

Mail Stop 4720

May 13, 2010

Mr. Joel Brooks
Chief Financial Officer
Senesco Technologies, Inc.
303 George Street, Suite 420
New Brunswick, NJ 08901

**Re: Senesco Technologies, Inc.
Registration Statement on Form S-3
Filed April 23, 2010
File No. 333-166277**

Dear Mr. Brooks:

We have limited our review of your filing to the comments issued below. Where indicated, we think you should revise your document 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. 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 on any other aspect of our review. Feel free to call us at the telephone numbers listed at the end of this letter.

Form S-3

General

1. It appears from your disclosure that you are registering an additional 13,790,623 shares of common stock to cover resales by the selling securityholders of shares of your common stock which may be issued to them in the future in payment of dividends on the Series A preferred stock. Since these additional shares are not issued and outstanding, the registration of these common shares is impermissible at this time. Accordingly, please revise your registration statement to remove the registration of these 13,790,623 shares. You may register the resale of these shares after they are issued and outstanding.

Mr. Joel Brooks
Senesco Technologies, Inc.
May 13, 2010
2

Eligibility Requirements for use of Form S-3

2. It appears that you were delinquent in filing your Form 10-Q for the quarter ended December 31, 2009. Note that General Instruction I.A.3.b of Form S-3 requires the registrant to have filed in a timely manner all reports required to be filed during the twelve calendar months and any portion of a month immediately preceding the filing of the registration statement. Because of your delinquent Form 10-Q, it appears you do not meet one of the eligibility requirements for use of Form S-3.

Total Potential Profit from Other Securities

3. Please provide us, with a view toward disclosure in the prospectus, with tabular disclosure of:
 - the total possible profit to be realized as a result of any conversion discounts for securities underlying any other warrants, options, notes, or other securities of the issuer that are held by the selling shareholders or any affiliates of the selling shareholders, presented in a table with the following information disclosed separately:
 - market price per share of the underlying securities on the date of the sale of that other security;
 - the conversion/exercise price per share as of the date of the sale of that other security, calculated as follows:
 - if the conversion/exercise price per share is set at a fixed price, use the price per share on the date of the sale of that other security; and
 - if the conversion/exercise price per share is not set at a fixed price and, instead, is set at a floating rate in relationship to the market price of the underlying security, use the conversion/exercise discount rate and the market rate per share on the date of the sale of that other security and determine the conversion price per share as of that date;
 - the total possible shares to be received under the particular securities (assuming complete conversion/exercise);

- the combined market price of the total number of underlying shares, calculated by using the market price per share on the date of the sale of that other security and the total possible shares to be received;
- the total possible shares to be received and the combined conversion price of the total number of shares underlying that other security calculated by using the conversion price on the date of the sale of that other security and the total possible number of underlying shares; and
- the total possible discount to the market price as of the date of the sale of that other security, calculated by subtracting the total conversion/exercise price on the date of the sale of that other security from the combined market price of the total number of underlying shares on that date.

Comparison of Issuer Proceeds to Potential Investor Profit

4. Please provide us, with a view toward disclosure in the prospectus, with tabular disclosure of:
- the gross proceeds paid or payable to the issuer in the private placement transactions;
 - all payments that have been made or that may be required to be made by the issuer to the selling stockholders or affiliates of the selling stockholders;
 - the resulting net proceeds to the issuer; and
 - the combined total possible profit to be realized as a result of any conversion discounts regarding the securities underlying the preferred stock, warrants and any other warrants, options, notes, or other securities of the issuer that are held by the selling shareholders or any affiliates of the selling shareholder.

Further, please provide us, with a view toward disclosure in the prospectus, with disclosure – as a percentage – of the total amount of all possible payments and the total possible discount to the market price of the shares underlying the preferred stock and warrants divided by the net proceeds to the issuer from the sale of the preferred stock and warrants, as well as the amount of that resulting percentage averaged over the term of the preferred stock and warrants.

Prior Transactions between the Issuer and the Selling Shareholders

5. Please provide us, with a view toward disclosure in the prospectus, with tabular disclosure of all prior securities transactions between the issuer (or any of its predecessors) and the selling shareholders, any affiliates of the selling shareholders, or any person with whom any selling shareholder has a contractual relationship regarding the transaction (or any predecessors of those persons), with the table including the following information disclosed separately for each transaction:
- the date of the transaction;
 - the number of shares of the class of securities subject to the transaction that were outstanding prior to the transaction;
 - the number of shares of the class of securities subject to the transaction that were outstanding prior to the transaction and held by persons other than the selling shareholders, affiliates of the company, or affiliates of the selling shareholders;
 - the number of shares of the class of securities subject to the transaction that were issued or issuable in connection with the transaction;
 - the percentage of total issued and outstanding securities that were issued or issuable in the transaction (assuming full issuance), with the percentage calculated by taking the number of shares issued and outstanding prior to the applicable transaction and held by persons other than the selling shareholders, affiliates of the company, or affiliates of the selling shareholders, and dividing that number by the number of shares issued or issuable in connection with the applicable transaction;
 - the market price per share of the class of securities subject to the transaction immediately prior to the transaction (reverse split adjusted, if necessary); and
 - the current market price per share of the class of securities subject to the transaction (reverse split adjusted, if necessary).

Comparison of Registered Shares to Outstanding Shares

6. Please provide us, with a view toward disclosure in the prospectus, with tabular disclosure comparing:
- the number of shares outstanding prior to the private placement transaction that are held by persons other than the selling shareholders, affiliates of the company, and affiliates of the selling shareholders;

- the number of shares registered for resale by the selling shareholders or affiliates of the selling shareholders in prior registration statements;
- the number of shares registered for resale by the selling shareholders or affiliates of the selling shareholders that continue to be held by the selling shareholders or affiliates of the selling shareholders;
- the number of shares that have been sold in registered resale transactions by the selling shareholders or affiliates of the selling shareholders; and
- the number of shares registered for resale on behalf of the selling shareholders or affiliates of the selling shareholders in the current transaction.

In this analysis, the calculation of the number of outstanding shares should not include any securities underlying any outstanding convertible securities, options, or warrants.

Intention and Ability to Make All Payments and the Presence or Absence of Short Selling by the Shareholder

7. Please provide us, with a view toward disclosure in the prospectus, with the following information:
- whether the issuer has the intention, and a reasonable basis to believe that it will have the financial ability, to make all payments on the overlying securities; and
 - whether – based on information obtained from the selling shareholders – any of the selling shareholders have an existing short position in the company's common stock and, if any of the selling shareholders have an existing short position in the company's stock, the following additional information:
 - the date on which each such selling shareholder entered into that short position; and
 - the relationship of the date on which each such selling shareholder entered into that short position to the date of the announcement of the private placement transaction and the filing of the registration statement (*e.g.*, before or after the announcement of the private placement transaction, before the filing or after the filing of the registration statement, etc.).

Relationships Between the Issuer and the Selling Shareholders

8. Please provide us, with a view toward disclosure in the prospectus, with:
- a materially complete description of the relationships and arrangements that have existed in the past three years or are to be performed in the future between the issuer (or any of its predecessors) and the selling shareholders, any affiliates of the selling shareholders, or any person with whom any selling shareholder has a contractual relationship regarding the transaction (or any predecessors of those persons) – the information provided should include, in reasonable detail, a complete description of the rights and obligations of the parties in connection with the sale of the preferred stock and warrants; and
 - copies of all agreements between the issuer (or any of its predecessors) and the selling shareholders, any affiliates of the selling shareholders, or any person with whom any selling shareholder has a contractual relationship regarding the transaction (or any predecessors of those persons) in connection with the sale of the preferred stock and warrants.

If it is your view that such a description of the relationships and arrangements between and among those parties already is presented in the prospectus and that all agreements between and/or among those parties are included as exhibits to the registration statement, please provide us with confirmation of your view in this regard.

The Method by which the Number of Registered Shares was Determined

9. Please provide us, with a view toward disclosure in the prospectus, with a description of the method by which the company determined the number of shares it seeks to register in connection with this registration statement. In this regard, please ensure that the number of shares registered in the fee table is consistent with the shares listed in the “Selling Shareholders” section of the prospectus.

* * * *

As appropriate, please amend your registration statement in response to these comments. You may wish to provide us with marked copies of the amendment to expedite our review. Please furnish a cover letter with your amendment that keys your responses to our comments and provides any requested information. Detailed letters greatly facilitate our review. Please understand that we may have additional comments after reviewing your amendment and 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 1933 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.

Notwithstanding our comments, in the event the company requests acceleration of the effective date of the pending registration statement, it should furnish a letter, at the time of such request, acknowledging that:

- should the Commission or the staff, acting pursuant to delegated authority, declare the filing effective, it does not foreclose the Commission from taking any action with respect to the filing;
- the action of the Commission or the staff, acting pursuant to delegated authority, in declaring the filing effective, does not relieve the company from its full responsibility for the adequacy and accuracy of the disclosure in the filing; and
- the company may not assert staff comments and the declaration of effectiveness 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 connection with our review of your filing or in response to our comments on your filing.

We will consider a written request for acceleration of the effective date of the registration statement as confirmation of the fact that those requesting acceleration are aware of their respective responsibilities under the Securities Act of 1933 and the Securities Exchange Act of 1934 as they relate to the proposed public offering of the securities specified in the above registration statement. We will act on the request and, pursuant to delegated authority, grant acceleration of the effective date.

We direct your attention to Rules 460 and 461 regarding requesting acceleration of a registration statement. Please allow adequate time after the filing of any amendment for further review before submitting a request for acceleration. Please provide this request at least two business days in advance of the requested effective date.

Please contact Nandini Acharya at (202) 551-3495 or me at (202) 551-3715 with any questions.

Mr. Joel Brooks
Senesco Technologies, Inc.
May 13, 2010
Page 8

Sincerely,

Jeffrey Riedler
Assistant Director

cc: Emilio Ragoza, Esq.
Morgan, Lewis & Bockius LLP
502 Carnegie Center
Princeton, NJ 08540