

Mail Stop 6010

December 2, 2005

VIA U.S. MAIL AND FACSIMILE (763) 553-0052

John R. Judd
Chief Financial Officer
ATS Medical, Inc.
3905 Annapolis Lane
Minneapolis, Minnesota 55447

**Re: ATS Medical, Inc.
 Form 10-K for the year ended December 31, 2004
 Filed March 14, 2005
 Form 10-Q for the quarterly period ended September 30, 2005
 File No. 000-18602**

Dear Mr. Judd:

We have reviewed your response dated November 29, 2005 and related filings and have the following comments. Where indicated, we think you should revise future filings 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.

Form 10-K for the year ended December 31, 2004

Results of Operations, page 16

Cost of Goods Sold, page 17

1. We note your response to prior comment one in our letter dated October 31, 2005. We see that you believe that the presentation of adjusted cost of goods sold and adjusted cost of goods sold as a percentage of sales are appropriate because you anticipate that you will record few if any lower of cost or market inventory adjustments in future periods. We refer you to question nine of the Staff's FAQ Regarding the use of Non-GAAP Financial Measures which states that if there is "no articulated demonstration that such charges will not continue ... it would be difficult for a company to meet the burden of disclosing why such a non-GAAP financial measure is useful to investors." Please further demonstrate to us how you can conclude that these adjustments will diminish substantially in the future and that you will experience few if any lower of cost or market inventory adjustments in future periods. Your response should consider the obligation to resume minimum purchases under the Carbomedics Supply Agreement in 2007. In your response please also consider the requirements of Item 10(e) of Regulation S-K which prohibits adjusting a Non-GAAP financial measure to eliminate or smooth items identified as non-recurring, infrequent or unusual, when the nature of the charge is such that it is reasonable likely to recur within two years or there was a similar charge within the prior two years. Please consider removing this non-GAAP measure from future filings.

Liquidity and Capital Resources, page 19

Cash Management, page 20

2. Refer to your response to prior comment two in our letter dated October 31, 2005. You state that that the quantity of components purchased under the Carbomedics Supply Agreement "will be significantly less than in previous years" when you resume the obligation in 2007. Tell us the basis for this statement since it appears based on the previous disclosure in your filings that your minimum purchase obligation will be a continuation of the same minimum purchase commitment as it was in the prior periods.

Form 10-Q for the quarterly period ended September 30, 2005

Consolidated Financial Statements

Note 6. Licensing Fee Payments, page 8

3. We see your response to prior comment four and the revised disclosures in your Form 10-Q for the quarterly period ended September 30, 2005. Please tell us and revise future filings to disclose why the licensing fee payment is appropriately recorded as an indefinite-lived intangible asset. Refer to the requirements of SFAS 142.

Note 7. Issuance of Convertible Debt and Warrants, page 8

4. We see that you sold \$22.4 million of 6% convertible senior notes and issued warrants to purchase 1.3 million shares of common stock in October 2005. In conjunction with the issuance, we note that you signed a Registration Rights Agreement which requires you to file a registration statement within 30 days of the closing date and to use reasonable efforts to cause the registration statement to become effective within 90 or 120 days, as described in the agreement. In addition, we see that under the Registration Rights Agreement, you must respond to comments from the Commission within 15 days and maintain effectiveness of the registration statement until the period when all related securities have been sold. We also note that you will incur various penalties if a “registration delay” is identified, such as if the registration statement is not filed and declared effective in a timely manner and if you do not maintain effectiveness of the registration statement. Please confirm that you will follow the accounting guidance provided in EITF Issues 00-19, 01-6, 05-02 and 05-04 and SFAS 133 as well as any other applicable areas of US GAAP in your accounting for this transaction.

John R. Judd
ATS Medical, Inc.
December 2, 2005
Page 4

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 response 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 responses to our comments.

You may contact Kristin Lochhead at (202) 551-3664 or me at (202) 551-3676 if you have questions. In this regard, please do not hesitate to contact Martin James, Senior Assistant Chief Accountant, at (202) 551-3671 with any other questions.

Sincerely,

Brian Cascio
Accounting Branch Chief