



UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549-7010

Mail Stop 7010

April 3, 2009

By U.S. Mail and Facsimile

Mr. Rakesh Sachdev
Chief Financial Officer
Sigma-Aldrich Corporation
3050 Spruce Street
St. Louis, Missouri 63103

Re: Sigma-Aldrich Corporation
Form 10-K for the Fiscal Year Ended December 31, 2008
File No. 000-08135

Dear Mr. Sachdev:

We have reviewed your filing 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 comments are 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 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

Exhibit 13

Management's Discussion and Analysis, page 21
Introduction, page 21

1. In your MD&A you state that economic conditions will impact demand from your customers and that demand from several of the company's key markets are expected to decline in 2009. In future filings, please expand your discussion to provide more detailed information on the global economic downturn and its impact on your customers, recent order activity, expected trends, management's

response for managing these events, your operations and financial position. Additionally, expand your liquidity discussion to address the expected impact to current and future cash flows and how you expect recent economic events may impact your sources of liquidity, if any.

Critical Accounting Estimates, page 22

2. We note at December 31, 2008 that approximately 55% of your U.S. pension plan assets were represented by equity securities. In future filings please expand your discussion to include the impact market conditions have had on plan assumptions and the net periodic benefit cost, as well as the expected impact on future operations from a decrease in plan assets, change in expected return and amortization of actuarial loss. Please also address potential funding requirements relative to your accumulated benefit obligation and the implications to current and future liquidity resulting from potential incremental cash payments required to maintain funding requirements.

Operating Results, page 23

3. In future filings, please expand your discussion of the results of your operations to quantify the impact that changes in volume and/or changes in selling price had on net sales from period to period.
4. In future filings, please expand your discussion of gross profit margin to address the main drivers included in costs of products sold.

Liquidity and Capital Resources, page 25

5. Please supplementally tell us and revise future filings to address the reasons for the significant changes in the working capital items you have identified in your discussion of cash flows provided by operating activities. For example, please discuss why there were higher pension plan contributions, as well as address the reason for fluctuations in accrued income taxes.

Exhibit 31 – Section 302 Certifications

6. We note that paragraphs 2, 3, and 4 of your certifications replace the word “report” with “annual report”. In your future annual and quarterly filings, please provide your certifications using the exact language as provided in Item 601(b)(31)(i) of Regulation S-K.

* * *

Please respond to these comments within 10 business days, or tell us when you will provide us with a response. Please provide us with a response letter that keys your

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responses to our comments and provides any requested information. Detailed letters greatly facilitate our review. Please furnish your response on EDGAR as a correspondence file. Please understand that we may have additional comments after reviewing your 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 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 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 their filings;
- 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.

If you have any questions regarding these comments, you may contact Dale Welcome, Staff Accountant, at (202) 551-3865 or, in his absence, to the undersigned at (202) 551-3768.

Sincerely,

John Cash
Accounting Branch Chief