



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

Mail Stop 3030

September 30, 2009

Via Facsimile and U.S. Mail

Mr. Roger G. Little  
Chief Executive Officer  
Spire Corporation  
One Patriots Park  
Bedford, MA 01730-2396

**Re: Spire Corporation  
Form 10-K for the year ended December 31, 2008  
Filed March 31, 2009  
File No. 0-12742**

Dear Mr. Little:

We have reviewed your filing and have the following comments. Where indicated, we think you should revise future filings in response to these comments. If you disagree, we will consider your explanation as to why our comment is inapplicable or a revision is unnecessary. Please be as detailed as necessary in your explanation. In some of our comments, we may ask you to provide us with information so we may better understand your disclosure. After reviewing this information, we may raise additional comments.

Please understand that the purpose of our review process is to assist you in your compliance with the applicable disclosure requirements and to enhance the overall disclosure in your filing. We look forward to working with you in these respects. We welcome any questions you may have about our comments or on any other aspect of our review. Feel free to call us at the telephone numbers listed at the end of this letter.

Form 10-K for the Year Ended December 31, 2008

Spire Solar, page 2

1. Please file as an exhibit your December 2008 contract with the Federal Prison Industries mentioned in the last paragraph in this section. In future filings, please discuss the material terms of the contract, such as the duration.

Item 1A. Risk Factors, 6

2. We note that you include several bullets in your risk factors, such as the eleven bullets in your second risk factor and the seven bullets in your third risk factor. In future filings, please clarify how each of the issues mentioned in the bullet points are specific to you. Add separate risk factors as appropriate.

Our ability to expand revenue and sustain profitability, page 7

3. In future filings, please expand the Business section to discuss the “substantial investment” mentioned in the seventh bullet of this risk factor. Also, disclose the status of your plans to redirect the use of the equipment.

Item 7. Management’s Discussion and Analysis of Financial Condition, page 15

Overview, page 16

4. When drafting future “Overview” sections for your Management’s Discussion and Analysis of Financial Condition and Results of Operations, please carefully review the guidance in Release 34-48960 (December 19, 2003). As noted in that release, an overview should include the most important matters on which a company’s executives focus in evaluating financial condition and operating performance and provide a context for the discussion and analysis of the financial statements. A good overview should:
  - be a balanced, executive-level discussion that identifies the most important themes or other significant matters with which management is concerned primarily in evaluating the company’s financial condition and operating results;
  - include economic or industry-wide factors relevant to the company;
  - provide insight into the material opportunities, challenges and risks on which the company’s executives are most focused and the actions the company’s executives are taking to address those opportunities, challenges and risks; and
  - address other issues mentioned in the Release.

We note, for example, the themes and matters discussed in your March 31, 2009 and May 15, 2009 earnings conference calls.

Loan Agreements, page 21

5. In future filings, please expand this section to quantify the ratios and covenants of your credit facility that you must comply with and compare the ratios and covenants to your financial position.

Exhibits 31.1 and 31.2

6. We note that the certifications filed pursuant to Exchange Act Rule 13a-14(a) are not in the exact form prescribed by Item 601(b)(31) of Regulation S-K. Specifically, we note that you include the title of the certifying officer in the introduction of your certification. Please revise the certifications to conform to the exact wording required by Item 601(b)(31) of Regulation S-K.

Signatures

7. Your controller or principal accounting officer should sign the Form 10-K below the second paragraph required on the Signatures page. Please revise.

Form 10-Q for the fiscal quarter ended June 30, 2009

Net Sales and Revenues, page 15

8. In future filings, please expand the discussion of changes in revenue to disclose, if applicable, the change in the material amount of revenues from your customers. We note the disclosure on page 8 that two customers accounted for approximately 69% of your gross sales for the three months ended June 30, 2009.

Loan Agreements, page 19

9. Please tell us where you filed as an exhibit the bank waiver mentioned in the last paragraph of this section.

As appropriate, please respond to these comments within 10 business days or tell us when you will provide us with a response. Please furnish a cover letter with your response that keys your responses to our comments and provides any requested information. Detailed cover letters greatly facilitate our review. Please understand that we may have additional comments after reviewing your amendment and responses to our comments.

We urge all persons who are responsible for the accuracy and adequacy of the disclosure in the filing to be certain that the filing includes all information required under the Securities and Exchange Act of 1934 and that they have provided all information investors require for an informed investment decision. Since the company and its management are in possession of all

Mr. Roger G. Little  
Spire Corporation  
September 30, 2009  
Page 4

facts relating to a company's disclosure, they are responsible for the accuracy and adequacy of the disclosures they have made.

In connection with responding to our comments, please provide, in writing, a statement from the company acknowledging that:

- The company is responsible for the adequacy and accuracy of the disclosure in the filing;
- staff comments or changes to disclosure in response to staff comments do not foreclose the Commission from taking any action with respect to the filing; and
- the company may not assert staff comments as a defense in any proceeding initiated by the Commission or any person under the federal securities laws of the United States.

In addition, please be advised that the Division of Enforcement has access to all information you provide to the staff of the Division of Corporation Finance in our review of your filing or in response to our comments on your filing.

You may contact Thomas Jones, Staff Attorney, at (202) 551-3602 or me at (202) 551-3314 if you have questions regarding comments on these legal matters.

Sincerely,

Daniel H. Morris  
Special Counsel