



DIVISION OF
CORPORATION FINANCE

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

March 29, 2012

Via E-mail

James S. Allen
Chief Financial Officer
Molycorp, Inc.
5619 Denver Tech Center Parkway
Suite 1000
Greenwood Village, CO 80111

**Re: Molycorp, Inc.
Form 10-K for the Fiscal Year Ended December 31, 2010
Filed March 9, 2011
Correspondence submitted March 12, 2012
File No. 001-34827**

Dear Mr. Allen:

We have reviewed your filing and have the following comments. In some of our comments, we may ask you to provide us with information so we may better understand your disclosure.

Please respond to this letter within ten business days by amending your filing, by providing the requested information, or by advising us when you will provide the requested response. If you do not believe our comments apply to your facts and circumstances or do not believe an amendment is appropriate, please tell us why in your response.

After reviewing any amendment to your filing and the information you provide in response to these comments, we may have additional comments.

Form 10-K for the Fiscal Year Ended December 31, 2010

Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations, page 50

Factors Affecting Our Results, page 54

Environmental, page 58

1. We note that you anticipate the need to dispose of a portion of the wastewater in one of your evaporation ponds in order to repair lining tears detected earlier in 2011, and that you estimate the wastewater transportation and disposal costs associated with this repair to be approximately \$17.0 million in 2012. Please tell us if you recorded a liability for

this estimated environmental obligation as of December 31, 2011, and cite the authoritative guidance that you followed to account for this obligation. Also tell us whether the \$17.0 million is included in your contractual obligations table on page 73.

Notes to Consolidated Financial Statements, page 88

(5) Acquisitions, page 105

Molycorp Sillamae, page 106

2. We note in your response to comment seven of our letter dated December 28, 2011 that you calculated volatility for purposes of determining the fair value of your common shares issued to acquire 80% of Molycorp Sillamae using the daily closing prices of Molycorp common stock for the most recent six months as of April 1, 2011. We further note on page 111 of your Form 10-K that for purposes of determining the fair value of each stock option award at the grant date management computed volatility assumptions based on a peer group analysis. Please explain to us the reason(s) why you used two different methods to determine the volatility of your shares for purposes of stock option awards and the acquisition of Molycorp Sillamae.

Molycorp Tolleson, page 107

3. We note in your response to comment eight of our letter dated December 28, 2011 that the product premium per kilogram sold is a fixed amount based on the applicable product sold and represents a contract manufacturing, or tolling fee; and that the product premiums were established during negotiations between the Company and Santoku and were based on market prices for alloy manufacturing services. We further note in your response to comment four of our letter dated February 10, 2012 that the product premium is intended to be the key driver of gross margin realized by Molycorp Tolleson. Please provide us with a detailed analysis to support your conclusion to report Molycorp Tolleson's revenue earned on sales to Santoku on a gross versus net basis, including your consideration of the significant terms of your marketing and distribution agreements with Santoku for the sale and distribution of neodymium and samarium magnet alloy products. Refer to FASB ASC 605-45-45.
4. We note in your response to comment eight of our letter dated December 28, 2011 that Molycorp Tolleson's sales of alloys to Santoku under the rare earth products purchase and supply agreement are at the cost of feedstock plus a premium to reasonably approximate the market value of such products sold by other producers. We further note in your fourth quarter 2011 earnings conference call transcript that Molycorp Tolleson is currently structured largely as a lower gross margin pass-through tolling business; and that this will remain the case while you reconfigure and expand it into a larger, more flexible operation with more customers. Please advise us of the following:

- a. Provide us with a courtesy copy of the rare earth products purchase and supply agreement;
- b. Quantify for us the applicable product premium for Tolleson's sales of neodymium alloys and samarium alloys to Santoku under the agreement;
- c. Tell us the average market price of neodymium alloys and samarium alloys in U.S. dollars per kilogram for the period from April 15, 2011 through December 31, 2011, and Tolleson's average sales price of neodymium alloys and samarium alloys to Santoku during this same period; and
- d. To the extent that there were significant differences between the average market price and the average sales price to Santoku, tell us the reason(s) for the differences and further explain to us how you considered the factors in ASC 805-10-25-20 through 25-22 to determine whether the purchase and supply agreement was a part of the business combination transaction.

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 the information the Securities Exchange Act of 1934 and all applicable Exchange Act rules require. Since the company and its management are in possession of all facts relating to a company's disclosure, they are responsible for the accuracy and adequacy of the disclosures they have made.

You may contact Brian McAllister at (202) 551-3341 or John Archfield at (202) 551-3315 if you have questions regarding comments on the financial statements and related matters. Please contact me at (202) 551-3871 with any other questions.

Sincerely,

/s/Tia L. Jenkins

Tia L. Jenkins
Senior Assistant Chief Accountant
Office of Beverages, Apparel and
Mining