the unrealized gain on these marketable securities was approximately \$40,000.

### *(e) Inventories*

Inventories are stated at the lower of cost or market, cost being determined on a first-in, first-out (FIFO) basis. Judgments and estimates are used in determining the likelihood that goods on hands can be sold to customers. Historical inventory usage and current revenue trends are considered in estimating both excess and obsolete inventory. If actual product demand and market conditions are less favorable than those projected by management, additional inventory write-downs may be required.

**Table of Contents****SPIRE CORPORATION AND SUBSIDIARIES****NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)****December 31, 2004 and 2003***(f) Property and Equipment*

Property and equipment is stated at cost. Depreciation and amortization are provided using the straight-line method over the estimated useful lives of the respective assets, as follows:

Building and equipment under capital lease	Lesser of 5 years or remaining life of original facility lease term
Machinery and equipment	5 and 7 years
Furniture and fixtures	5 years
Leasehold improvements	Lesser of 10 years or remaining life of original facility lease term

Maintenance and repairs are charged to expense as incurred. Major renewals and betterments are added to property and equipment accounts at cost.

*(g) Intangible and Other Assets*

Patents amounted to \$543,686, net of accumulated amortization of \$565,984, at December 31, 2004. Licenses amounted to \$180,714, net of accumulated amortization of \$44,286, at December 31, 2004. Patent cost is primarily composed of cost associated with securing and registering patents that the Company has been awarded or that have been submitted for, and the Company believes will be approved by the government. License cost is composed of the cost to acquire rights to the underlying technology or know-how. These costs are capitalized and amortized over their useful lives or terms, ordinarily five years, using the straight-line method. There are no expected residual values related to these patents. For disclosure purposes, the table below includes future amortization expense for patents and licenses owned by the Company as well as \$438,594 of estimated amortization expense related to patents that remain pending. Estimated amortization expense for the periods ending December 31, is as follows:

<u>Year</u>	<u>Amortization Expense</u>
2005	\$ 171,700
2006	167,293
2007	160,141
2008	132,950
2009	92,316

	\$ 724,400
--	------------

*(h) Long-lived Assets*

The Company accounts for long-lived assets in accordance with the provisions of SFAS No. 144, Accounting for the Impairment or Disposal of Long-Lived Assets . SFAS No. 144 requires that long-lived assets and certain identifiable intangibles be reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. The Company measures recoverability of assets to be held and used by a comparison of the carrying amount of an asset to future net cash flows expected to be generated by the asset. If such assets are considered to be impaired, the impairment to be recognized is measured by the amount by which the carrying amount of the assets exceed the fair value of the assets. The Company reports assets to be disposed of at the lower of the carrying amount or fair value less costs to sell.

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**SPIRE CORPORATION AND SUBSIDIARIES**

**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)**

**December 31, 2004 and 2003**

*(i) Income Taxes*

In accordance with SFAS No. 109, *Accounting for Income Taxes* ( SFAS 109 ), the Company recognizes deferred income taxes based on the expected future tax consequences of differences between the financial statement basis and the tax basis of assets and liabilities, calculated using enacted tax rates in effect for the year in which the differences are expected to be reflected in the tax return. Valuation allowances are provided if, based on the weight of available evidence, it is more likely than not that some or all of the deferred tax assets will not be realized.

*(j) Warranty*

The Company provides warranties on certain of its products and services. The Company's warranty programs are described below:

Spire Solar Equipment warrants solar energy module manufacturing equipment sold for a total of 360 days, the first 90 days of which include the replacement of defective component parts and the labor to correct the defect and the next 270 days of which include only the cost of defective component parts.

Spire Solar Systems warrants photovoltaic electric power systems sold against defective components for 360 days to include the replacement of defective component parts and the labor to correct the defect. Spire Solar Systems also warrants that its photovoltaic electric power systems will achieve a minimum of 80% of rated electrical power output for 20 years.

Spire Biomedical warrants that any of its catheter products found to be defective will be replaced. No warranty is made that the failure of the product will not occur, and Spire disclaims any responsibility for any medical complications. Spire Biomedical warrants that its services only will meet the agreed upon specifications.

Bandwidth Semiconductor warrants that its products will meet the agreed upon specifications.

The Company provides for the estimated cost of product warranties, determined primarily from historical information, at the time product revenue is recognized. Should actual product failure warranties differ from the Company's estimates, revisions to the estimated warranty liability

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would be required. The changes in the product warranties for the year ended December 31, 2004, are as follows:

Balance at December 31, 2003	\$ 50,000
Provision charged to income	18,676
Usage	(18,676)
	<hr/>
Balance at December 31, 2004	\$ 50,000
	<hr/>

### *(k) Research and Development Costs*

Research and development costs are charged to operations as incurred, except where such costs are reimbursable under customer funded contracts. During the years ended December 31, 2004 and 2003, unfunded research and development costs were \$1,406,000 and \$1,087,000, respectively.

### *(l) Earnings (Loss) Per Share*

Basic earnings (loss) per share is computed by dividing income available to common stockholders by the weighted average number of common shares outstanding during the period. Diluted earnings (loss) per share

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## SPIRE CORPORATION AND SUBSIDIARIES

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

December 31, 2004 and 2003

gives effect to all potential dilutive common shares outstanding during the period. The computation of diluted earnings (loss) per share does not assume conversion, exercise or contingent exercise of securities that would have an anti-dilutive effect on earnings per share.

*(m) Comprehensive Income (Loss)*

Comprehensive income (loss) is comprised of net income (loss) and other comprehensive income. Other comprehensive income includes certain changes in equity that are excluded from net income (loss). At December 31, 2004, accumulated other comprehensive income was comprised of unrealized gain of available-for-sale investments of \$25,000, net of tax.

*(n) Stock-Based Compensation*

The Company has adopted the disclosure provisions of SFAS No. 148, Accounting for Stock-Based Compensation-Transition and Disclosure which is an amendment of SFAS No. 123 Accounting for Stock-Based Compensation, and continues to apply Accounting Principles Board Opinion No. 25 and related interpretations in accounting for its stock plans. If the Company had elected to recognize compensation cost for all of the plans based upon the fair value at the grant dates for awards under those plans, consistent with the method prescribed by SFAS 123, net income (loss) and earnings (loss) per share would have been changed to the pro forma amounts indicated below.

	For the Year Ended December 31,	
	2004	2003
Net earnings (loss), as reported	\$ (4,119,562)	\$ 8,932
Deduct: Total stock-based employee compensation expense determined under fair value based method for all awards, net of related tax effects	(291,711)	(339,606)
Pro forma net loss	<u>\$ (4,411,273)</u>	<u>\$ (330,674)</u>
Earnings (loss) per share:		
Basic as reported	<u>\$ (0.60)</u>	<u>\$ 0.00</u>

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Basic pro forma	\$ (0.65)	\$ (0.05)
Diluted as reported	\$ (0.60)	\$ 0.00
Diluted pro forma	\$ (0.65)	\$ (0.05)

The per-share weighted-average fair value of stock options granted in 2004 and 2003 was \$3.56 and \$2.45, respectively, on the date of grant using the Black-Scholes option-pricing model with the following weighted-average assumptions:

<u>Year</u>	<u>Expected Dividend Yield</u>	<u>Risk-Free Interest Rate</u>	<u>Expected Option Life</u>	<u>Expected Volatility Factor</u>
2004		4.23%	5 years	78.2%
2003		3.27%	5 years	92.0%

*(o) Treasury Shares*

There were no treasury shares as of December 31, 2004.

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**SPIRE CORPORATION AND SUBSIDIARIES**

**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)**

**December 31, 2004 and 2003**

*(p) Use of Estimates*

The preparation of financial statements in conformity with accounting principles generally accepted in the United States of America requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenue and expenses during the reporting period. Significant estimates include revenue recognition, valuation of income tax assets and intangible assets. Actual results could differ from those estimates.

*(q) Financial Instruments*

Financial instruments of the Company consist of cash and cash equivalents, accounts receivable, available for sale marketable securities, accounts payable and capital leases. The carrying amounts of these financial instruments approximate their fair value.

*(r) Shipping and Handling Costs*

Shipping and handling costs are included in cost of goods sold.

*(s) Reclassifications*

Certain prior year amounts have been reclassified to conform with current presentation.

*(t) New Accounting Standards*

In January 2003, the Financial Accounting Standards Board ( FASB ) issued FASB Interpretation No. 46, Consolidation of Variable Interest Entities ( FIN 46 ) which requires the consolidation of variable interest entities by the primary beneficiary of the entity if the equity investors in



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the entity do not have the characteristics of a controlling financial interest or do not have sufficient equity at risk for the entity to finance its activities without additional subordinated financial support from other parties. In December 2003, the FASB issued FASB Interpretation No. 46R, Consolidation of Variable Interest Entities ( FIN46R ). FIN 46R superseded FIN46 and defers the effective date for small business filers until the first reporting period that ends after December 15, 2004 (fourth quarter of 2004). The Company adopted FIN No. 46R on January 1, 2004 and adoption did not have a material impact on the Company's financial position or results of operations.

In November 2004, the FASB issued FASB Statement No. 151, Inventory Costs an Amendment of ARB No. 43, Chapter 4 ( FAS 151 ). FAS 151 amends ARB 43, Chapter 4, to clarify that abnormal amounts of idle facility expense, freight, handling costs, and wasted materials (spoilage) should be recognized as current-period charges. In addition, this Statement requires that allocation of fixed production overheads to the costs of conversion be based on the normal capacity of the production facilities. The provisions of this Statement are effective for inventory costs incurred during fiscal years beginning after June 15, 2005. The adoption of the provisions of FAS 151 is not expected to have a material impact on the Company's financial position or results of operations.

In December 2004, the FASB issued SFAS No. 123R, *Share-Based Payment*. SFAS No. 123R requires companies to expense the value of employee stock option and similar awards. SFAS No. 123R is effective as of the beginning of the first interim or annual reporting period that begins after December 15, 2005. As of the effective date, the Company will be required to expense all awards granted, modified, cancelled or repurchased as well as the portion of prior awards for which the requisite service has not been rendered, based on the

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## SPIRE CORPORATION AND SUBSIDIARIES

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

December 31, 2004 and 2003

grant-date fair value of those awards as calculated for pro forma disclosures under SFAS No. 123. SFAS No. 123R permits public companies to adopt its requirements using one of two methods: A modified prospective method in which compensation cost is recognized beginning with the effective date (a) based on the requirements of SFAS No. 123R for all share-based payments granted after the effective date and (b) based on the requirements of SFAS No. 123R for all awards granted to employees prior to the effective date of SFAS No. 123R that remain unvested on the effective date. A prospective method which includes the requirements of the modified prospective method described above, but also permits entities to restate based on the amounts previously recognized under SFAS No. 123R for purposes of pro forma disclosures either (a) all prior periods presented or (b) prior interim periods of the year of adoption. SFAS No. 123R also requires the benefits of tax deductions in excess of recognized compensation cost to be reported as a financing cash flow, rather than as an operating cash flow as required under current literature. This requirement will reduce net operating cash flows and increase net financing cash flows in periods after adoption. The adoption of SFAS No. 123R's fair value method will have an impact on the Company's results of operations. The Company is currently in the process of determining the effects on its financial position, results of operations and cash flows that will result from the adoption of SFAS No. 123R under the modified prospective method.

**3. Accounts Receivable / Advances on Contracts in Progress**

Net accounts receivable, trade consists of the following:

	<b>December 31, 2004</b>
Amounts billed	\$ 3,763,150
Retainage	40,671
Accrued revenue	579,549
	<u>4,383,370</u>
Less: Allowance for sales returns and doubtful accounts	(155,492)
Net accounts receivable	<u>\$ 4,227,878</u>
Advances on contracts in progress	<u>\$ 2,598,746</u>

Accrued revenue represents revenues recognized on contracts for which billings have not been presented to customers. These amounts are billed and generally collected within one year.

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Retainage represents revenues on certain United States government sponsored research and development contracts. These amounts, which usually represent 15% of the Company's research fee on each applicable contract, are not collectible until a final cost review has been performed by government auditors. Included in retainage are amounts expected to be collected after one year, which totaled \$41,000 at December 31, 2004. All other accounts receivable are expected to be collected within one year.

All contracts with United States government agencies have been audited by the government through December 2002. The Company has not incurred significant losses as a result of government audits.

The Company maintains allowances for doubtful accounts for estimated losses resulting from the inability of its customers to pay amounts due. Bad debts are written off against the allowance when identified. In addition, the Company maintains an allowance for potential future product returns and rebates related to current period revenues. The Company analyzes the rate of historical returns when evaluating the adequacy of the allowance for sales returns and allowances. Returns and rebates are charged against the allowance when incurred.

**Table of Contents****SPIRE CORPORATION AND SUBSIDIARIES****NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)****December 31, 2004 and 2003**

Advances on contracts in progress represent contracts for which billings have been presented to the customer but revenue has not been recognized.

**4. Inventories**

Inventories consist of the following:

	<b>December 31, 2004</b>
Raw materials	\$ 890,300
Work in process	1,645,879
Finished goods	188,259
	<b>\$ 2,724,438</b>

**5. Property and Equipment**

Property and equipment consists of the following:

	<b>December 31, 2004</b>
Building under capital lease	\$ 3,390,397
Equipment under capital lease	880,927
Machinery and equipment	14,183,247
Furniture fixtures and computer equipment	3,644,254
Leasehold improvements	1,788,361
Construction in progress	53,513
	<b>\$ 23,940,699</b>

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Accumulated depreciation	(17,199,454)
	<u>6,741,245</u>
	<u>\$ 6,741,245</u>

Depreciation expense relating to property and equipment was \$2,457,000 and \$1,610,000 for the years ended December 31, 2004 and 2003, respectively.

**6. Accrued Liabilities**

Accrued liabilities include the following:

	<b>December 31, 2004</b>
Accrued payroll and payroll taxes	\$ 556,893
Accrued legal and audit fees	97,359
Accrued other	794,491
	<u>1,448,743</u>
	<u>\$ 1,448,743</u>

**7. Notes Payable and Credit Arrangements**

On June 23, 2003, the Company entered into a \$2,000,000 Loan Agreement (the Agreement) with Citizens Bank of Massachusetts. The Agreement provides Standby Letter of Credit Guarantees for foreign and domestic customers and are 100% secured with cash. The Agreement had an original expiration date of June 30, 2004 and was amended in June 2004 to extend the expiration date to June 28, 2005. The amendment also suspended the Agreement's revolving line of credit conversion feature for one year. At December 31, 2004, the

**Table of Contents****SPIRE CORPORATION AND SUBSIDIARIES****NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)****December 31, 2004 and 2003**

Company had \$828,000 of restricted cash associated with letters of credit. Standby Letters of Credit under this Agreement bear interest at 1%. A commitment fee of .25% is charged on the unused portion of the borrowing base. The Agreement contains covenants including certain financial reporting requirements. At December 31, 2004, the Company was in compliance with its financial reporting requirements and cash balance covenants. Letters of Credit are required to be 100% secured by cash.

**8. Stock Compensation Plans**

The Company has two employee stock option plans: the 1985 Incentive Stock Option Plan, and the 1996 Equity Incentive Plan. Both plans were approved by stockholders. These plans provide that the Board of Directors may grant options to purchase the Company's common stock to key employees of the Company. Incentive options must be granted at least at the fair market value of the common stock or, in the case of certain optionees, at 110% of such fair market value at the time of grant. The options may be exercised, subject to certain vesting requirements, for periods up to ten years from the date of issue.

Through December 31, 2004, the Company has outstanding under its 1996 Equity Incentive Plan, non-qualified stock options held by the unaffiliated directors of the Company for the purchase of common stock at an average price of \$4.95 per share. The options may be exercised, subject to certain vesting requirements, for periods up to ten years from the date of issue. The Company may no longer award options under any plans other than the 1996 Equity Incentive Plan.

A summary of the activity of these plans follows:

	<b>Number of Shares</b>	<b>Weighted Average Exercise Price</b>
Outstanding, December 31, 2002	703,710	\$ 3.48
Granted	34,000	\$ 2.39
Exercised	(1,000)	\$ 1.32
Canceled/expired	(25,382)	\$ 3.56
Options Outstanding at December 31, 2003	711,328	\$ 3.44
Granted	122,750	\$ 4.88
Exercised	(82,881)	\$ 2.29
Canceled/expired	(43,500)	\$ 3.54

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Options Outstanding at December 31, 2004	707,697	\$ 3.82
Options Exercisable at December 31, 2004	444,822	\$ 3.51

The following table summarizes information about stock options outstanding at December 31, 2004:

Range of Exercise Price	Options Outstanding			Options Exercisable	
	Number Outstanding	Weighted Average Remaining Contractual Life	Weighted Average Exercise Price	Number Exercisable	Weighted Average Exercise Price
\$1.32 to \$1.88	49,372	4.10 years	\$ 1.76	49,372	\$ 1.76
\$1.89 to \$2.70	142,200	5.50 years	\$ 2.52	129,200	\$ 2.51
\$2.71 to \$3.89	48,600	4.18 years	\$ 3.61	47,100	\$ 3.63
\$3.90 to \$4.39	383,025	7.63 years	\$ 4.02	184,150	\$ 3.96
\$4.40 to \$7.94	84,500	7.20 years	\$ 6.39	35,000	\$ 7.13
	<u>707,697</u>	6.67 years	\$ 3.82	<u>444,822</u>	\$ 3.51

There were 1,249,424 shares reserved for issuance under all plans at December 31, 2004.

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On May 23, 2003, the Company acquired from Stratos Lightwave, Inc. ( Stratos ) all of the ownership interests of Bandwidth Semiconductor, LLC ( Bandwidth ), a Delaware limited liability company, located in Hudson, New Hampshire. Bandwidth is a compound semiconductor foundry providing material and device fabrication services to defense, telecommunications and biomedical instrument industries.

The total purchase price was \$954,351 in cash, including related acquisition costs of \$229,385, and liabilities assumed of \$3,044,244. In connection with the acquisition, the Company assumed an unrelated party capital lease with GE Capital that Bandwidth had entered into to finance the purchase of a wafer production reactor. The consideration from the Company to Stratos also included the release and forgiveness from all future obligations of Bandwidth and Stratos in connection with a sublease agreement with the Company dated December 29, 1999 and expiring on November 30, 2005 for approximately 21,275 square-feet of space previously occupied by Bandwidth in Bedford, Massachusetts, that is now vacant. The Company's acquisition of Bandwidth did not include the building in Hudson, New Hampshire occupied by Bandwidth.

The total purchase price of \$954,351 was allocated based on management's estimated fair value of the assets acquired and liabilities assumed as follows:

Current assets	\$ 402,796
Property and equipment	3,595,799
Reactor capital lease	(1,430,311)
Accrued lease obligation related party	(1,247,241)
Other liabilities	(366,692)
	<hr/>
Total cash paid	\$ 954,351
	<hr/>

The following unaudited pro forma information assumes that the acquisition of Bandwidth had been completed as of the beginning of 2003:

**Year Ended**  
**December 31, 2003**  

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**(unaudited)**



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Revenue	\$	16,395,389
Net loss	\$	(1,308,248)
Loss per share	\$	(0.19)
Weighted average number of common and common equivalent shares outstanding		6,764,394

The pro forma financial information is not necessarily indicative of the results to be expected in the future as a result of the acquisition of Bandwidth.

### 10. Sale of a License

In October 2002, the Company sold an exclusive patent license for a hemodialysis split-tip catheter to Bard Access Systems, Inc. ( Bard ), a wholly owned subsidiary of C. R. Bard, Inc., in exchange for \$5,000,000 upon the execution of the agreement, with another \$5,000,000 due upon the earlier to occur of: (a) the date of the first

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## SPIRE CORPORATION AND SUBSIDIARIES

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

## December 31, 2004 and 2003

commercial sale of a licensed product by Bard; or (b) no more than 18 months after signing. The agreement further provides for two additional contingent cash payments of \$3,000,000 each upon the completion of certain milestones by Bard in 2004 and 2005. Bard has the right to cancel the agreement at any time subsequent to the second payment. There can be no assurances that these milestones will be attained and attainment is beyond the control of the Company. During the year ended December 31, 2002, the Company recorded the initial payment under the agreement, resulting in a gain of \$4,464,929, net of direct costs. Due to the potential length of time between the first and second payments and the cancellation provisions within the agreement, the Company did not record the potential remaining payments at that time. During June 2003, in accordance with the agreement, the Company received notification from Bard of the first commercial sale, collected the \$5,000,000 payment due and recorded a gain of \$4,989,150, net of direct costs. In June 2004, the Company received the first contingent milestone payment and recorded a gain of \$3,000,000. There were no direct costs associated with this payment. These gains have been recorded in the accompanying consolidated statements of operations for the years ended December 31, 2004 and 2003, respectively. The Company believes that the sale of the license does not reflect the day-to-day operations of the Company. Therefore, the net proceeds received has been classified under investing activities in the consolidated statements of cash flows for the years ended December 31, 2004 and December 31, 2003, respectively.

In conjunction with the sale, the Company received a sublicense, which permits the Company to continue to manufacture and market hemodialysis catheters for the treatment of chronic kidney disease. In addition, the Company granted Bard a right of first refusal should the Company seek to sell the catheter business.

**11. Income Taxes**

A summary of the components of income tax expense (benefit) attributable to continuing operations is as follows:

	2004		
	Current	Deferred	Total
Federal	\$	\$	\$
State			
<b>Total</b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
	2003		
	Current	Deferred	Total

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Federal	\$	\$ 27,200	\$ 27,200
State	1,432	4,800	6,232
Total	\$ 1,432	\$ 32,000	\$ 33,432

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The reconciliation between the amount computed by applying the United States federal statutory tax rate of 34% to pretax income and the actual provision for income taxes follows:

	<u>2004</u>	<u>2003</u>
Income tax expense (benefit) at statutory rate	\$ (1,400,651)	\$ 14,404
State income taxes net of federal income tax benefit	(273,097)	2,656
Increase in valuation allowance related to income tax expense	1,656,555	
Permanent differences	14,658	17,207
Utilization of tax credit carryforwards		
Expiration of foreign tax credits	2,435	
Other	100	(835)
	<u>          </u>	<u>          </u>
Total	<u>\$</u>	<u>\$ 33,432</u>

The tax effects of temporary differences that give rise to significant portions of deferred tax assets and deferred tax liabilities are as follows:

	<u>2004</u>
Deferred tax assets:	
Accounts receivable	\$ 63,175
Accruals	366,229
Inventories	115,267
Net operating loss carryforwards	1,394,182
General business credit carryforwards	6,803
Alternative minimum tax credit carryforwards	337,463
Foreign tax credit	31,697
	<u>          </u>
Total gross deferred tax assets	2,314,816
Valuation allowance	(2,157,159)
Deferred tax liabilities:	
Depreciation	(157,657)
	<u>          </u>
Total gross deferred tax liabilities	(157,657)

Net deferred tax assets	\$
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The net change in the total valuation allowance for the period ended December 31, 2004 was an increase of \$1,656,555.

**12. Commitments**

*Letters of Credit*

Outstanding letters of credit totaled \$828,000 at December 31, 2004. The letters of credit principally secure performance obligations, and allow holders to draw funds up to the face amount of the letter of credit if the Company does not perform as contractually required. These letters of credit expire through 2007 and are 100% secured by cash.

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## SPIRE CORPORATION AND SUBSIDIARIES

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

December 31, 2004 and 2003

*Property Under Capital Leases and Lease Commitments*

At December 31, 2004, the Company had capital leases in effect for a building and fabrication equipment. The Company also had operating leases for office space and other miscellaneous items.

The components of capitalized costs and carrying value of the property under capital leases were as follows:

	<b>2004</b>
	<hr/>
Unrelated party capital lease:	
Equipment	\$ 880,927
Less: accumulated depreciation	(250,330)
	<hr/>
	\$ 630,597
	<hr/>
	<b>2004</b>
	<hr/>
Related party capital lease:	
Hudson, New Hampshire building	\$ 3,390,397
Less: accumulated depreciation	(1,073,622)
	<hr/>
	\$ 2,316,775
	<hr/>

At December 31, 2004, future minimum lease payments for the period ended are as follows:

Unrelated Party Capital Lease	Related Party Capital Lease	Unrelated Party Operating Leases	Related Party Operating Lease
<hr/>	<hr/>	<hr/>	<hr/>

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2005	\$ 436,932	\$ 727,500	\$ 118,676	\$ 1,055,428
2006	495,655	870,000	98,265	
2007		1,102,500	36,176	
2008		495,260		
	<u>          </u>	<u>          </u>	<u>          </u>	<u>          </u>
Total minimum lease payments	932,587	3,195,260	\$ 253,117	\$ 1,055,428
	<u>          </u>	<u>          </u>	<u>          </u>	<u>          </u>
Less amount representing interest	(84,222)	(398,913)		
	<u>          </u>	<u>          </u>		
Present value of minimum lease payments	848,365	2,796,347		
Less current portion	(401,681)	(548,365)		
	<u>          </u>	<u>          </u>		
Long-term portion of capital lease obligation	\$ 446,684	\$ 2,247,982		
	<u>          </u>	<u>          </u>		

*Unrelated Party Capital Lease*

In September 2001, Bandwidth entered into an agreement with GE Capital Leasing Corp, for the lease of a reactor for its wafer production line. The lease is accounted for as a capital lease. Under the lease agreement, the Company is making monthly payments of approximately \$36,000. After the initial three-year period ending in September 2004, the lease allows for an additional two-year extension. In September 2004, the Company extended the lease term for an additional two years to September 2006. The lease includes a residual value guarantee of \$204,000 at the end of the extended period. Interest costs were assumed at 7%. For the year ended December 31, 2004, interest expense was \$61,000.

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## SPIRE CORPORATION AND SUBSIDIARIES

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

December 31, 2004 and 2003

*Related Party Capital Lease*

In conjunction with the acquisition of Bandwidth by the Company, SPI-Trust, a Trust of which Roger G. Little, Chairman of the Board, Chief Executive Officer and President of the Company, is sole trustee and principal beneficiary, purchased from Stratos the building that Bandwidth occupies in Hudson, New Hampshire for \$3.7 million. Subsequently, the Company entered into a lease for the building (90,000 square-feet) with SPI-Trust whereby the Company will pay \$4.1 million to the SPI-Trust over an initial five-year term expiring in 2008 with a Company option to extend for five years. In addition to the rent payments, the lease obligates the Company to keep on deposit with SPI-Trust the equivalent of three months rent (\$168,750 as of 12/31/04). The lease agreement does not provide for a transfer of ownership at any point. Interest costs were assumed at 7%. For the year ended December 31, 2004, interest expense was \$213,000. This lease has been classified as a related-party capital lease and a summary of payments (including interest) follows:

<u>Year</u>	<u>Rate Per Square Foot</u>	<u>Annual Rent</u>	<u>Monthly Rent</u>	<u>Security Deposit</u>
June 1, 2003 - May 31, 2004	\$ 6.00	\$ 540,000	\$ 45,000	\$ 135,000
June 1, 2004 - May 31, 2005	7.50	675,000	56,250	168,750
June 1, 2005 - May 31, 2006	8.50	765,000	63,750	191,250
June 1, 2006 - May 31, 2007	10.50	945,000	78,750	236,250
June 1, 2007 - May 31, 2008	13.50	1,215,000	101,250	303,750
		<u>\$ 4,140,000</u>		

*Unrelated Party Operating Leases*

Unrelated party operating leases primarily consist of leases for copiers and the telephone system.

*Related Party Operating Lease*

The Company subleases 74,000 square-feet in a building leased by Mykrolis Corporation, who in turn leases the building from a Trust of which Roger G. Little, Chairman of the Board, Chief Executive Officer and President of the Company, is sole trustee and principal beneficiary. The Company believes that the terms of the third-party sublease are commercially reasonable. The 1985 sublease originally was for a period of ten



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years, was extended for a five-year period expiring on November 30, 2000 and was further extended for a five-year period expiring on November 30, 2005. The agreement provides for minimum rental payments plus annual increases linked to the consumer price index. Rent expense under this sublease for the years ended December 31, 2004 and 2003 was \$1,151,000 and \$855,000, net of \$211,000 of sublet income received from Bandwidth prior to its acquisition, respectively (the Company sublet a portion of the building to Bandwidth prior to its acquisition by the Company). In connection with this sublease, the Company is invoiced and pays certain Trust related expenses, including building maintenance and insurance. The Company invoices the Trust on a monthly basis and the Trust reimburses the Company for all such costs. No amounts were due from the Trust as of December 31, 2004.

In conjunction with the acquisition of Bandwidth by the Company, the Company released Bandwidth from a lease agreement that had existed between Bandwidth and the Company. In November 2001, Bandwidth, under its previous owner, abandoned the space being subleased from the Company in Bedford, Massachusetts, to move to a new building and wafer fabrication lab in Hudson, New Hampshire. At that time, there were 48 months left on the lease. Subsequent to the move to Hudson, New Hampshire, Bandwidth was unable to sublease the Bedford,

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**SPIRE CORPORATION AND SUBSIDIARIES**

**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)**

**December 31, 2004 and 2003**

Massachusetts space, and was paying the Company for the unused space. In conjunction with the acquisition of Bandwidth in May 2003, the Company released Bandwidth from the remaining lease payments. However, the Company continues to be obligated to Mykrolis Corporation for the entire amount of the remaining lease agreement. As a result the present value of the remaining lease obligation associated with the unused space was recorded as an assumed liability of \$1,247,241 in the purchase accounting. As of December 31, 2004, the remaining lease obligation is \$472,699, which is reflected as accrued lease obligation related party in the December 31, 2004 consolidated balance sheet. The difference between the actual rent payment and the discounted rent payment will be accreted to the consolidated statements of operations as interest expense. Interest of 6.28% has been assumed on this obligation. For the year ended December 31, 2004, interest expense was \$54,000.

*Agreement with BP Solarex*

On October 8, 1999, the Company entered into an Agreement with BP Solarex ( BPS ) in which BPS agreed to purchase certain production equipment built by the Company, for use in the Company's Chicago factory ( Spire Solar Chicago ) and in return the Company agreed to purchase solar cells of a minimum of two megawatts per year over a five-year term for a fixed fee from BPS (the Purchase Commitment ). BPS has the right to reclaim the equipment should the Company not meet its obligations in the Purchase Commitment. The proceeds from the sale of the production equipment purchased by BPS have been classified as an unearned purchase discount in the accompanying consolidated balance sheets. The Company will amortize this discount as a reduction to cost of sales as it purchases solar cells from BPS. During the quarter ended September 30, 2003, the Company and BPS retroactively amended the agreement to include all purchases of solar modules, solar systems, inverter systems and other system equipment purchased by the Company from BPS in the purchase commitment calculation. Amortization of the purchase discount amounted to \$159,571 for the year ended December 31, 2004. The production equipment has been classified as a component of fixed assets in the accompanying consolidated balance sheets. Depreciation amounted to \$272,511 for the year ended December 31, 2004.

In addition, the agreement contains a put option for BPS to have the Company create a separate legal entity for Spire Solar Chicago and for BPS to convert the value of the equipment and additional costs, as defined, into equity of the new legal entity. The percentage ownership in the joint venture would be determined based on the cumulative investments by BPS and the Company.

The amended agreement also allows the Company to terminate the agreement on 30 days notice in consideration for a termination payment based on the aggregate amount of Spire purchases of BPS products and the fair market value of the production equipment purchased by BPS at the time of the termination election. As of December 31, 2004, the Company has no intention of terminating the agreement.

**13. Employee Benefit Plans**

*Profit Sharing Plan*

In 1985, the Company adopted a profit sharing plan under Section 401(k) of the Internal Revenue Code. This plan allows employees to defer up to 17.5% of their income up to certain dollar limits on a pretax basis through contributions to the plan. No matching contributions have been made to the plan for the years ended December 31, 2004 and 2003, respectively.

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## SPIRE CORPORATION AND SUBSIDIARIES

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)

December 31, 2004 and 2003

*Deferred Compensation Plan*

Effective January 1, 2002, the Company adopted the Spire Corporation Non-Qualified Deferred Compensation Plan (the Plan) for Roger Little, Chairman of the Board, Chief Executive Officer and President of the Company (the Participant). Under this Plan, the Company makes equal monthly contributions to the Spire Corporation Non-Qualified Deferred Compensation Trust (the Trust) up to the annually required amount of \$250,000 over 5 years. The Company records these contributions as selling, general and administration expense when made. The Trustee makes all investment decisions for the Trust on behalf of the Participant. The Company has not guaranteed a return on investment for the Participant, however, all earnings and losses on the Plan assets are borne by the Participant. All contributions and earnings are fully vested to the Participant when made but are subject to the Company's creditors in the event of bankruptcy. As a result, the assets held in the Plan have been recorded as Available-for-sale investments in the consolidated balance sheet with a corresponding liability being recorded as Deferred compensation. Unrealized gains and losses on the Available-for-sale investments are recorded as Accumulated other comprehensive income within the equity section of the consolidated balance sheet. A corresponding entry to Deferred compensation is made to increase the amounts due the Participant resulting from the changes in the asset value with an offsetting charge to Selling, general and administrative expense.

**14. Earnings (Loss) Per Share**

The following table provides a reconciliation of the denominators of the Company's reported basic and diluted earnings (loss) per share computations for the year ended December 31:

	2004	2003
Weighted average number of common and common equivalent shares outstanding basic	6,809,462	6,764,394
Add: Net additional common shares upon assumed exercise of common stock options		105,274
Weighted average number of common and common equivalent shares diluted outstanding diluted	6,809,462	6,869,668

For the year ended December 31, 2004, 209,959 shares of common stock issuable relative to stock options were excluded from the calculation of dilutive shares since the inclusion of such shares would be anti-dilutive due to the Company's net loss position. In addition, 78,250 shares had exercise prices per share that exceeded the average market price of the Company's common stock and were excluded from the calculation of diluted shares since their inclusion would be anti-dilutive.

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For the year ended December 31, 2003, 404,916 shares had exercise prices per share that exceeded the average market price of the Company's common stock and were excluded from the calculation of diluted shares since their inclusion would be anti-dilutive.

### **15. Legal Matters**

From time to time, the Company is subject to legal proceedings and claims arising from the conduct of its business operations. The Company does not expect the outcome of these proceedings, either individually or in the aggregate, to have a material adverse affect on its financial position, results of operations, or cash flows.

The Company has been named as a defendant in 58 cases filed from August 2001 to July 2003 in state courts in Texas by persons claiming damages from the use of allegedly defective mechanical heart valves coated by a process licensed by the Company to St. Jude Medical, Inc., the valve manufacturer, which has also been

**Table of Contents****SPIRE CORPORATION AND SUBSIDIARIES****NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)****December 31, 2004 and 2003**

named as a defendant in the cases. In June 2003, a judge in a state court in Harris County, Texas agreed to grant the Company's motion for summary judgment based upon the principle of federal preemption with regard to 57 of those cases and to order that the cases against the Company be dismissed with prejudice. An order to this effect was signed in late July 2003. The remaining case is still pending, and due to aspects of its fact situation is not subject to the principle of federal preemption. From August 2003 to date, a total of seven new cases were filed against the Company in courts in Harris County. Activity with regard to these cases is likely to occur only after the disposition of the original 57 cases is finally settled. The plaintiffs whose cases were dismissed have filed appeals with the Texas appellate court. A decision on these appeals is pending and is expected soon. Attorneys who represent the Company with respect to these cases in Texas do not believe at this time that the actions of a federal district court judge in Minnesota in denying St. Jude Medical's request for summary judgment will materially affect the Company's position in the Texas complaints.

**16. Operating Segments and Related Information**

The following table presents certain operating division information in accordance with the provisions of SFAS No. 131, Disclosure about Segments of an Enterprise and Related Information .

The results of Bandwidth have been combined with the Company's Biophotonics Life Sciences segment, which has been renamed the Optoelectronics segment. The acquisition took place on May 23, 2003.

	<b>Solar</b>	<b>Solar</b>	<b>Spire</b>			<b>Total</b>
	<b>Equipment</b>	<b>Systems</b>	<b>Biomedical</b>	<b>Optoelectronics</b>	<b>Other</b>	<b>Company</b>
<i>December 31, 2004</i>						
Net sales and revenues	\$ 2,683,243	\$ 3,316,955	\$ 8,897,340	\$ 2,380,498	\$	\$ 17,278,036
Earnings (loss) from operations	(2,086,038)	(269,833)	774,706	(2,262,808)		(3,843,973)
Identifiable assets	2,739,238	2,144,876	3,779,262	5,581,855	5,859,702	20,104,933
Capital expenditures	45,687	1,613	246,542	58,848	54,765	407,455
Depreciation	75,419	297,635	415,530	1,426,794	241,553	2,456,931
<i>December 31, 2003</i>						
Net sales and revenues	\$ 5,324,688	\$ 2,005,404	\$ 6,603,767	\$ 1,869,009	\$	\$ 15,802,868
Earnings (loss) from operations	(659,382)	(1,323,647)	3,065,252	(879,334)		202,889
Identifiable assets	1,851,251	1,395,325	2,961,726	6,890,084	9,693,582	22,791,968
Capital expenditures	58,753	(3,950)	637,087	57,762	268,107	1,017,759
Depreciation	59,221	288,675	275,770	825,131	161,506	1,610,303

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The following table shows net sales and revenues by geographic area (based on customer location):

	<u>2004</u>	<u>2003</u>
Foreign	\$ 2,524,000	\$ 4,669,000
United States	14,754,000	11,134,000
	<u>\$ 17,278,000</u>	<u>\$ 15,803,000</u>

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**SPIRE CORPORATION AND SUBSIDIARIES**

**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (CONTINUED)**

**December 31, 2004 and 2003**

The Company's operations are focused on three primary business areas: Spire Solar (comprised of two business units, solar equipment and solar systems), Spire Biomedical (comprised of biomedical and biophotonics research) and optoelectronics (comprised primarily of Bandwidth Semiconductor, LLC). Spire Solar and Spire Biomedical operate out of the Company's facility in Bedford, Massachusetts. Solar systems operates out of Chicago, Illinois, and Bandwidth Semiconductor LLC operates out of the Company's facility in Hudson, New Hampshire. Each business unit is independently managed and has separate financial results that are reviewed by the Board of Directors and Chief Executive Officer and the chief executive officers of each operating division.

Earnings (loss) from operations is net sales less cost of sales, selling, general and administrative expenses and gain on sale of license, but is not affected either by non-operating income or by income taxes. In calculating earnings from operations for individual business units, substantial administrative expenses incurred at the operating level that are common to more than one segment are allocated on a net sales basis. Certain corporate expenses of an operational nature are also allocated to the divisions based on factors including occupancy, employment, and purchasing volume. All intercompany transactions have been eliminated.

Revenues from contracts with United States government agencies for 2004 and 2003 were \$2,837,000 and \$2,393,000, or 16% and 15% of consolidated net sales and revenues, respectively. In 2004 and 2003, export revenues were \$2,524,000 and \$4,669,000, or 15% and 30% of consolidated net sales and revenues, respectively.

One customer accounted for approximately 15% and three customers accounted for approximately 30% of the Company's gross sales during 2004 and 2003, respectively. In addition, the Company received funding from one customer representing approximately 11% of gross sales during 2004. One customer represented approximately 12% and two customers represented approximately 36% of net account receivables, trade at December 31, 2004 and 2003, respectively.



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***Item 8. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure***

None.

***Item 8A. Controls and Procedures***

*Evaluation of Disclosure Controls and Procedures*

As required by Rule 13a-15 under the Securities Exchange Act of 1934, as amended (the Exchange Act), the Company carried out an evaluation under the supervision and with the participation of the Company's management, including the Chief Executive Officer and President and Chief Financial Officer, of the effectiveness of the Company's disclosure controls and procedures as of December 31, 2004. In designing and evaluating the Company's disclosure controls and procedures, the Company and its management recognize that there are inherent limitations to the effectiveness of any system of disclosure controls and procedures, including the possibility of human error and the circumvention or overriding of the controls and procedures. Accordingly, even effective disclosure controls and procedures can only provide reasonable assurance of achieving their desired control objectives. Additionally, in evaluating and implementing possible controls and procedures, the Company's management was required to apply its reasonable judgment. Furthermore, in the course of this evaluation, management considered certain internal control areas, including those discussed below, in which we have made and are continuing to make changes to improve and enhance controls. Based upon the required evaluation, the Chief Executive Officer and the Chief Financial Officer concluded that as of December 31, 2004 the Company's disclosure controls and procedures were effective (at the reasonable assurance level mentioned above) to ensure that information required to be disclosed by the Company in the reports it files or submits under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the Securities and Exchange Commission's rules and forms.

From time to time, the Company and its management have conducted and will continue to conduct further reviews and, from time to time put in place additional documentation of, the Company's disclosure controls and procedures, as well as its internal control over financial reporting. The Company may from time to time make changes aimed at enhancing their effectiveness, as well as changes aimed at ensuring that the Company's systems evolve with, and meet the needs of, the Company's business. These changes may include changes necessary or desirable to address recommendations of the Company's management, its counsel and/or its independent auditors, including any recommendations of its independent auditors arising out of their audits and reviews of the Company's financial statements. These changes may include changes to the Company's own systems, as well as to the systems of businesses that the Company has acquired or that the Company may acquire in the future and will, if made, be intended to enhance the effectiveness of the Company's controls and procedures. The Company is also continually striving to improve its management and operational efficiency and the Company expects that its efforts in that regard will from time to time directly or indirectly affect the Company's disclosure controls and procedures, as well as the Company's internal control over financial reporting.

As disclosed in our quarterly report on Form 10-QSB/A Amendment Number 2 for the quarterly period ended June 30, 2003, as amended (the Second Quarter Form 10-QSB), in connection with the initial filing of the Second Quarter Form 10-QSB, which was initially submitted prior to the completion of the required SAS 100 Review by the Company's independent auditors, the Audit Committee engaged outside counsel to conduct an investigation into the events surrounding the preparation and filing of the Second Quarter Form 10-QSB. Based on the results of that investigation, outside counsel concluded that weaknesses existed in the Company's disclosure controls and procedures and proposed an action plan designed to strengthen the Company's disclosure controls and procedures. The Audit Committee, the Board of Directors and management have begun to adopt and implement certain of those recommendations in order to strengthen the Company's disclosure controls and procedures.

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As disclosed in our annual report on Form 10-KSB for the year ended December 31, 2003, the Company's independent auditor, Vitale, Caturano & Company, Ltd. ( VCC ) advised management and the Audit Committee by a letter dated March 18, 2004 that, in connection with its audit of the Company's consolidated financial statements for the year ended December 31, 2003, it noted certain matters involving internal control and its operation that it considered to be a material weakness under standards established by the American Institute of

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Certified Public Accountants. Reportable conditions are matters coming to an independent auditor's attention that, in their judgment, relate to significant deficiencies in the design or operation of internal control and could adversely affect the organization's ability to record, process, summarize, and report financial data consistent with the assertions of management in the financial statements. Further, a material weakness is a reportable condition in which the design or operation of one or more internal control components does not reduce to a relatively low level the risk that errors or fraud in amounts that would be material in relation to the financial statements being audited may occur and not be detected within a timely period by employees in the normal course of performing their assigned functions. VCC advised management and the Audit Committee that it considered the following to constitute material weaknesses in internal control and operations: (i) the Company's failure to adequately staff its finance group with the appropriate level of experience to effectively control the increased level of transaction activity, address the complex accounting matters and manage the increased financial reporting complexities resulting from, among other things, the acquisition of Bandwidth, the implementation of a new financial reporting system and the investigation surrounding the filing and eventual restatement of the Company's Form 10-QSB, as amended, for the quarter ended June 30, 2003 and (ii) the Company's current monthly close process does not mitigate the risk that material errors could occur in the books, records and financial statements, and does not ensure that those errors would be detected in a timely manner by the Company's employees in the normal course of performing their assigned functions. The matter noted in clause (i) above was similar to the material weakness noted by our former independent auditor (as disclosed in prior SEC filings). VCC noted that these matters were considered by it during its audit and did not modify the opinion expressed in its independent auditor's report dated March 18, 2004.

On March 24, 2005, VCC issued a letter advising management and the Audit Committee, that, in connection with its audit of the Company's consolidated financial statements for the year ended December 31, 2004, it continued to note certain matters involving internal control and its operation previously outlined in their March 18, 2004 letter that it considered to be a material weakness under standards established by the American Institute of Certified Public Accountants. VCC noted that the Company had implemented several of the specific recommendations in their March 18, 2004 letter including, but not exclusive of:

An improved reconciliation process;

A disciplined and timely close process on a monthly basis; and

Detailed reviews of monthly close packages by the appropriate levels of management.

However, VCC also noted that improvements still need to be made in the reconciliation and documentation and information flow processes. In addition, VCC noted that while an internal assessment of the finance staff has been made and certain roles and responsibilities have been defined, the appropriate level of staffing within the finance department will not be alleviated until such time as the full finance team is assembled.

The Company concurs with VCC's finding noted above and is continuing to make changes in its internal controls and procedures. The Company is also continually striving to improve its management and operational efficiency and expects that its efforts in that regard will from time to time directly or indirectly affect the Company's controls and procedures, including its internal control over financial reporting. On April 1, 2004, the Company hired a permanent chief financial officer with the appropriate experience and background to manage the diverse and complex financial issues, which may arise in the Company's business. The Company has recently reorganized the accounting staff and expects to hire additional professionals in the near term. In addition, the Company has completed compliance training and will continue to arrange for additional training for its finance staff. The Company is continuing its efforts to upgrade and enhance its enterprise wide accounting capabilities and has completed the implementation of a common accounting system for all of its business units.

*Changes in Internal Control Over Financial Reporting*

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There was no change in the Company's internal control over financial reporting that occurred during the fourth fiscal quarter of 2004 that has materially affected, or is reasonably likely to materially affect, the Company's internal control over financial reporting.

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**PART III**

***Item 9. Directors and Executive Officers of the Registrant; Compliance with Section 16(a) of the Exchange Act***

Information concerning the directors and executive officers of the Company is set forth under *Election of Directors* and *Executive Officers* in the Proxy Statement for the Special Meeting in Lieu of 2005 Annual Meeting of Stockholders ( *Proxy Statement* ) and is incorporated herein by reference. Information concerning compliance with Section 16(a) of the Exchange Act is set forth under *Compliance with Section 16(a) of the Securities Exchange Act of 1934* in the Proxy Statement and is incorporated herein by reference.

The Company has adopted a Code of Business Conduct and Ethics (the *Code* ) that applies to its principal executive officer, principal financial officer and principal accounting officer or controller, as well as to directors, officers and employees generally. The Code sets forth written standards that are reasonably designed to deter wrongdoing and to promote (1) honest and ethical conduct, (2) full, fair, accurate, timely and understandable disclosure in reports and documents that the Company files with the SEC and in other public communications made by the Company, (3) compliance with applicable governmental laws, rules and regulations, (4) the prompt internal reporting of violations of the Code to an appropriate person or persons identified in the Code and (5) accountability for adherence to the Code. The Company will provide to any person without charge, upon request, a copy of the Code. Any person wishing a copy should write to Michael W. O' Dougherty, Clerk, Spire Corporation, One Patriots Park, Bedford, Massachusetts 01730-2396.

A copy of the Code is incorporated by reference as an exhibit to this Form 10-KSB.

***Item 10. Executive Compensation***

Information concerning executive compensation is set forth under *Compensation of Officers and Directors* in the Proxy Statement and is incorporated herein by reference.

***Item 11. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters***

Information concerning security ownership of certain beneficial owners and management is set forth under *Ownership of Securities* in the Proxy Statement and is incorporated herein by reference. Information regarding equity compensation plan information is set forth under *Equity Compensation Plan Information* under Part II, Item 5 of this Form 10-KSB and is incorporated herein by reference.

***Item 12. Certain Relationships and Related Transactions***

Information concerning certain relationships and related transactions is set forth under *Certain Relationships and Related Transactions* in the Proxy Statement and is incorporated herein by reference.

*Item 13. Exhibits and Reports on Form 8-K*

**(1) Exhibits**

The following Exhibits are either filed herewith or are incorporated by reference as may be indicated.

- 3(a) Articles of Organization as amended, incorporated by reference to Exhibit 3(a) to the Company's Form 10-QSB for the quarter ended June 30, 1997
- 3(b) By-Laws, as amended, incorporated by reference to Exhibit 3(b) to the Company's Form 10-K for the year ended December 31, 1989
- 10(a) Sublease Agreement with Millipore Corporation as landlord for facility at Bedford, Massachusetts dated November 25, 1985, incorporated by reference to Exhibit 10(a) to the Company's Form 10-K for the year ended December 31, 1985

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10(b)	Amendment to Sublease Agreement with Millipore Corporation as landlord for facility at Bedford, Massachusetts dated December 30, 1999, incorporated by reference to Exhibit 10(b) to the Company's Form 10-KSB for the year ended December 31, 1999 ( 1999 10-KSB )
10(c)	Sublease Agreement with Methode Electronics, Inc. as tenant for a portion of the facility at Bedford, Massachusetts dated December 29, 1999, incorporated by reference to Exhibit 10(c) to the 1999 10-KSB
10(d)	Asset Purchase Agreement dated as of November 18, 1999 with Methode Electronics, Inc. and Methode Massachusetts, Inc., incorporated by reference to Exhibit 1 to the Company's Form 8-K dated December 29, 1999
10(e)	Employment Agreement with Roger G. Little dated as of January 1, 2002, incorporated by reference to Exhibit 10(e) to the Company's Form 10-KSB for the year ended December 31, 2001 ( 2001 10-KSB )
10(f)	Deferred Compensation Plan with Roger G. Little dated as of January 1, 2002, incorporated by reference to Exhibit 10(f) to 2001 10-KSB
10(g)	Spire Corporation 1985 Incentive Stock Option Plan incorporated by reference to Exhibit 10(d) to the Company's Form 10-K for the year ended December 31, 1984
10(h)	Spire Corporation 401(k) Profit Sharing Plan incorporated by reference to Exhibit 10(h) to the Company's Form 10-KSB for the year ended December 31, 2003 ( 2003 10-KSB )
10(i)	Spire Corporation 1996 Equity Incentive Plan, incorporated by reference to Appendix A to the Company's Proxy Statement dated April 15, 2004
10(j)	Purchase Agreement dated May 23, 2003 with Stratos Lightwave and Bandwidth Semiconductor, LLC incorporated by reference to Exhibit 10(h) to the Company's Form 10-QSB for the quarter ended June 30, 2003
10(k)	Lease Agreement dated May 23, 2003 by and between Roger G. Little, Trustee of SPI-Trust as Landlord and Spire Corporation as Tenant incorporated by reference to Exhibit 10(i) to the Company's Form 10-QSB for the quarter ended June 30, 2003
10(l)	Trust Agreement dated April 1, 2004 between the Company and Riggs Bank N.A. as Trustee of the Company's 401(k) Profit Sharing Plan (filed herewith)
10(m)	Amendment No. One dated November 18, 2004 to Employment Agreement for Roger G. Little (filed herewith)
14	Code of Business Conduct and Ethics incorporated by reference to Exhibit 14 to the 2003 10-KSB
21	Subsidiaries of the Registrant incorporated by reference to Exhibit 21 to the 2003 10-KSB
23	Independent Registered Public Accounting Firm's Consent (filed herewith)
31.1	Certification of the Chairman of the Board, Chief Executive Officer and President pursuant to §302 of the Sarbanes-Oxley Act of 2002
31.2	Certification of the Chief Financial Officer pursuant to §302 of the Sarbanes-Oxley Act of 2002
32.1	Certification of the Chairman of the Board, Chief Executive Officer and President pursuant to 18 U.S.C. §1350, as adopted pursuant to §906 of the Sarbanes-Oxley Act of 2002
32.2	Certification of the Chief Financial Officer pursuant to 18 U.S.C. §1350, as adopted pursuant to §906 of the Sarbanes-Oxley Act of 2002

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**(2) Reports on Form 8-K**

There were no reports on Form 8-K that were filed by the Registrant in the quarter ended December 31, 2004.

***Item 14. Principal Accountant Fees and Services***

Information concerning principal accountant fees and services is set forth under **Disclosure of Principal Accountant Fees and Services** in the Proxy Statement.



Table of Contents**SIGNATURES**

In accordance with Section 13 or 15(d) of the Exchange Act, the registrant caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

SPIRE CORPORATION

By:           /s/ ROGER G. LITTLE          

March 31, 2005

**Roger G. Little**  
**Chairman of the Board,**

**Chief Executive Officer, and**  
**President**

In accordance with the Exchange Act, this report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

<u>Signature</u>	<u>Title</u>	<u>Date</u>
<u>          /s/ ROGER G. LITTLE          </u> <b>Roger G. Little</b>	Chairman of the Board, Chief Executive Officer and President	March 31, 2005
<u>          /s/ JAMES F. PARSLOW          </u> <b>James F. Parslow</b>	Chief Financial Officer	March 31, 2005
<u>          /s/ UDO HENSELER          </u> <b>Udo Henseler</b>	Director	March 31, 2005
<u>          /s/ DAVID R. LIPINSKI          </u> <b>David R. Lipinski</b>	Director	March 31, 2005
<u>          /s/ MARK C. LITTLE          </u> <b>Mark C. Little</b>	Chief Executive Officer, Spire Biomedical and Director	March 31, 2005
<u>          /s/ MICHAEL J. MAGLIOCHETTI          </u> <b>Michael J. Magliochetti</b>	Director	March 31, 2005
<u>          /s/ GUY L. MAYER          </u> <b>Guy L. Mayer</b>	Director	March 31, 2005

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/s/ ROGER W. REDMOND

Director

March 31, 2005

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**Roger W. Redmond**

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**EXHIBIT INDEX**

<b><u>Exhibit</u></b>	<b><u>Description</u></b>
10(l)	Trust Agreement dated April 1, 2004 between the Company and Riggs Bank N.A. as Trustee of the Company's 401(k) Profit Sharing Plan
10(m)	Amendment No. One dated November 18, 2004 to Employment Agreement for Roger G. Little
23	Independent Registered Public Accounting Firm's Consent
31.1	Certification of the Chairman of the Board, Chief Executive Officer and President pursuant to §302 of the Sarbanes-Oxley Act of 2002
31.2	Certification of the Chief Financial Officer pursuant to §302 of the Sarbanes-Oxley Act of 2002
32.1	Certification of the Chairman of the Board, Chief Executive Officer and President pursuant to 18 U.S.C. §1350, as adopted pursuant to §906 of the Sarbanes-Oxley Act of 2002
32.2	Certification of the Chief Financial Officer pursuant to 18 U.S.C. §1350, as adopted pursuant to §906 of the Sarbanes-Oxley Act of 2002