



DIVISION OF
CORPORATION FINANCE

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

Mail Stop 3030

March 16, 2009

VIA U.S. MAIL AND FAX (978) 256-0013

Mr. Robert E. Hult
Senior Vice President and Chief Financial Officer
Mercury Computer Systems, Inc.
201 Riverneck Road
Chelmsford, MA 01824

**Re: Mercury Computer Systems, Inc.
Form 10-K for the year ended June 30, 2008
Filed September 12, 2008
File No. 000-25839**

Dear Mr. Hult:

We have reviewed your filings and have the following comments. We have limited our review to only your financial statements and related disclosures and do not intend to expand our review to other portions of your documents. 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 any other aspect of our review. Feel free to call us at the telephone numbers listed at the end of this letter.

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Form 10-K for the year ended June 30, 2008

Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations, page 29

Results of Operations, page 37

Fiscal Year 2008 Vs. Fiscal Year 2007, page 37

Other Income (Expense), Net, page 40

1. We see that you included the proceeds from a legal settlement with a former employee and a related company in other income (rather than as part of your operating loss). Please tell us why you believe this income is properly classified in non-operating income. Your explanation should include a discussion of why the former employee and related company do not relate to your operating activities. If the former employee and related company relate to your operating activities, litigation gains or losses related to operating leases and/or employees should be included in operating activities.

Financial Statements, page 50

Report of Independent Registered Public Accounting Firm, page 50

2. Please provide us with a copy of the signed audit opinion. Please ensure future filings include a properly signed audit opinion from your auditors.

Note H. Operating Segment, Significant Customers and Geographic Information, page 70

3. Disclosure of long-lived assets by geographic area under SFAS 131 should present tangible assets only and should not include intangibles or investments. See question 22 to the FASB publication "Segment Information: Guidance on Applying Statement 131." Please address our concern in your future filings.

Note N. Discontinued Operations, page 81

4. We see that you completed the sale of ES/PS in May 2008 and as part of the sale you retained the right to future royalties and provided a guarantee to the buyer which would cover a portion of the severance costs if the buyer must sever any ES/PS employees before December 19, 2008. Based upon the foregoing, please clarify for us why you believe it is appropriate to reflect the ES/PS businesses as discontinued operations when it appears you may have significant continuing involvement in the operations. We refer you to paragraph 42 of SFAS 144.

Item 9A. Controls and Procedures, page 93

5. We note your disclosure regarding the effectiveness of your disclosure controls and procedures is limited to information being recorded, processed, summarized and reported. Please revise your disclosure in future filings to fully comply with the terms of Item 307 of Regulation S-K, including disclosure of whether information is accumulated and communicated to your management. Refer to the definition of the term disclosure controls and procedures set forth in Rule 13a-15(e) of the Securities Exchange Act 1934.

Item 11. Executive Compensation, page 95

6. We refer to your discussion of annual incentive bonus awards on page 27 of your proxy statement. We note that you have not disclosed the specific individual targets to be achieved in order for your named executive officers to earn the portion of their bonuses which are tied to individual performance objectives. Please describe these objectives in detail to us and provide such disclosure in your future filings, as applicable. To the extent you believe that disclosure of such information, on a historical basis, would result in competitive harm such that the information could be excluded under Instruction 4 to Item 402(b) of Regulation S-K, please provide us with a detailed explanation supporting your conclusion. To the extent that it is appropriate to omit specific targets or performance objectives, you are required to provide appropriate disclosure. Refer also to question 118.04 of the Regulation S-K Compliance and Disclosure Interpretations available on our website. In discussing how difficult or likely it will be to achieve the target levels or other factors, you should provide as much detail as necessary without disclosing information that poses a reasonable risk of competitive harm.
7. We note that on page 24 of your proxy statement you disclose that you benchmark your cash and equity compensation against programs available to employees in comparable roles at peer companies. Your disclosure does not appear to disclose the benchmarks used for each element of your compensation nor where each element of compensation fell relative to such benchmarks. Please provide us with such disclosure and provide such disclosure in your future filings.
8. We note from your disclosure under "Equity Compensation" on page 30 of your proxy statement that you determined the option and restricted stock award to be made to Mark Aslett after considering among other things "relevant benchmarking data." Please

describe such benchmarks and if applicable their components, including component companies.

9. Please explain what you mean by the terms executive's current contribution to Mercury, anticipated contribution to meeting Mercury's long-term strategic performance goals, and industry practices and norms, which you refer to in discussing your determination of equity compensation on page 30 of your proxy statement. Please tell us how the Compensation Committee measures each of these factors and how your equity awards reflect such contributions or industry norms and practices. Please provide such disclosure in your future filings, as applicable.
10. We note that on page 31 of your proxy statement which you have incorporated by reference you state that on June 10, 2008 you granted option awards to each of your named executive officers (other than the CEO and the Executive Chairman). However in the Grants of Plan-Based Awards table on page 38 you appear to show awards to only two of your executive officers. Please reconcile.

Item 15. Exhibits and Financial Statement Schedules, page 96

11. Given your disclosure relating to your senior convertible debt being put on May 1, 2009 and your available cash and liquid marketable securities, please explain why you have not filed the agreement governing the margin loan facility as an exhibit in accordance with Item 601(b)(10)(i) of Regulation S-K.

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 amendment 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 amendments 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

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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.

You may contact Julie Sherman, Staff Accountant, at (202) 551-3640 or me at (202) 551-3603 if you have any questions regarding these comments. In this regard, do not hesitate to contact Angela Crane, Accounting Branch Chief, at (202) 551-3554.

Sincerely,

Jay Webb
Reviewing Accountant