



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

Mail Stop 3030

November 9, 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
Letter dated October 14, 2009
File No. 0-12742**

Dear Mr. Little:

We have reviewed your letter and have the following comments. Where indicated, we think you should revise your documents 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 fiscal year ended December 31, 2008

1. We note your press release on September 29, 2009 stating that you entered into two contracts with UNI-CHEM Co., Ltd. in an aggregate value of approximately \$60 million. Please tell us why you did not file a Form 8-K to disclose that you entered into these agreements. In addition, please file the UNI-CHEM contracts.

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2. We note your response to the first sentence of prior comment 1. However, we also note that the contract with Federal Prison Industries (“FPI”) is worth approximately \$53 million. Please expand your analysis of the materiality of this contract to specifically address its size. Given your disclosure on page 6 that no customers accounted for more than 10% of your consolidated net sales during the year ended December 31, 2008, the size of the FPI contract relative to your operations and to other customer contracts would appear to make the FPI contract material.

Signatures

3. We reissue prior comment 7. Your controller or principal accounting officer should sign the Form 10-K below the second paragraph on the signatures page. Please revise.

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.

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