

Mail Stop 6010

May 30, 2006

Mr. Steven R. Roth
Chief Financial Officer
Rudolph Technologies, Inc.
One Rudolph Road
PO Box 1000
Flanders, New Jersey 07836

**Re: Rudolph Technologies, Inc.
Form 10-K for the Year Ended December 31, 2005 and related filings
Form 10-Q for the Quarter Ended March 31, 2006
File No. 000-27965**

Dear Mr. Roth:

We have reviewed your filing and have the following comments. We have limited our review of your filing to those items we have addressed in our comments. Where indicated, we think you should revise your documents in future filings 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 8-K Dated February 3, 2006

1. We note that you present your non-GAAP measures in the form of a statement of operation. This format may be confusing to investors as it also reflects several non-GAAP measures, including non-GAAP revenue, non-GAAP research and development, non-GAAP operating income (loss) which have not been identified or described to investors. In fact, it appears that management does not use all of these non-GAAP measures but they are shown here as a result of the presentation format. Please note that Instruction 2 to Item 2.02 of Form 8-K requires that when furnishing information under this item you must provide all the disclosures required by paragraph (e)(1)(i) of Item 10 of Regulation S-K and FAQ 8 Regarding the Use of Non-GAAP Financial Measures dated June 13, 2003 for each non-GAAP measure presented. Specifically, you should provide a reconciliation of each non-GAAP measure to the most directly comparable GAAP measure and explain why you believe each measure provides useful information to investors.
 - To eliminate investor confusion, please remove the non-GAAP statement of operations format from all future filings. Instead, only disclose those non-GAAP measures used by management and which you intended to provide to investors (such as, adjusted gross profit, adjusted operating income and adjusted net income) with the appropriate reconciliations to the most directly comparable GAAP measure.
2. Further to the above, we note that you refer to your non-GAAP information as “pro forma” net income. The pro forma terminology has very specific meaning in accounting literature, as indicated by Article 11 of Regulation S-X. In future filings, please revise your presentation to omit the pro forma terminology when referring to your non-GAAP information.

Form 10-K for the Year Ended December 31, 2005

Consolidated Financial Statements, page F-1

Consolidated Statement of Cash Flows, page F-7

3. We note that you present your investing activities related to your marketable securities on a net basis. Please revise your future filings to present your cash inflows and outflows related to your marketable securities on a gross basis. Refer to the guidance in paragraph 11 of SFAS 95.

Form 10-Q for the Quarter Ended March 31, 2006

Consolidated Condensed Financial Statements

Note 2. Business Combinations

4. We note that you issued 11,298,265 shares of common stock as part of the consideration for the purchase of August Technology Corporation and that you valued these shares at \$17.51, which represented the average closing price of your common stock for the three day period ended February 15, 2006. Please tell us and revise your future filings to disclose why you determined the measurement date to be the day on which the transaction was consummated. Refer to the guidance in EITF 99-12 and paragraph 51(d) of SFAS 141.
5. We note that you have allocated \$25 million of the purchase price to developed technology and have assigned a useful life of nine years to this intangible asset. Please tell us and revise the note in future filings to clearly describe this developed technology and explain how it meets the definition of an intangible asset outlined in paragraph 39 of SFAS 141. To the extent possible, please identify the products that were feasible at the date of the acquisition. Discuss your basis for assigning a useful life of nine years to this intangible asset.
6. We note that you have allocated \$9.9 million of the purchase price to in-process research and development expense (IPR&D) expenditures for defect inspection technology. Please revise this note and MD&A in future filings to provide the following disclosures:
 - Describe each significant IPR&D project acquired;
 - Describe how you determined the fair value of these projects and the significant assumptions utilized in your determination of fair value;
 - Present in tabular format the fair value assigned to each project acquired and projected costs to complete by project;
 - For each project, disclose in MD&A the status of the development, stage of completion at acquisition date, the nature and timing of the remaining efforts for completion, anticipated completion date and the date you will begin benefiting from the projects, the risks and uncertainties associated with completing development within a reasonable period of time, and the risks involved if the IPR&D projects are not completed on a timely basis.

Note 3. Share-Based Compensation

7. Please revise your future filings to disclose the impact of adopting SFAS 123(R) on basic and diluted earnings per share. Refer to the guidance in paragraph 84 of SFAS 123(R).

Item 4. Disclosure Controls and Procedures

8. We note your statement that “management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving the desired control objectives, and management is required to apply judgment in evaluating the cost-benefit relationship of possible controls and procedures.” Please revise to state clearly, if true, that your disclosure controls and procedures are designed to provide reasonable assurance of achieving their objectives. In the alternative, remove the reference to the level of assurance of your disclosure controls and procedures. Please refer to Section II.F.4 of Management’s Reports on Internal Control Over Financial Reporting and Certification of Disclosure in Exchange Act Periodic Reports, SEC Release No. 33-8238, available on our website at <http://www.sec.gov/rules/final/33-8238.htm>.

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 that keys your responses to our comment and provides any requested information. Detailed cover letters greatly facilitate our review. 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 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.

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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 Tara Harkins, Staff Accountant, at (202) 551-3639 or me at (202) 551-3671 if you have questions regarding these comments.

Sincerely,

Martin F. James
Senior Assistant Chief Accountant