

March 30, 2009

VIA EDGAR AND OVERNIGHT COURIER

Division of Corporation Finance
Securities and Exchange Commission
Mail Stop 3030
100 F Street, N.E.
Washington, D.C. 20549

Attention: Jay Webb
Julie Sherman

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

Ladies and Gentlemen:

This letter is submitted on behalf of Mercury Computer Systems, Inc. (the "Company" or "Mercury") in response to the comments of the staff of the Division of Corporation Finance of the Securities and Exchange Commission (the "Staff") as set forth in your letter to Robert E. Hult dated March 16, 2009 with respect to the Company's Form 10-K for the fiscal year ended June 30, 2008 (the "Comment Letter"). For reference purposes, the text of your letter has been reproduced herein with responses below each numbered comment.

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.

Response 1:

The Company supplementally advises the Staff of the following information pertaining to the classification of the legal settlement with a former employee as other income (expense). As noted in the Form 10-K, in October 2006, the Company and one of its German subsidiaries commenced a series of legal actions in the District Court of Nuremberg-Fuerth, Germany against the former general manager of the subsidiary and a third-party company related to the former general manager alleging, among other things, that the former general manager had breached his non-competition obligations to the Company and the subsidiary and had otherwise engaged in conduct detrimental to the subsidiary while still employed by the subsidiary. In November 2006, the parties settled all of these legal actions and a related labor suit, through the payment to the Company of damages in the amount of \$2.352 million for breach of non-compete agreements, interference with the subsidiary's business and the assumption of certain non-medical professional service contracts by the third-party company. The settlement amount of \$2.352 million was included in other income (expense) in the consolidated statements of operations.

The Company recorded this settlement in other income (expense) given that this legal matter and the associated gain were not considered part of the Company's normal or routine operations, but were instead related to pursuit of a non-compete claim against a former employee. The former employee had established a company to provide professional services to a market that the German subsidiary was no longer interested in pursuing.

The German subsidiary operated and earned revenue in three general areas: 1) medical systems, 2) embedded systems, and 3) professional services. The majority of the German subsidiary's revenue was derived from the medical and embedded systems businesses. The professional services area consisted of professional services to clients in the medical and automotive industries. The professional services contracts for the German subsidiary's automotive customers were largely unprofitable and were not in line with the Company's future strategic direction. As such, the Company was not interested in further pursuing the automotive professional services. The Company planned to maintain the medical professional services contracts, however, as they supported the German subsidiary's medical systems business.

The company established by the former employee was designed to compete in the automotive professional services market. Although the Company no longer planned to

serve the automotive professional services market, the Company still elected to enforce its non-compete agreement with the former employee. As such, given that the nature of the settlement was primarily related to the breach of the non-compete agreement and damages related to the assumption of contracts in a market that the Company no longer planned to pursue, the settlement was recorded in other income (expense). The Company believes that had the settlement been recorded in income from operations, the operating results of the Company would have been improperly overstated.

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.*

Response 2:

In response to the Staff's comment, the Company has attached a copy of its signed audit opinion. The Company will ensure that future filings include a properly signed audit opinion from the Company's 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.*

Response 3:

In response to the Staff's comment, the Company will ensure that the disclosure of long-lived assets by geographic area under Statement of Financial Accounting Standard (SFAS) 131, *Disclosures about Segments of an Enterprise and Related Information*, in all future filings only presents tangible assets, in accordance with question 22 to the FASB publication "Segment Information: Guidance on Applying Statement 131".

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.

Response 4:

The Company supplementally advises the Staff of the following information pertaining to its sale of ES/PS and its classification of the ES/PS business as discontinued operations in Form 10-K for the year ended June 30, 2008. For this sale, the Company followed the guidelines set forth in SFAS 144, *Disposal of Long Lived Assets*. Per SFAS 144, paragraph 42, the results of operations of a component of an entity that either has been disposed of or is classified as held for sale shall be reported in discontinued operations if both of the following conditions are met: (a) the operations and cash flows of the component have been (or will be) eliminated from the ongoing operations of the entity as a result of the disposal transaction and (b) the entity will not have any significant continuing involvement in the operations of the component after the disposal transaction.

The Company also followed the guidance provided by Emerging Issues Task Force (EITF) 03-13, *“Applying the Conditions in Paragraph 42 of FASB Statement No. 144 in Determining Whether to Report Discontinued Operation.”* Per EITF 03-13, paragraph 9, the Task Force reached a consensus that “significant continuing involvement” is involvement in the operations of the disposed component that provides the ongoing entity with the ability to influence the operating and/or financial policies of the disposed component. It further states that the retention of risk or the ability to obtain benefits should be considered in the overall evaluation of whether the ongoing entity has the ability to influence the operating and/or financial policies of the disposed component. It should be noted, however, that per the guidance, the retention of risk or the ability to obtain benefits associated with the ongoing operations of the disposed component does not indicate by itself that the ongoing entity has the ability to influence the operating and/or financial policies of the disposed component resulting in continuing involvement.

The Company completed the sale of ES/PS in May 2008 and believed that the conditions outlined in SFAS 144, paragraph 42 were met and accounted for the sale of its ES/PS business as discontinued operations. In reaching this conclusion, the Company considered two particular terms of the sale agreement:

1. Per the terms of the purchase agreement, the Company was obligated to pay severance for the ES/PS employees if the buyer terminated an ES/PS employee prior to December 19, 2008. After that date, any decisions regarding termination of ES/PS employees would have no financial consequence to the Company. This obligation was capped at a cost of 50% of the employee’s monthly salary multiplied by the employee’s years of service plus 5,000 EUR. The Company agreed to this because the buyer wanted to limit their liability in the event that they learned that they did not need to retain all of the ES/PS employees soon after the closing of the sale. The

Company did not retain any involvement in the decision making process regarding which, if any, employees of its former ES/PS business were terminated by the buyer subsequent to the sale. In total, the obligation that the Company was required to fund based on the termination decisions made by the buyer was approximately \$16,000.

2. Per the terms of the purchase agreement, the Company will receive royalties driven by ES/PS sales over the 21 months subsequent to the sale. Per EITF 03-13, Example 9, the task force reached the consensus that “the royalty arrangement would likely not provide the ongoing entity with the ability to significantly influence the operating and (or) financial policies of the disposed component based on the following: a) the royalty agreement is not significant to the overall operations of the disposed component; b) the extent to which the ongoing entity is involved in the operation of the disposed component is limited to the ability to receive a royalty payment; and c) the rights conveyed by the agreement do not enable the ongoing entity to exert significant influence over the disposed component.”

The royalty arrangement does not allow for any active involvement by the Company nor does it enable the Company to influence the operating or financial policies of ES/PS. The Company did not retain any rights to influence the pricing of the ES/PS products or services, the buyer’s sales and marketing strategy or product development plans. Further, the estimated value of the royalty agreement was not significant to the operations of the disposed component (less than 5% of the annual revenue of the business unit). To date, the Company has received approximately \$0.22 million in royalties from the buyer.

In accordance with EITF 03-13, paragraph 9 and SFAS 144, paragraph 42, the Company believes that it properly accounted for the sale of the ES/PS business as discontinued operations in accordance with SFAS 144, paragraph 42 and EITF 03-13, paragraph 9, despite the existence of the royalty agreement and the potential severance obligation based on the following:

1. The cash flows of the ES/PS business will be eliminated as a result of the sale. The cash flows related to the royalty arrangement and the potential severance obligation both were not expected to be significant and both had defined periods of time after which they would cease.
2. The Company will not have any significant continuing involvement in the operations of the ES/PS business after the sale. The Company is entitled to royalties on revenues produced by the ES/PS business subsequent to the sale. However, the Company has no involvement or influence as to how the buyer operated the business in order to generate those revenues.

The Company was also potentially obligated to reimburse the buyer for severance costs associated with the termination of employees of the ES/PS business for a brief period of time subsequent to the closing. However, the Company did not retain any rights to influence the decision over which, if any, of its former employees were terminated.

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 of 1934.*

Response 5:

In response to the Staff's comment, the Company will ensure its future filings fully comply with the terms of Item 307 of Regulation S-K, including disclosure, as defined by Rule 13a-15(e) of the Securities Exchange Act of 1934, of whether information is accumulated and communicated to our management.

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.*

Response 6:

As indicated in the Company's proxy statement, the Company's annual executive bonus program provides each named executive officer with the opportunity to earn a target

bonus based on the achievement of certain corporate performance objectives contained in the Company's annual operating plan, as well as individual performance objectives. For fiscal year 2008, 40% of the performance objectives for Mark Aslett, James R. Bertelli, Robert E. Hult and Joel B. Radford related to the achievement of individual performance objectives, and the remaining 60% related to corporate performance objectives. Eighty percent of the performance objectives for Mark F. Skalabrin and Didier M.C. Thibaud related to the achievement of individual performance objectives, and the remaining 20% related to corporate performance objectives. The Compensation Committee allocated a larger percentage of the performance objectives to individual performance for Messrs. Skalabrin and Thibaud, who were directly responsible for a business unit, because their individual performance objectives included performance measures for such business unit.

Per the Staff's request, set forth below are the specific individual targets for each of the named executive officers for fiscal year 2008:

Mark Aslett. The fiscal year 2008 Q3 and Q4 individual performance objectives for Mr. Aslett established by the Board of Directors, upon the recommendation of the Compensation Committee, following his appointment on November 19, 2007, as President and Chief Executive Officer of the Company were as follows:

- Preparation of Strategic Operating Plans for fiscal year 2009 and beyond that were satisfactory to the Board of Directors and approval of an operating budget for fiscal year 2009 by the Board; and
- Achievement of the revenue and earnings guidance published by the Company following the second quarter for the remainder of fiscal year 2008.

The Board of Directors did not assign fixed percentages to the elements above, but placed relatively equal emphasis on the two goals. The Board determined that Mr. Aslett had achieved these performance goals and, as a result, he received a payment equal to 100% of his individual objective bonus target.

James R. Bertelli. The individual performance objectives for Mr. Bertelli established by the Board of Directors, upon the recommendation of the Compensation Committee, were as follows:

- Stewardship of the succession process at the CEO level (30% of total individual bonus potential);
- Support of the organizational transition accompanying the appointment of a new CEO (40% of individual bonus potential);
- Participation in the Business Advisory Board of the Company's SolMap business (10% of total individual bonus potential); and

- Creation of more productive interactions between the Board and management, including through both written materials and a new Board website (20% of total individual bonus potential).

The Board determined that Mr. Bertelli had achieved these performance goals and, as a result, he received a payment equal to 100% of his individual objective bonus target.

Robert E. Hult. The individual performance objectives for Mr. Hult approved by the Compensation Committee, upon the recommendation of the CEO, were as follows:

- Implementation of investor relations initiatives and maintenance of market credibility (30% of individual bonus potential);
- Development of a potential plan to restructure the Company's outstanding debt (15% of individual bonus potential);
- Preparation of the Company's Visage Imaging business unit for financial separation in advance of a possible exit strategy (15% of individual bonus potential);
- Oversight of business unit operations in accordance with the Company's operating budget and development of an appropriate business model for the Fiscal Year 2009 Strategic Operating Plan (25% of individual bonus potential); and
- Assistance in restructuring the Company's non-core business unit portfolio (15% of individual bonus potential).

The Compensation Committee, based on the report and recommendation of the CEO, determined that Mr. Hult had achieved these performance goals and, as a result, he received a payment equal to 100% of his individual objective bonus target.

Joel B. Radford. The individual performance objectives for Mr. Radford approved by the Compensation Committee, upon the recommendation of the CEO, were as follows:

- Delivery of Fiscal Year 2009 Strategic Operating Plan to the Board with input from the Company's CEO (25% of individual bonus potential);
- Delivery of a market-based view of the Company's opportunities for its Advanced Computing Solutions (ACS) business unit that was acceptable to the Company's executive team (25% of individual bonus potential); and
- Implementation of initial program management infrastructure for the oversight of the Company's strategic initiatives (50% of individual bonus potential).

The Compensation Committee, based on the report and recommendation of the CEO, determined that Mr. Radford had achieved the first two performance goals at the 100% level and the third performance goal at the 70% level. As a result, Mr. Radford received a payment equal to 85% of his individual objective bonus target.

Didier M.C. Thibaud. The individual performance objectives for Mr. Thibaud approved by the Compensation Committee, upon the recommendation of the CEO, were as follows:

- 40% of Mr. Thibaud's individual bonus potential was based on the performance of the ACS business unit measured by achieving: (1) \$190 million in revenue, including at least \$3 million in systems integration service revenue; (2) non-GAAP operating income as a percentage of revenue of at least 7%; (3) 35 design wins; and (4) a satisfactory Fiscal Year 2009 Strategic Operating Plan. The Compensation Committee did not assign fixed percentages to these elements of the overall performance objective. Mr. Thibaud achieved all of the elements of the performance objective, except that the business unit revenue was slightly below the threshold at \$189 million. Given his overall performance, however, the Compensation Committee determined, based on the recommendation of the CEO, that Mr. Thibaud should receive payout at the 100% level for this category of performance goals.
- 30% of Mr. Thibaud's individual bonus potential was based on the technology leadership of the ACS business unit measured by the delivery of certain new products to customers during the year and the development of a plan for several new architecture systems. The Compensation Committee did not assign fixed percentages to these elements of the overall goal. The Compensation Committee, based on the report and recommendation of the CEO, determined that these goals were 100% achieved.
- 20% of Mr. Thibaud's individual bonus potential was based on the operating effectiveness of the ACS business unit measured by the reduction of at least \$3 million in inventory from fiscal year-end 2007 and the maintenance of an inventory reserve of \$14 million. The Compensation Committee determined that the inventory reserve goal was achieved, but the inventory reduction goal was not achieved during the fiscal year. The Compensation Committee placed equal emphasis on these two goals, which resulted in a 10% payout based on this category of performance goals.
- 10% of Mr. Thibaud's individual bonus potential was based on talent retention and development for the ACS business unit measured by achieving an attrition level below 10% and utilizing associate development plans. The Compensation Committee, based on the report and recommendation of the CEO, determined that the attrition level was achieved and that the roll-out of associate development plans was partially achieved. The Compensation Committee placed equal emphasis on these two goals, which resulted in a 7.5% payout based on this category of performance goals.

Overall, Mr. Thibaud received a payment equal to 87.5% of his individual objective bonus target based on the individual performance goals described above.

Mark F. Skalabrin. Mr. Skalabrin began the fiscal year with the same individual performance objectives as Mr. Thibaud, and such performance objectives provided the basis for Mr. Skalabrin's bonus determination for the first half of the fiscal year. However, following a change in Mr. Skalabrin's role with the Company during January 2008, his individual performance objectives were revised for the second half of the fiscal year. The individual performance objectives for Mr. Skalabrin approved by the Compensation Committee, upon the recommendation of the CEO, for the second half of fiscal year 2008 were as follows:

- Completion of an optimization transition milestone plan under a customer contract (40% of individual bonus potential);
- Negotiation of a new contract with a customer of the Company's ACS business unit (40% of individual bonus potential); and
- Completion of a project under an existing development contract (20% of individual bonus potential).

The Compensation Committee, based on the report and recommendation of the CEO, determined that the second performance goal was achieved at the 100% level, and the other two goals were partially achieved. The Compensation Committee placed approximately equal emphasis on these goals. Overall, the Compensation Committee determined that, based on the recommendation of the CEO, Mr. Skalabrin was entitled to a payout equal to 87.5% of his individual objective bonus target for the fiscal year.

The Company advises the Staff that it will provide such disclosure in future filings, as applicable, in response to the Staff's comment.

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.*

Response 7:

As indicated in the Company's proxy statement, the Compensation Committee benchmarks the Company's cash and equity incentive compensation against programs available to employees in comparable roles at peer companies. All forms of compensation are evaluated relative to data included in the Radford High-Technology Executive Survey among companies from which the Company may draw talent and also specific peer group data. In particular, the Compensation Committee reviewed the following elements of compensation against the benchmarking data:

- Base salary;

- Target bonus as a percentage of base salary;
- Total target cash compensation;
- Target long-term incentive compensation, which consists of the target award under the Company's Long-Term Incentive Plan (LTIP) and equity awards; and
- Total target direct compensation, which consists of total target cash compensation and the target payout under the LTIP.

For purposes of comparison, the Compensation Committee also reviewed actual long-term incentive compensation and total direct compensation paid to the named executive officers in the prior fiscal year against the benchmarking data.

Each such element of compensation was compared to data from the Radford High-Technology Executive Survey at the 25th, 50th and 75th percentiles for (1) public technology companies with revenue between \$150 and \$349.9 million for corporate positions, and (2) public technology companies with revenue less than \$150 million for division senior executives (i.e., Messrs. Thibaud and Skalabrin). Each element of compensation also was compared against peer group data for the Company's Chief Executive Officer and Chief Financial Officer. The companies included in the Company's peer group were listed in the proxy statement.

The Radford survey data and proxy data of the peer group, as applicable, were reviewed together to form a final market data point. All forms of compensation were then evaluated relative to the market median. Individual compensation pay levels may vary from this reference point based on individual performance and other considerations, including an executive's relative experience in a new position, the initial compensation levels required to attract qualified new hires, and the compensation levels required to retain highly qualified executives.

The Compensation Committee evaluated the benchmarking data prior to the end of fiscal year 2007 in connection with its determination of compensation levels for fiscal year 2008. The data from this benchmarking indicated that base salary for the named executive officers was around the 50th percentile, except that Mr. Radford's salary was below the market 25th percentile. As described in the proxy statement, the Compensation Committee increased the salaries of Messrs. Radford, Hult and Thibaud during fiscal year 2008, resulting in Mr. Radford's salary being between the 25th and 50th percentile, Mr. Hult's salary being between the 50th and 75th percentile and Mr. Thibaud's salary being above the 75th percentile due to the increase in his duties and responsibilities.

The data from the benchmarking also indicated that target bonus as a percentage of base salary for the named executive officers ranged from 5% below to 10% above the 50th percentile. Total target cash compensation for the named executive officers was also clustered around the 50th percentile. As a result of the increase in Mr. Thibaud's base

salary described above, however, his total target cash compensation for fiscal year 2008 was above the 75th percentile.

The benchmarking data indicated that the target long-term incentive compensation for the named executive officers was generally between the 50th and 75th percentiles, except that Mr. Radford's target compensation was between the 25th and 50th percentile and Mr. Thibaud's target compensation was above the 75th percentile. The total target direct compensation of the named executive officers was generally below the 50th percentile, except that Mr. Thibaud's total target direct compensation was between the 50th and 75th percentiles.

Also, in connection with Mr. Aslett's appointment as CEO in November 2007, the Compensation Committee reviewed the overall compensation program for the CEO position as described in the proxy statement. The benchmarking data reviewed by the Compensation Committee indicated that Mr. Aslett's base salary and target total cash compensation was at approximately the 75th percentile for the peer group.

The Company advises the Staff that it will provide such disclosure in future filings, as applicable, in response to the Staff's comment.

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.*

Response 8:

As indicated in the Company's proxy statement, in connection with his appointment as Chief Executive Officer, the Board of Directors, upon the recommendation of the Compensation Committee, granted Mr. Aslett an option to purchase 200,000 shares of common stock, and 114,285 shares of restricted stock. In determining these initial equity awards for Mr. Aslett, the Compensation Committee considered previous equity awards to the Company's CEO, the highly competitive market for qualified CEO candidates, and relevant benchmarking data. The benchmarking data consisted of stock grants for newly hired CEOs of high-technology companies with revenue between \$150 and \$349.9 million. The data indicated the value of such grants at the 25th, median and 75th percentile. This data indicated that the overall size of these initial equity awards to Mr. Aslett (314,285 shares, or approximately 1.4% of the Company's outstanding shares) was about the median of grants made to new CEOs.

The Company advises the Staff that it will provide such disclosure in future filings, as applicable, in response to the Staff's comment.

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.*

Response 9:

As indicated in the Company's proxy statement, when approving equity awards for an executive officer, the Compensation Committee considers the executive's current contribution to the Company, the anticipated contribution to meeting the Company's long-term strategic performance goals, and industry practices and norms. Long-term incentives granted in prior years, existing levels of stock ownership by executive officers, and aggregate grants to all executive officers are also taken into consideration. The Compensation Committee believes that compensation in the form of Company stock should be a significant portion of an executive officer's total compensation, as equity compensation creates a unique link between the creation of shareholder value and an executive's long-term wealth accumulation opportunity.

In considering the executive's current contribution to the Company, the Compensation Committee reviews the executive's role within the Company, the contribution that the executive is currently making to the Company, the results achieved by the executive, and input from the Chief Executive Officer with respect to executive officers other than the CEO. In general, executives with higher levels and amounts of responsibility receive larger equity awards. As a result, the Company's CEO, Chief Financial Officer and business unit leaders tend to have larger equity awards than the Company's other executive officers.

In terms of the executive's anticipated contribution to meeting the Company's long-term strategic performance goals, the Compensation Committee reviews the potential role of the executive in achieving the long-term strategic goals of the Company as set forth in its strategic operating plans, again with input from the CEO with respect to executive officers other than the CEO. The Compensation Committee considers the incentive and retention value that equity awards may provide. For instance, in fiscal year 2008, the Compensation Committee took into consideration the significant change in the strategic direction of the Company and the importance of the roles of the named executive officers who would be continuing with the Company in achieving these goals.

Finally, the Compensation Committee reviews proposed equity awards to executive officers against benchmarking and peer group data as described in the proxy statement and Response 7 above. The Compensation Committee believes that equity awards create an incentive in addition to the annual executive bonus program in order to attract and

retain senior executives and other key employees who would contribute to the Company's future success. As a result, the Compensation Committee intends for equity awards to the Company's executive officers as part of their long-term incentive compensation to generally be in line with industry practices and norms, both in terms of the type of equity award (e.g., stock options versus restricted stock) and the amount of the award.

The Company advises the Staff that it will provide such disclosure in future filings, as applicable, in response to the Staff's comment.

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.*

Response 10:

The Company advises the Staff that equity awards were not made to Mark F. Skalabrin and Joel B. Radford on June 10, 2008 because, at the time of such grants, both executives were leaving the Company in order to pursue other business interests. The disclosure in the Compensation Discussion and Analysis should have clarified that Messrs. Skalabrin and Radford did not receive grants of equity awards on such date because of their anticipated departure from the Company as described elsewhere in the proxy statement (see, e.g., footnotes 8 and 9 and the narrative discussion to the Summary Compensation Table).

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.*

Response 11:

The Company advises the Staff that, in fiscal 2008, the Company secured a margin loan facility of \$23.7 million collateralized by its \$50.3 million of auction rate securities. At the time that the Company secured the loan facility, it did not have any specific uses for the proceeds, but instead wanted the facility to be in place in order to have such additional liquidity available, if needed, given the lack of liquidity of the auction rate securities. As of June 30, 2008, the Company had not utilized this margin loan facility. As indicated in the Form 10-K, the Company believed that one of the potential future uses of the loan facility

was to fund a portion of the put price for its senior convertible debt in the event that all of the debt were put to the Company in May 2009. While the Company did not have adequate cash and liquid marketable securities to meet the May 1, 2009 repurchase date as of the time of filing of the Form 10-K, the Company believed that it would have adequate funds available by the repurchase date from cash from future operations and other potential sources, such that, even if it did access the loan facility for such purpose, it would have had other means for obtaining the funds. Subsequent to the filing of the Form 10-K, in December 2008, the Company replaced the margin loan facility. At that time, the Company had cash and liquid marketable securities available to fund the repurchase of the debt.

In response to the Staff's comment, however, the Company will file an amendment to its Form 10-K to file the agreement governing the margin loan facility as an exhibit.

As requested in the Comment Letter, the Company acknowledges 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.

If you should have any questions concerning the enclosed matters, please contact the undersigned at (978) 967-1990.

Sincerely,

/s/ Robert E. Hult

Robert E. Hult
Senior Vice President and
Chief Financial Officer

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

The Board of Directors and Shareholders
Mercury Computer Systems, Inc.:

We have audited the accompanying consolidated balance sheets of Mercury Computer Systems, Inc. and subsidiaries as of June 30, 2008 and 2007, and the related consolidated statements of operations, shareholders' equity and comprehensive loss, and cash flows for each of the years in the three-year period ended June 30, 2008. In connection with our audits of the consolidated financial statements, we also have audited financial statement Schedule II. We also have audited Mercury Computer Systems, Inc.'s internal control over financial reporting as of June 30, 2008, based on criteria established in Internal Control – Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). Mercury Computer Systems, Inc.'s management is responsible for these consolidated financial statements and financial statement schedule, for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying Management's Annual Report on Internal Control Over Financial Reporting. Our responsibility is to express an opinion on these consolidated financial statements and financial statement schedule, and an opinion on the Company's internal control over financial reporting based on our audits.

We conducted our audits in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the financial statements are free of material misstatement and whether effective internal control over financial reporting was maintained in all material respects. Our audits of the consolidated financial statements included examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, and evaluating the overall financial statement presentation. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or

timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of Mercury Computer Systems, Inc. and subsidiaries as of June 30, 2008 and 2007, and the results of their operations and their cash flows for each of the years in the three-year period ended June 30, 2008, in conformity with U.S. generally accepted accounting principles. Also in our opinion, the related financial statement schedule, when considered in relation to the basic consolidated financial statements taken as a whole, presents fairly, in all material respects, the information set forth therein. Also in our opinion, Mercury Computer Systems, Inc. maintained, in all material respects, effective internal control over financial reporting as of June 30, 2008, based on criteria established in Internal Control – Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission.

As discussed in Note B to the consolidated financial statements, Mercury Computer Systems, Inc. adopted Statement of Financial Accounting Standards No. 123(R), Share-Based Payment, effective July 1, 2005.

/s/ KPMG LLP

Boston, Massachusetts
September 12, 2008