



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

March 18, 2010

Via Facsimile and US Mail

Henri A. Termeer
Chairman & Chief Executive Officer
Genzyme Corporation
500 Kendall Street
Cambridge, MA 02142

**Re: Genzyme Corporation
 Preliminary Proxy Statement on Schedule 14A
 Filed March 11, 2010
 File No. 0-14680**

Dear Mr. Termeer:

We have reviewed your filing and have the following comments. Where indicated, we think you should revise your document in response to these comments. If you disagree with any of these comments, 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 supplemental information so we may better understand your disclosure. Please understand that after our review of all of your responses, 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 filings. 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.

General

1. Support for each statement or assertion of opinion or belief must be self-evident, disclosed in the proxy materials, or provided to the staff on a supplemental basis. Provide us with support with respect to the following statements you make:
 - “I am confident we will emerge from 2009 a stronger company and resume our track record of performance...” (cover letter);
 - The company is “push[ing] forward expansion projects that will result in a

quadrupling of our biologics manufacturing capacity form 2004 to 2010. ...”
(emphasis added) (page 19).

Where the basis of support is other documents, provide either complete copies of the documents or sufficient pages of information so that we can assess the context of the information upon which you rely. Mark any supporting documents provided to identify the specific information relied upon, such as quoted statements, financial statement line items, press releases, and mathematical computations, and identify the sources of all data utilized.

What is the cost of soliciting proxies for the annual meeting..., page 5

2. Please provide the information required by Item 4(b) of Schedule 14A. Further, please clarify whether Relational Investors LLC or any of its affiliates will also be soliciting proxies.
3. We note that proxies will be solicited personally, electronically, via mail, phone, press release and the company’s website. Please note that all written soliciting materials, including any e-mails or scripts to be used in soliciting proxies must be filed under the cover of Schedule 14A on the date of first use. Refer to Rule 14a-6(b) and (c). Please confirm your understanding.

Stock Ownership, page 7

4. Please revise to provide updated information as of the most reasonable practicable date. In this regard, please also refer to Item 5(b)(1) and provide the information called for with respect to each participant in Annex A, inclusive of Relational Investors LLC and/or its affiliates. Please see our comments below regarding Relational Investors LLC.

Election of Directors, page 9

5. We note the agreement to elect Mr. Ralph Whitworth pursuant to the terms of the agreement entered into with Relational Investors, LLC. Please supplement the disclosure in this section to clarify that the Board composition would change in the event of Mr. Whitworth’s potential election to the Board in November 2010.
6. Please see our prior comment. Please clarify in your disclosure, if true, that pursuant to the company’s charter documents, the Board is authorized to elect Mr. Whitworth to the Board in November without shareholder approval. Please also clarify whether the election would be pursuant to an expansion of the Board or if any of the current nominees and Board members will be resigning or removed.
7. Please see our prior comments. We note reference to the Board’s beliefs regarding the qualifications each nominee possesses to fulfill his/her role as a

director. With a view towards possible revised disclosure, please tell us what consideration you have given to providing the information required by Item 401 of Regulation S-K with respect to Mr. Whitworth. Please also describe the “limited conditions” that would preclude the Board from electing Mr. Whitworth assuming Relational requests his nomination.

Appendix A

8. Please clearly identify all persons who are participants in the current proxy solicitation. In this regard, please identify Relational Investors, LLC and its affiliates and members who are participants in the current proxy solicitation, including, Mr. Whitworth or advise. Please refer to Instruction 3 to Item 4 of Schedule 14A for the definition of “participant”.
9. It is not apparent whether all of the material terms of the agreement between the company, Relational and Mr. Whitworth have been provided. For example, please further supplement your disclosure to describe why the company entered into the Relational Agreement. See Item 5(b)(1)(viii) of Schedule 14A. Similarly, we note the description of Mr. Whitworth as one of the largest shareholders, yet are unable to locate disclosure or beneficial ownership reports disclosing the percentage of shares he owns. Please revise or advise.

* * *

Please respond to the above comments promptly and comply with our comments when disseminating information in the future. If you believe that compliance with our comments is not appropriate, please provide the basis for your view in your response letter filed via EDGAR and tagged as “CORRESP”. You should be aware, however, that we may have additional comments based on your supplemental response.

We urge all persons who are responsible for the accuracy and adequacy of the disclosure in the filings 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 participants acknowledging that:

- the participants are responsible for the adequacy and accuracy of the disclosure in the filings;

Mr. H. Termeer
Genzyme Corporation
March 18, 2010
Page 4

- staff comments or changes to disclosure in response to staff comments do not foreclose the Commission from taking any action with respect to the filings; and
- the participants 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 filings or in response to our comments on your filings.

Please direct any questions to me at (202) 551-3757. You may also contact me via facsimile at (202) 772-9203. Please send all correspondence to us at the following ZIP code: 20549-3628.

Sincerely,

Melissa Campbell Duru
Special Counsel
Office of Mergers and Acquisitions

Cc (via facsimile): Jodie Vasily-Cioffi (Genzyme)