

Edgar Filing: SPIRE CORP - Form 10-K

SPIRE CORP
Form 10-K
March 15, 2011

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-K

S Annual Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934
For the fiscal year ended December 31, 2010 or

o 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

Spire Corporation
(Exact name of registrant as specified in its charter)

Massachusetts
(State or other jurisdiction of incorporation or organization)
04-2457335
(I.R.S. Employer Identification Number)

One Patriots Park
Bedford, Massachusetts 01730-2396
(Address of principal executive offices)

(781) 275-6000
(Registrant's telephone number, including area code)

Securities registered pursuant to Section 12(b) of the Act:
Title of Each Class Name of Each Exchange on Which Registered
Common Stock, \$0.01 par value per share The Nasdaq Global Market

Securities registered pursuant to Section 12(g) of the Act:
None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes o No x

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. Yes o No x

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes x No o

Edgar Filing: SPIRE CORP - Form 10-K

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files).

Yes No

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K.

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, or a smaller reporting company. See the definitions of "large accelerated filer," "accelerated filer" and "smaller reporting company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer Accelerated filer Non-accelerated filer Smaller reporting company

(Do not check if a smaller reporting company)

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act).

Yes No

Aggregate market value of the voting stock held by non-affiliates of the registrant based on the last sale price of such stock as reported by The Nasdaq Global Market on June 30, 2010: \$21,146,000

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the definitive proxy statement for the Special Meeting in Lieu of 2011 Annual Meeting of Stockholders currently scheduled to be held on May 19, 2011, are incorporated by reference in Part III of this Form 10-K.

Spire Corporation
 Form 10-K
 For the Year Ended December 31, 2010

Table of Contents

PART I

Item 1.	<u>Business</u>	<u>1</u>
Item 1A.	<u>Risk Factors</u>	<u>6</u>
Item 1B.	<u>Unresolved Staff Comments</u>	<u>15</u>
Item 2.	<u>Properties</u>	<u>15</u>
Item 3.	<u>Legal Proceedings</u>	<u>15</u>
Item 4.	<u>Reserved</u>	<u>16</u>

PART II

Item 5.	<u>Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities</u>	<u>17</u>
Item 6.	<u>Selected Financial Data</u>	<u>17</u>
Item 7.	<u>Management's Discussion and Analysis of Financial Condition and Results of Operations</u>	<u>17</u>
Item 7A.	<u>Quantitative and Qualitative Disclosures About Market Risk</u>	<u>30</u>
Item 8.	<u>Financial Statements and Supplementary Data</u>	<u>31</u>
Item 9.	<u>Changes in and Disagreements with Accountants on Accounting and Financial Disclosure</u>	<u>58</u>
Item 9A(T).	<u>Controls and Procedures</u>	<u>58</u>
Item 9B.	<u>Other Information</u>	<u>60</u>

PART III

Item 10.	<u>Directors, Executive Officers and Corporate Governance</u>	<u>60</u>
Item 11.	<u>Executive Compensation</u>	<u>61</u>
Item 12.	<u>Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters</u>	<u>61</u>
Item 13.	<u>Certain Relationships and Related Transactions and Director Independence</u>	<u>61</u>
Item 14.	<u>Principal Accounting Fees and Services</u>	<u>61</u>

PART IV

Item 15.	<u>Exhibits, Financial Statement Schedules</u>	<u>62</u>
	<u>Signatures</u>	<u>65</u>

FORWARD-LOOKING STATEMENTS

This Report contains forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended (the “Securities Act”), and Section 21E of the Securities Exchange Act of 1934, as amended (the “Exchange Act”), which statements 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 “may”, “could”, “would”, “should”, “will”, “expects”, “anticipates”, “intends”, “plans”, “believes”, “estimates” and similar expressions. Our actual results and timing of certain events could differ materially from those discussed in these statements. Factors that could contribute to these differences include but are not limited to, those discussed under “Item 1A. Risk Factors”, “Management’s Discussion and Analysis of Financial Condition and Results of Operations” and elsewhere in this Report. Readers are encouraged to carefully review these risk factors. The cautionary statements made in this Report should be read as being applicable to all forward-looking statements wherever they appear in this report. We undertake no obligation to update any forward looking statements.

PART I

Item 1. 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 Global Market under the symbol “SPIR”.

Principal Products and Services

Overview

Spire has been in the solar business for over 30 years, initially pioneering developments in solar cell technology. Currently, we develop, manufacture and market customized turn-key solutions for the solar industry, including individual pieces of manufacturing equipment and full turn-key lines for cell and module production and testing. We have been continually active in research and development, with over \$100 million of R&D conducted and 26 issued patents. This expertise has provided the platform for development of our manufacturing equipment and turn-key lines. We have equipment deployed in approximately 50 countries and have among our customers some of the world's leading solar manufacturers including: First Solar, BP Solar, Canadian Solar, Trina Solar Energy, Evergreen Solar, Solaria Energia, and Martifer Solar S.A.

As the solar market continues to expand, and photovoltaic cell and module manufacturers ramp production to meet increasing demand, they require more equipment to produce additional photovoltaic cells and modules. We believe that we are one of the world's leading suppliers of the manufacturing equipment and technology needed to produce solar photovoltaic modules. Our individual manufacturing equipment products and our SPI-Line™ integrated turn-key cell and module production lines can be scaled, customized, and automated with high throughput. These machines are designed to meet the needs of a broad customer base ranging from manufacturers relying on mostly manual processes, to some of the largest photovoltaic manufacturing companies in the world.

In addition, Spire provides photovoltaic systems for application to powering buildings with connection to the utility grid. Our systems use commercially available modules, in some cases manufactured by our turn-key module line

customers. This business was re-established at Spire with the dissolution of our joint venture with Gloria Solar Co., Ltd. of Taiwan in the third quarter of 2009.

With over forty years since our incorporation and over thirty years in the solar market, we are well positioned to capitalize on the market's growth. Our total sales and revenues for 2010 increased approximately 14.3% compared to 2009.

Our Spire Semiconductor subsidiary provides semiconductor foundry services and has recently developed a record efficiency triple-junction gallium arsenide ("GaAs") concentrator solar cells for solar concentrator systems. This state-of-the-art semiconductor fabrication facility also provides our solar cell process technology for silicon cells. Additionally, Spire Semiconductor provides services to the consumer, medical and defense markets.

In addition to our cell and module manufacturing equipment, photovoltaic systems business and semiconductor foundry services, our biomedical business provides value-added surface treatments to manufacturers of orthopedic and other medical devices that enhance the durability, antimicrobial or other material characteristics of their products; and performs sponsored

research programs into practical applications of advanced biomedical and biophotonic technologies.

The foundation for all of our business units is our industry-leading expertise in manufacturing and materials technologies. This proprietary knowledge enables us to further develop our products and services in each market we serve.

Sale of Medical Products Business Unit; Discontinued Operations

On December 14, 2009, we completed the sale of our medical products business unit, which develops and markets coated and uncoated hemodialysis catheters and related devices for the treatment of chronic kidney disease (the “Medical Products Business Unit”), to Bard Access Systems, Inc. (“Bard”). Accordingly, the results and assets of the Medical Products Business Unit are being presented herein as discontinued operations and assets held for sale. See Note 17 to the consolidated financial statements.

The purchase price for the Medical Products Business Unit was \$12.4 million, including (i) \$9.4 million paid in cash to us at closing, (ii) \$100 thousand that was paid in cash at closing to two of our key employees, including Mark Little, Chief Executive Officer of Spire Biomedical, as consideration for their execution of non-competition agreements, and (iii) \$2.9 million that was paid in cash to us in the second quarter of 2010 based on the achievement of certain milestones described below (the “Contingent Purchase Price”).

Certain of the assets were transferred to Bard at the closing, and certain other assets (the “Contingent Deferred Assets”) were transferred to Bard upon the completion of a product recall related to such assets, which occurred during the second quarter of 2010. Until the Contingent Deferred Assets were transferred by us, we continued to manufacture and supply to Bard certain hemodialysis catheter products under the terms of a distribution agreement (the “Transition Period”). The Contingent Deferred Assets were transferred to Bard and Bard paid \$1.5 million of the Contingent Purchase Price to us in the second quarter of 2010. In addition, Bard paid \$1.4 million of the remaining Contingent Purchase Price to us in the second quarter of 2010 based upon the achievement of milestones related to the manufacture and supply of certain quantities of hemodialysis catheter products under the distribution agreement. The transfer price for hemodialysis catheter products delivered to Bard under the distribution agreement was equal to our standard costs of goods, including related overhead, without mark-up and calculated in accordance with U.S. generally accepted accounting principles.

Industry Overview

Solar power from photovoltaics has become one of the fastest growing industries in the world. From 2009 to 2010 new photovoltaic installations more than doubled worldwide, from about 7.5 GW to over 16 GW, which is over six times larger than it was just four years earlier. Key factors driving the demand for solar power include rising fossil fuel prices and environmental concerns including green house gases. As a result, businesses, governments, and consumers have become increasingly supportive of the development of solar energy. Government incentive programs are making solar power more cost competitive. Historically, the largest markets for photovoltaic systems have been in Europe and Japan with manufacturing located primarily in Europe and Asia. However, industry analysts predict that the U.S. will become one of the fastest growing markets over the next several years due to a number of factors including the extension of the tax credits and grants coupled with rapid expansion of photovoltaic utility markets.

Photovoltaic Module Manufacturing Overview

Photovoltaics is the direct conversion of sunlight into electricity through the use of semiconductor cells. Though various thin film and other semiconductor materials can be used, the majority of the photovoltaic systems market, approximately 80%, utilize crystalline silicon modules. Silicon modules are high efficiency and low cost and have demonstrated endurance required by systems providers.

Crystalline solar cells and modules are produced in five basic steps: (1) polysilicon production; (2) ingot growth; (3) ingot wafering; (4) cell production; and (5) module assembly. The value chain begins with the processing of quartz sand to produce polysilicon. The resulting polysilicon is melted down and cast into ingots. The ingots are sliced into wafers. The wafers are manufactured into solar cells through an etching, doping and coating process. The solar cells are combined into modules by testing and sorting the cells, soldering the cells into strings, transferring the strings onto a glass superstrate, laminating the structure with a back sheet, framing the module and, finally, testing the module performance. Spire provides equipment for the final two steps in the manufacturing process: cell production and module assembly.

Products and Services

Our core business is in the solar market, where we provide individual pieces of manufacturing equipment, turn-key cell and module lines, cell supply, solar factory management services, and solar systems. Our solar business was responsible for 84% of our revenues in 2010. We also operate smaller businesses in the semiconductor and biomedical device markets, both of which were derived from our core expertise in solar cell processing.

Spire Solar

We believe that we are one of the world's leading suppliers of manufacturing equipment and technology needed to manufacture solar photovoltaic power systems. Our individual items of manufacturing equipment and our SPI-Line™ module production lines span the full photovoltaic module fabrication process, which currently includes:

- Sorting solar cells into performance groups;
- 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 safe 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 photovoltaic modules, ready for use. We provide the necessary equipment and training for implementing these process steps for individual equipment items and for fully integrated production lines.

Many of our customers have been new entrants in the solar photovoltaic market. These entities are primarily local manufacturers that are encouraged to produce photovoltaic modules with the aid of government incentive programs. We offer a turn-key solution with enabling technology to allow these companies to quickly enter into the market, or to expand existing capacity. We also sell individual equipment primarily to existing silicon module manufacturers as well as certain pieces of our module equipment to "thin film" manufacturers, specifically lamination and testing equipment. We provide full turn-key solar cell and wafer lines to customers for vertical integration. A majority of the equipment used in these lines is purchased from third parties and we provide integration services along with proprietary cell line process technology.

Our solar systems business provides clients with grid-connected distributed photovoltaic systems and custom modules to meet their demand for solar electricity. The business is primarily a system design and engineering service whose team of experienced professionals offers complete project design, management, installation coordination, and customer service.

We also supply solar materials on a recurring basis under a Federal government contract. See "Unicor Relationship" below.

Spire Semiconductor

Spire Semiconductor operates a state-of-the-art semiconductor foundry and fabrication facility in Hudson, New Hampshire, equipped with advanced and sophisticated metal-organic chemical vapor deposition ("MOCVD") reactors and fabrication equipment. Our fabrication facility has been designed with flexibility to engage in quick-turn research and prototyping, as well as for economical full-rate volume production services.

Spire Semiconductor offers double- and triple-junction gallium arsenide ("GaAs") solar cells and recently completed a contract for the Department of Energy's National Renewable Energy Laboratory ("NREL") for a \$3.7 million, 20% cost share program to develop a 40%+ conversion efficiency solar cell design. GaAs concentrator cells represent a significant market opportunity and, as one of the pioneers in GaAs fabrication, we have the expertise to provide customers with turn-key cell products. We currently have capacity for 25 MW of high efficiency solar cell production with opportunities to expand. We also have capabilities for fabricating thermo-photovoltaic ("TPV") cells.

In 2007, we invested approximately \$3.8 million in equipment which would allow us to produce optoelectronic devices on a commercial basis. This was in anticipation of future revenues under our Manufacturing Agreement with Principia Lightworks who provided a non-refundable up front payment to partially offset our investment. On March 27, 2009, we and Principia Lightworks agreed to terminate the Manufacturing Agreement. See Note 15 to the consolidated financial statements. We are using this equipment for our other customers and are performing research and development of solar concentrator cells under a Federal government contract, which we expect to be able to commercialize.

Spire Biomedical

Through our Spire Biomedical subsidiary, we provide advanced medical device surface treatment processes for performance improvement of orthopedic and cardiovascular devices, enhancing properties such as wear resistance, infection resistance and thromboresistance.

As noted above, we sold our catheter product line at the end of 2009 to further focus our resources on our solar business. See Note 17 to the consolidated financial statements.

Principal Distribution Methods

Our products and services are sold primarily by our direct, internal sales staff with two notable exceptions: (i) in certain offshore markets, we utilize independent sales representatives to augment our sales efforts for our solar equipment, and (ii) proposals for sponsored research and development work are prepared by our on staff scientists and researchers.

Competitive Conditions

The markets in which we operate are highly competitive and characterized by changes due to technological improvements and developments. We compete with many other manufacturers and service providers in each of our product and service areas; many of these competitors have greater resources and sales. Additionally, with respect to our competition, our products and services utilizes alternative technologies. For example, our solar photovoltaic systems compete with other forms of renewable energy including wind, solar thermal and geo-thermal. Price, service and product performance are significant elements of competition in the sale of each of our products. We believe that there are considerable barriers to entry into the markets we serve, including a significant investment in specialized capital equipment and product design and development, and the need for a staff with sophisticated scientific and technological knowledge.

Sources and Availability of Raw Materials

Principal raw materials purchased by us 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 we generally rely on more than one supplier for each item.

Key Licenses and Patents, Government Rights to Intellectual Property

Through over 30 years of research and development, we have accumulated extensive scientific and technological expertise. We protect our technological advances as trade secrets, in part through confidentiality agreements with employees, consultants and third parties. We also seek and enforce patents as appropriate. We currently have 24 issued United States patents, 2 foreign patents and 26 patents pending in the United States, all of which cover elements of our materials and processing technologies.

The United States government retains the right to obtain a patent on any invention developed under government contracts as to which we do not seek and obtain a patent, and may require us 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, our United States government contracts prohibit us 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

Prior to the sale of the Medical Products Business Unit, we initiated a voluntary recall of certain catheters based upon three field complaints of catheter malfunctions received in the third quarter of 2009. No patient injury or complications resulted from the malfunction. It was determined that under certain molding conditions, there was a possibility that insufficient bonding may occur which could cause the catheter to malfunction. As it could not be isolated to a particular lot, we initiated a voluntary recall of any inventory held by our distributors and their customers. As the manufacturer of record, we are responsible for ensuring that the product meets the product specifications and the associated product liability that may result in failure of those specifications. Included in discontinued operations are reserves for inventory and potential returns related to a voluntary recall of medical products totaling approximately \$1.1 million in the year ended December 31, 2009. Not included in discontinued operations are certain indirect costs of the Medical Products Business Unit that have been reclassified to selling, general and administrative expense in the amount of \$162 thousand and \$584 thousand for the years ended December 31, 2010 and 2009, respectively. The voluntary recall was initiated in October 2009 and in February 2010, we determined that we had achieved a 100% effectiveness rating based upon the recall criteria. The U.S. Food and Drug Administration advised us in June 2010 that the recalls were terminated.

Government Regulation of Contracts

Our 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 our business, as well as to work performed for us by any subcontractors. We believe that we have put in place systems and personnel to ensure compliance with all such federal regulations and oversight requirements. All contracts with United States government agencies have been audited by the government through December 2007. We have not incurred substantial losses as a result of these incurred cost audits.

Research and Development

Our policy is to support as much of our research and development as possible through government contract funding, which we recognize as revenue. Revenues from our research and development contracts and NREL funded by the United States government, and their percent of consolidated net sales and revenues were \$3.1 million, or 4%, and \$3.3 million, or 5%, for the years ended December 31, 2010 and 2009, respectively.

Our contracts with the United States government grant to us 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 pursue patent protection on any inventions made under these contracts as to which patent protection is not sought and obtained by us. To date, the Government has not exercised its rights to patent nor indicated it has or it will do so. We still have the ability to sell our rights to develop technology and has successfully sold the rights in the past. Our rights to technology developed under contracts with private companies vary, depending upon negotiated terms.

Our internally funded research and development expenditures were \$1.3 million and \$1.1 million for the years ended December 31, 2010 and 2009, respectively.

Customers and Markets

Revenues from the delivery of a solar equipment module line and recurring revenues from the sale of solar cell materials to Federal Prison Industries, Inc. accounted for 7% and 21%, respectively, of total net sales and revenues for 2010. See “UNICOR Relationship” below. Revenues from the delivery of a solar equipment cell line and solar equipment module line to Solaria Energia accounted for 10% and 5%, respectively, of total net sales and revenues for 2010.

Revenues from the delivery of a solar equipment cell line and a solar equipment module line to two different customers (Hanwha International LLC and Martifer Solar S.A.) accounted for 17% and 15%, respectively, of total net sales and revenue for 2009 and recurring revenue from the sale of solar cell materials to Federal Prison Industries, Inc. accounted for 18% of total net sales and revenue during the same period. See “UNICOR Relationship” below.

Our export sales, which accounted for 39% and 59% of net sales and revenues for 2010 and 2009, respectively, continue to constitute a significant portion of our net sales and revenues. Over 90% of export sales in 2010 and 2009 were to solar customers with the remainder to biomedical and optoelectronic related customers.

The following table shows net sales and revenues by geographic area (based on customer location) for the years ended December 31:

(in thousands)	2010	%	2009	%	
United States	\$48,793	61	% \$28,798	41	%
Europe/N. Africa	14,763	19	% 15,191	22	%
Asia	16,233	20	% 25,561	37	%
Rest of the world	53	0	% 321	0	%
	\$79,842	100	% \$69,871	100	%

UNICOR Relationship

On November 28, 2008, we entered into a Solicitation/Contract/Order For Commercial Items (the "Cell Materials Contract") to provide Federal Prison Industries, Inc., otherwise known as UNICOR ("UNICOR"), a twenty two month supply of multicrystalline solar cells for \$53.9 million in the aggregate. Over the past two years, the parties have amended the pricing and quantity to be delivered during the initial two year term six times resulting in an overall decrease in value of the Cell Materials Contract to \$36.2 million and extending definite delivery commitments into 2011. Delivery commenced in the first quarter of 2009 with approximately 34% and 46% of the amended Cell Materials Contract value delivered in 2009 and 2010, respectively, and 20% to be delivered in the first quarter of 2011. The last amendment changed the contract from a definite quantity to a indefinite delivery, indefinite quantity contract after the final 20% of definite delivery commitments are delivered in 2011. Under the terms of the amended Cell Materials Contract, UNICOR can terminate the contract for convenience at any time. The amended Cell Materials Contract will be in place until December 31, 2011.

Additionally, in the third quarter of 2009, under a separate contract, we were awarded a contract to deliver a 50 MW module production line for another Federal prison facility located in Oregon. We delivered the equipment for this line in the first two quarters of 2010 and expect to complete installation in the second quarter of 2011. This line, along with our previously installed 25 MW module line in New York, will utilize solar cells from several vendors including us to fabricate modules for use in photovoltaic systems designated for Federal installations. Our systems group has established a teaming relationship with UNICOR whereby we could utilize UNICOR as a source of modules for Federal system projects. The systems group has completed its registration process to allow it to bid for Federal photovoltaic system projects.

Environmental Quality

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

Employees

At December 31, 2010, we had approximately 194 employees, of whom 188 worked full time. Our year end head count included 117 employees in manufacturing operations, 7 employees in research and development, and 70 employees in sales, general and administrative. We also employ part-time employees and hire independent contractors. Our employees are not represented by any collective bargaining agreement, and we have never experienced a work stoppage. We believe that our employee relations are good.

Item 1A. Risk Factors

In addition to the other information in this Form 10-K, the following risk factors inherent in and affecting our business should be considered. The descriptions in this Form 10-K contain forward-looking statements that involve risks and uncertainties. Our 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.”

Risks Relating to Our Business

Our success will depend upon our ability to effectively implement our business model of creating or acquiring scientifically advanced technology, developing and manufacturing commercially viable products from such technology and successfully marketing and distributing such products. The failure to successfully execute any stage of this process could have a materially negative impact on our business and results of operations.

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, that we 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 gain on sale of assets and gain on termination of contract, and we expect that our operating results will fluctuate in the future.

We have experienced losses from operations before non-recurring gains in fiscal year 2010. These losses have contributed to an accumulated deficit of approximately \$12.6 million as of December 31, 2010. Our revenues have not been sufficient to cover our operating expenses, and we anticipate that we may sustain future losses from operations if revenues do not increase. 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 processed by the capital equipment we provide to our buyers, particularly the polysilicon used in the manufacture of the silicon wafers and solar cells;
- 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;
- Changes in our receipt of license fees, milestone payments and royalty payments relating to our intellectual property;
- 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;
- Certain customers purchasing our solar equipment and optoelectronic services need to raise capital or borrow money as they are not currently profitable. If capital and credit markets are again disrupted this may impact our ability to grow revenues;
- Increased competition from current and future competitors, including competition resulting from services and products utilizing competing technologies;
- Termination of existing grants with government agencies or delays in funding of grants awarded;
- Problems experienced by our solar representatives through which we market, sell, and service certain foreign markets; and
- We have had customers cancel contracts and forfeit their deposits. This may occur in the future and these deposits may not offset costs incurred until the inventory can be redeployed to other customers.

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. Even if we are profitable, we may require additional working capital to meet expected growth. Although future sales of assets or technology licenses may be pursued, such sales cannot be assured. In addition, we may need to raise additional capital, or arrange other sources of funds, in order to sustain our operations. There can be no assurance that we will be able to raise such funds if they are required. Even if new financing were available, it may not be on commercially reasonable terms or terms that are acceptable to us.

Should photovoltaic technology be deemed unsuitable for global adoption, coupled with a potential lack of sufficient demand for solar modules or photovoltaic manufacturing equipment, we may experience an adverse effect on our revenues and related profits.

Our ability to expand revenues and reach and sustain profitability is dependant, in large part, on the feasibility of widespread adoption of photovoltaic technology and world demand for solar modules and photovoltaic manufacturing equipment. Factors

7

associated with the feasibility of widespread adoption of photovoltaic technology and world demand for solar modules and photovoltaic manufacturing equipment, the lack of which would limit the potential customers or expansion of our existing customer base, include, but are not limited to, the following:

- Consolidation of equipment manufacturers in the marketplace thereby reducing competitive advantages while experiencing market pricing concessions;
- Global nature of the competitive landscape and challenges associated with geographic diversity;
- Performance and reliability of photovoltaic systems and thin film technology compared to conventional and other non-solar renewable energy sources and products;
- Availability and substance of government subsidies, incentives and renewable portfolio standards to support the development of the solar energy industry;
- Position in the marketplace relative to competition and ability to scale upward as business opportunities are identified; and
- Unforeseen fluctuations in financially viable markets that affect the ability of customers to secure required financing for capital expenditures at competitive rates as well as vendor credit constraints and interruptions in materials flow throughout the U.S. supply chain.

Our optoelectronics subsidiary, Spire Semiconductor, has had difficulty in sustaining its revenue growth. It has high fixed costs with relatively low variable costs. If it cannot increase its volume, it may never reach profitability.

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.

A significant amount of revenue in 2010 was from a Federal government contract to develop solar concentrator cell

- technology, which ended in 2010. If we cannot commercialize this technology, we will need to find replacement customers for our services.

Our biomedical processing services are sold to OEM medical device manufacturers, primarily makers of orthopedic implants. Our ability to expand revenue and reach and sustain profitability depends substantially on the stability and growth of product lines that have incorporated our services into their product offering.

Demand for our customer products may be impacted by recent reforms to the healthcare system in the United States which may adversely affect the demand for our services or impose direct or indirect additional costs. We may be limited in our ability to raise prices and pass additional costs to our customers. Our customers or their competitors may introduce new products that compete with existing product lines. If customers fail to adopt our services in these newer generation of products this may impair our ability to expand and maintain our revenue and reach and sustain profitability. Our ability to introduce new services is dependent upon medical device manufacturers adopting our technology and the devices being approved by appropriate governmental regulatory authorities, factors over which we have limited control.

The growth of our solar systems business depends on the success of the project development or construction activities associated with a particular contract and the associated risk that projects under development may not receive the required permits or unforeseen delays in the scheduling of construction. Either event may lead to cost overruns and margin erosion.

The costs of development and construction of solar powered facilities involves a number of risks. Potential upfront out-of-pocket costs may be incurred for preliminary engineering, design work permitting, professional fees, and other expenses before we can determine whether a project is economically feasible. Several factors in developing the success of a particular project include:

- Negotiation and execution of acceptable engineering, procurement and construction agreements;
- Obtaining required governmental permits and approvals, including, but not limited to, the right to interconnect to the electric grid;
- Timely payment of customer deposits to ensure a positive cash flow by deliverable;
- Facilitating the obtaining of the required construction financing; and
- On schedule implementation and satisfactory sign-off related to completion of construction.

We may enter into fixed price Engineering, Procurement and Construction ("EPC") contracts whereby we act as the project manager for our customers as it relates to the installation of the solar power systems. Major identified costs are estimated at the time of execution of the EPC contract and are the basis for the pricing model to our customers. As these cost estimates are preliminary in nature they may or may not be covered by contracts between us or the subcontractors, suppliers and other parties to the project. Additionally, we require qualified, licensed subcontractors to install our systems and shortages in the labor pool could significantly delay a project or otherwise increase our costs. Should project overruns occur and we are unable to pass these along to our customer, we may not achieve our projected margins.

Although the disruptions in the capital and credit markets related to the recent national and world-wide financial crisis have improved, any re-occurrence could adversely affect our results of operations, cash flows and financial condition, or those of our customers or suppliers.

The recent disruptions in the capital and credit markets or the re-occurrence of those disruptions could adversely impact our results of operations, cash flows and financial condition, or those of our customers and suppliers. Such disruptions could adversely affect our ability to draw on our bank credit facilities. Disruptions in the capital and credit markets as a result of uncertainty, changing or increased regulation, reduced alternatives or failures of significant financial institutions could adversely affect our access to liquidity needed to conduct or expand our businesses or conduct acquisitions or make other discretionary investments, as well as our ability to effectively hedge our currency or interest rates. These same conditions and disruptions may also adversely impact the capital needs of our customers and suppliers, which, in turn, could adversely affect our results of operations, cash flows and financial condition. These may include project delays as well as longer project cycles from start to finish.

Our business relies in part on a limited number of products, and unfavorable sales and product mix may adversely affect our revenues, operating results and cash flows.

A significant portion of our net sales and revenues have historically been derived from sales of solar equipment module lines augmented by individual sales of simulators, assemblers, laminators and other module equipment which accounted for 42% and 47% of our net sales and revenues for 2010 and 2009, respectively. There can be no assurance that solar equipment module lines and individual equipment component sales will in fact increase or maintain their current level of sales. Circumstances that might have an effect on the sales pipeline and resulting levels of future sales of these products include factors beyond our control. Specifically, demand for solar products and the introduction of competing product offerings by other equipment manufacturers could have a material adverse affect on our business, financial condition, operating results, cash flow and future prospects.

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

Revenues from the delivery of a solar equipment module line and recurring revenues from the sale of solar cell materials to the same customer accounted for 7% and 21%, respectively, of total net sales and revenues for 2010. Revenues from the delivery of a solar equipment cell line and solar equipment module line to another customer account for 10% and 5%, respectively, of total net sales and revenues for 2010. Follow on orders from these customers would be subject to a competitive bid process.

Revenues from the customer acceptance of a solar equipment cell line and a solar equipment module line to two different customers accounted for 17% and 15%, respectively, of total net sales and revenue for 2009 and recurring revenue from the sale of solar cell materials to another customer accounted for 18% of total net sales and revenue

during the same period. Follow on orders from these customers would be subject to a competitive bid process.

Revenue recognition of solar cell materials, turn-key module and cell lines may result in significant fluctuations in operating results in sequential reporting periods and year over year comparisons. While many of these sales of solar equipment are non-recurring, we have had instances of recurring sales to such customers and may have them in the future. While the sales of solar cell materials has been recurring, the contract related to this revenue has been changed from a definite quantity to a indefinite delivery, indefinite quantity contract after the final 20% of definite delivery commitments are delivered in 2011. 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.

In order to mitigate potential exposure to risk associated with the collection of receivables, we often request that customers agree to pay an advance down payment upon execution of a purchase and sale agreement. The collection of these advances are critical to improving the cash flow. If however, customers do not accept contract terms that include the payment of advances, there may be a negative effect on our financial condition.

Certain critical raw materials and sub-components purchased within our equipment build are frequently procured from a single-source or from a limited number of third party suppliers within the supply chain. A vendor's inability to deliver on a timely basis could result in manufacturing delays and our capability to meet scheduled ship dates to our customers based upon contractual obligations without incurring additional production costs.

Our inability to procure the raw materials and sub-components based upon acceptable specifications and tolerances within required lead times could disrupt or impair our ability to manufacture our solar equipment or add increased costs to the manufacturing process. Certain critical raw materials and sub-components purchased within our equipment build are frequently procured from a single-source or from a limited number of third party suppliers. Accordingly, the inability of any of our key suppliers to deliver on a timely basis could disrupt our supply chain and adversely affect our operations. Furthermore, in certain instances several of our suppliers tend to be smaller companies that may not be able to maintain a required flow of materials should our volume requirements rapidly increase. Such conditions could find us unable to identify new suppliers able to meet our raw material specifications to be incorporated into our production process on commercially reasonable terms and in a timely manner.

Our solar business relies in part on our arrangements with UNICOR, and unfavorable developments in relation to this customer may adversely affect our revenues, operating results and cash flows going forward.

We have signed a contract and amended it multiple times to deliver approximately \$36.2 million in solar cells to UNICOR over a twenty-five month period, commencing in the first quarter of 2009, with three months remaining (80% of revenue was recognized at December 31, 2010). We have arranged a purchase agreement with a third party vendor to supply cells for the UNICOR contract. If our vendor fails to produce to specifications or quantities, we may need to replace this vendor and there can be no assurance that such a replacement contract will be on similar or favorable pricing terms. UNICOR has required modifications to the contract over purchase price and quantity purchased resulting in a decrease in contract value from \$53.9 million to \$36.2 million. The last amendment changed the contract from a definite quantity to a indefinite delivery, indefinite quantity contract after the final 20% of definite delivery commitments are delivered in the first quarter of 2011. While UNICOR can place delivery orders after the definite delivery commitments of solar cells are completed in 2011, there are no guaranteed minimums and there is no guarantee that they will place any additional delivery orders. We have an additional contract where we are currently installing equipment to a turn-key module line at a second Federal prison facility. If UNICOR is not successful in the production and sale of photovoltaic modules, this may adversely impact our equipment business unless we are able to develop new customers to replace UNICOR.

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 we do. 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 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.

The photovoltaic market is maturing due to the rapid growth of the industry. Our future success depends on our ability to sustain our business model.

We currently develop, manufacture and market customized turn-key solutions for the solar industry, including individual pieces of manufacturing equipment and full turn-key lines for cell and module production and testing. As the photovoltaic market matures, there may be fewer opportunities for start up firms. Further, customer purchasing decisions such as when purchasing decisions are made or how managed, what types of services are combined with purchased equipment may evolve as the industry expands. For example, we may determine that it is in our best interest to alter our strategy to focus on individual pieces of manufacturing equipment (as opposed to turn key solutions). We may have to offer vendor financing programs. Potentially re-engineering our focus toward individual pieces of manufacturing equipment and away from turn-key solutions may result in identification of non-productive assets, associated write-downs and/or reserves along with excess capacity and infrastructure costs.

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 24 United States patents, 2 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;
- 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.

From time to time we may be subject to lawsuits by other parties seeking to enforce their intellectual property rights. Any litigation could result in the expenditure of significant financial resources and the diversion of management's time and resources. In addition, litigation in which we are accused of infringement may have an impact on prospective customers, cause product delays, require us to develop non-infringing technology, make substantial payments to third parties or enter into royalty or license agreements, which may not be available on acceptable terms, or at all. If a successful claim of infringement were made against us and we could not develop non-infringing technology or license the infringed or similar technology on a timely and cost-effective basis, we may be forced to stop selling current products or abandon new products under development and we could be exposed to legal actions by our customers.

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

Most 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.

The U.S. government has certain rights relating to our intellectual property.

The United States government retains the right to obtain a patent on any invention developed under government contracts as to which we do not seek and obtain a patent, and may require us 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, our United States government contracts prohibit us 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.

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.

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.

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 39% in 2010) 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 but not limited to 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;
- Increased costs or reduced revenues as a result of movements in foreign currency exchange rates;
- Political instability;
-

Economic downturns in international markets;

- Strengthening of the United States dollar may negatively impact our foreign customers ability to purchase our products and services.
- Trade barriers such as export requirements, tariffs, taxes and other restrictions and expenses, which could increase the prices of our products and make our product offering less competitive in some countries; 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.

Global nature of our revenue subjects us to the legal systems of the international countries in which we offer and sell our products.

We offer and sell our products internationally which accounted for 39% and 59% of net sales and revenue for 2010 and 2009, respectively. As such, we are or could become subject to the laws and regulations of the jurisdictions in which we conduct

business. Laws and regulations include but are not limited to health and safety and environmental regulations, which are specific to the countries in which we sell our products. Accordingly we design our equipment to ensure their compliance with all applicable known standards. Continued compliance to satisfy ever changing legal and regulatory requirements, may cause us to incur additional costs leading to margin erosion. Accordingly, foreign laws and regulations which are applicable to us may have a material adverse effect on our business, financial condition, operating results, cash flow and future prospects.

As a result of the laws and regulations of the foreign jurisdictions in which we carry on business, we may experience difficulty in enforcing customer purchase and sale agreements or certain provisions included therein including but not limited to product warranty which is normally provided to our customers. The inability to enforce our contractual rights in foreign jurisdictions may have a material adverse effect on our business, financial condition, operating results, cash flow and future prospects.

The use of our medical related products (including our former catheter products), as well as our photovoltaic module manufacturing equipment, 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 fail to meet the manufacturers' specifications in performing our biomedical processing services, we may be exposed to potential product liability and other damage claims. We have had cases brought against us as a supplier of services with other defendants over the alleged manufacture and sale of defective heart valves. In the past, we have settled a case alleging that our catheter contributed to a patient's death in Ohio. Further, in 2010 we concluded a voluntary recall of certain hemodialysis catheters as the manufacturer of record due to a vendor molding issue. While no claims of product liability or other damages have been initiated against us due to the recall, this does not preclude such an event occurring as we have recalled only unused inventory held by distributors and hospitals. Even though we have completed the sale of our catheter product line to Bard, we are still the manufacturer of record of catheters implanted in patients, we are still responsible for those devices that we manufactured and are still liable for any recalls of any of these devices in the future. Furthermore, the use of our photovoltaic module manufacturing equipment could result in operator injury. 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.

Risks Related to Our Company

We may not be able to maintain our listing on the Nasdaq Global Market, which would adversely affect the price and liquidity of our common stock.

Our stock is currently listed on the Nasdaq Global Market. In order to maintain our listing on the Nasdaq Global Market, we must satisfy Nasdaq continued listing requirements. Under Nasdaq rules, we will maintain our listing so long as we meet, among other requirements, one of the following three requirements:

- stockholders' equity of at least \$10 million and market value of the common stock held by non-affiliates of at least \$5 million (Marketplace Rule 5450(b)(1));

Edgar Filing: SPIRE CORP - Form 10-K

- market value of listed securities of at least \$50 million and market value of the common stock held by non-affiliates of at least \$15 million (Marketplace Rule 5450(b)(2)); or
- total assets and total revenue of at least \$50 million each for the most recently completed fiscal year or two of the three most recently completed fiscal years and market value of the common stock held by non-affiliates of at least \$15 million (Marketplace Rule 5450(b)(3)).

As of the filing date of this Annual Report on Form 10-K, we are meeting only Marketplace Rule 5450(b)(3), as we have total assets and total revenue of at least \$50 million for two of the three most recently completed fiscal years (2009 and 2008) and the market value of the common stock held by non-affiliates is greater than \$15 million (approximately \$33 million as of March 1, 2011).

There is no assurance that in the future we will continue to satisfy Nasdaq continued listing requirements. At various times

in the past, we have received deficiency notices from Nasdaq and have been able to regain compliance prior to delisting, but we cannot assure you that we will always be able to regain or maintain compliance with Nasdaq continued listing requirements.

If we fail to maintain compliance with these rules and our common stock is delisted from the Nasdaq Global Market, there could be a number of negative implications, including reduced liquidity in the common stock as a result of the loss of market efficiencies associated with the Nasdaq Global 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 Company is subject to control by principal stockholder.

Roger G. Little, our founder, Chairman of the Board, Chief Executive Officer and President, controls approximately 26% of our outstanding common stock. As a result, Mr. Little is in a position to exert significant influence over actions which require stockholder approval and generally to direct our affairs, including the election of directors, potential acquisitions and sales or otherwise preventing or delaying changes in control of our Company that may be otherwise viewed as beneficial by shareholders other than Mr. Little.

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

We have paid no cash dividends since our inception. We anticipate retaining any future earnings for reinvestment in operations and do not anticipate that dividends will be paid in the foreseeable future. Accordingly, 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 our Company to fluctuate.

Our stock price has experienced significant volatility. While our revenues have increased, 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:

- Overall economic conditions and general market volatility;
- 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 alternative energy, semiconductor or biomedical 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.

Some of the requirements of Sarbanes-Oxley affect us as a small company disproportionately, and we may not be able to comply in a timely manner despite substantial effort and expense.

The Sarbanes-Oxley Act of 2002 imposed many new requirements on public companies, the most significant of which involves the documentation, testing and reporting of the effectiveness of our internal control over financial reporting.

We are required to report on our assessment of the effectiveness of our internal control over financial reporting in this Annual Report on Form 10-K. We have documented and tested our internal controls in 2010 and 2009 and this effort involved substantial time and expense. We have identified a material weakness and several other significant deficiencies, as discussed below, from our internal assessment and our independent registered public accounting firm has also identified items in connection with its annual audit of our consolidated financial statements.

Based on this evaluation, management concluded that the following material weakness in internal control over financial reporting existed as of December 31, 2010. We had inadequate personnel with appropriate tax knowledge to prepare the deferred tax analysis and related disclosures timely at year end. We also identified several other significant deficiencies that did not rise to the level of material weakness. As a result of such material weakness and significant deficiencies, issues related to accounting for income taxes existed in our internal preliminary 2010 fiscal year consolidated financial statements. For more detailed information see "Item 9A. Controls and Procedures."

We are working to address the issues raised by such material weakness and significant deficiencies, but we may not be successful in remediating them in a timely manner.

Our credit agreements with Silicon Valley Bank subjects us to various restrictions, which may limit our ability to pursue business opportunities.

Our credit agreements with Silicon Valley Bank subjects us to various restrictions on our ability to engage in certain activities without the prior written consent of the bank, including, among other things, our ability to:

- Dispose of or encumber assets, other than in the ordinary course of business,
- Incur additional indebtedness,
- Merge or consolidate with other entities, or acquire other businesses, and
- Make investments.

The agreements also subject us to various financial and other covenants with which we must comply on an ongoing or periodic basis. For example under our equipment and revolving line of credit, as long as any commitment remains outstanding under the facility, we must comply with a financial covenant, whereby we must maintain a minimum cash balance and availability line of credit. If we violate these or any other covenant, any outstanding debt under these agreements could become immediately due and payable, the bank could proceed against any collateral securing indebtedness and our ability to borrow funds in the future may be restricted or eliminated. These restrictions may also limit our ability to pursue business opportunities or strategies that we would otherwise consider to be in the best interests of the company.

We recognize revenue in accordance with various complex accounting standards, and changes in circumstances or interpretations may lead to accounting adjustments.

Our revenue recognition policies involve application of various complex accounting standards, including accounting guidance associated with revenue arrangements with multiple deliverables. Our compliance with such accounting standards often involves management's judgment regarding whether the criteria set forth in the standards have been met such that we can recognize as revenue the amounts that we receive as payment for our products or services. We base our judgments on assumptions that we believe to be reasonable under the circumstances. However, these judgments, or the assumptions underlying them, may change over time. In addition, the new guidance on the treatment of complex accounting matters may issue. Changes in circumstances or third-party guidance could cause our judgement to change with respect to our interpretations of these complex standards, and transactions recorded, including revenue recognized, for one or more prior reporting periods, which could be adversely affected.

Item 1B. Unresolved Staff Comments

None.

Item 2. Properties

Our corporate headquarters are located at One Patriots Park, Bedford, Massachusetts. This 144,230 square foot facility is leased and contains our administrative offices, sales and marketing offices, research and development facilities and the manufacturing facilities of our biomedical and solar equipment and systems businesses. The related party lease expires in November 2017. 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 Spire Semiconductor. The lease expires in August 2015. We believe that our facilities are suitable for their present intended purposes and adequate for our

current level of operations.

Item 3. Legal Proceedings

From time to time, we are subject to legal proceedings and claims arising from the conduct of our business operations.

On January 11, 2011 a suit was filed in U.S. District Court in Massachusetts by Spire Biomedical, Inc., our wholly owned subsidiary, against Creganna-Tactx Medical ("Creganna") alleging breach of contract related to the manufacture of hemodialysis catheters. The complaint claims that Creganna failed to assemble the catheters in accordance with its designs. We are seeking double or triple damages.

On February 4, 2011, Silicon International Ltd. ("SI") filed a complaint in Suffolk Superior Court in Massachusetts, and on February 11, 2011 served a summons, against us alleging breach of contract related to SI's activities acting as a former sales and service representative of ours within China. The complaint makes claims regarding amounts allegedly owed to SI by us, specifically with regard to allegedly owed commissions. SI is seeking an accounting for all money allegedly owed to it, including double or triple damages. We filed our answer and counterclaims against SI on February 24, 2011, denying SI's allegations, and

claiming that SI interfered in our business relationships and generally engaged in multiple breaches of contract against us. We are seeking double or triple damages.

We are not aware of any other current or pending legal proceedings to which we are or may be a party that we believe could materially adversely affect our results of operations or financial condition or cash flows.

Item 4. Reserved

16

PART II

Item 5. Market for Registrant’s Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities

Market Information

Our common stock is traded on the Nasdaq Global Market under the symbol “SPIR.” The following chart sets forth the high and low bid prices for the common stock for the periods shown:

	High Bid	Low Bid
2010		
First Quarter	\$5.92	\$3.35
Second Quarter	4.59	3.00
Third Quarter	4.45	3.00
Fourth Quarter	6.76	3.01
2009		
First Quarter	\$7.60	\$3.25
Second Quarter	8.99	4.00
Third Quarter	6.57	3.50
Fourth Quarter	6.17	3.50

These prices do not reflect retail mark-ups, markdowns or commissions and may not reflect actual transactions. The closing price of the common stock on March 1, 2011 was \$5.34 and on that date, there were 161 stockholders of record. The number of holders does not include individuals or entities who beneficially own shares but whose shares are held of record by a broker or clearing agency, but does include each such broker or clearing agency as one record holder.

Dividends

We did not pay any cash dividends during 2010 or 2009 and currently do 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. In addition, under our credit agreements with Silicon Valley Bank, we may not pay dividends on our common stock without the consent of the bank.

Item 6. Selected Financial Data

Not required as we are a smaller reporting company.

Item 7. 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 within the meaning of Section 27A of the Securities Act of 1933, as amended (the “Securities Act”), and Section 21E of the Securities Exchange Act of 1934, as amended (the “Exchange Act”), which statements 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 “may”, “could”, “would”, “should”, “will”, “expects”, “anticipates”, “intends”, “plans”, “believes”, “estimates”, and similar expressions. Our actual results

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, but are not limited to, those factors described below and above under “Item 1A. Risk Factors” and “Item 1. Business.” Readers are encouraged to carefully review those risk factors. The following discussion and analysis of our financial condition and results of operations should be read in light of those factors and in conjunction with our accompanying Consolidated Financial Statements, including the Notes thereto.

Overview

We develop, manufacture and market highly-engineered products and services in three principal business areas: (i) capital equipment for the photovoltaic solar industry, (ii) biomedical and (iii) optoelectronics, generally bringing to bear expertise in materials technologies, surface science and thin films across all three business areas, discussed below.

In the photovoltaic solar area, we develop, manufacture and market specialized equipment for the production of terrestrial photovoltaic modules from solar cells, provide photovoltaic systems for application to powering buildings with connection to the utility grid and supplies photovoltaic materials. Our equipment has been installed in approximately 200 factories in 50 countries. The equipment market is very competitive with major competitors located in Japan and Germany. Our flagship product is our Sun Simulator which tests module performance. Our other product offerings include turn-key module lines and to a lesser extent other individual equipment. To compete we offer other services such as training and assistance with module certification. At times, we supply materials such as solar cells to certain customers. We also provide turn-key services to our customers to backward integrate to solar cell manufacturing.

During 2009, we dissolved our joint venture, Gloria Spire Solar. We received a return of capital, hired several key employees, received pending customer contracts and have restarted a photovoltaic systems business. Our photovoltaic systems business provides an application for powering buildings with connection to the utility grid. We do not manufacture modules, but rather procure them from multiple suppliers based upon our industry knowledge of the supply chain.

In the optoelectronics area, we provide custom 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. We also provide materials testing services and perform services in support of sponsored research into practical applications of optoelectronic technologies. We have developed solar concentrator cell technology to provide high efficiency cells to the industry.

In the biomedical area, we provide 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; and perform sponsored research programs into practical applications of advanced biomedical and biophotonic technologies.

On December 14, 2009, we completed the sale of our Medical Products Business Unit, which develops and markets coated and uncoated hemodialysis catheters and related devices for the treatment of chronic kidney disease (the "Medical Products Business Unit"), to Bard Access Systems, Inc. ("Bard"). Accordingly, the results of operations, assets and liabilities of the Medical Products Business Unit are being presented herein as discontinued operations and assets held for sale. See Note 17 to the consolidated financial statements.

Operating results will depend upon revenue growth and product mix, as well as the timing of shipments of higher priced products from our solar equipment line, delivery of solar systems and solar materials. Export sales, which amounted to 39% of net sales and revenues for 2010, continue to constitute a significant portion of our net sales and revenues.

Results of Operations

The following discussions of our results of continuing operations exclude the results related to the Medical Products Business Unit, which was sold on December 14, 2009. The Medical Products Business Unit has been segregated from continuing operations and is reflected as discontinued operations for all periods presented. See "Net income from discontinued operations, net of tax" below and Note 17 to the consolidated financial statements.

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

	Year Ended December 31,			
	2010		2009	
Net sales and revenues	100	%	100	%
Cost of sales and revenues	(82)	(91)
Gross margin	18		9	