



UNITED STATES  
SECURITIES AND EXCHANGE COMMISSION  
WASHINGTON, D.C. 20549-7010

May 9, 2007

Mail Stop 7010

Via U.S. mail and facsimile

Mr. Frederick J. Goetz, Jr., President  
Third-Order Nanotechnologies, Inc.  
2601 Annand Dr., Suite #16  
Wilmington, Delaware 19808

**Re: Third-Order Nanotechnologies, Inc.**  
**Form 10-SB**  
**Filed on April 13, 2007**  
**File No. 0-52567**

Dear Mr. Goetz:

We have reviewed your filing and have the following comments. 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 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.

General

1. Please note that your filing will go effective by lapse of time 60 days after the original filing date pursuant to Section 12(g)(1) of the Exchange Act. If our comments are not addressed within this 60-day period, you should consider withdrawing your Form 10 prior to effectiveness and re-filing a new Form 10 that includes changes responsive to our comments. If you do not to withdraw, you

will be subject to the reporting requirements under Section 13(a) of the Exchange Act.

Description of Business, page 3

2. The disclosure in this section and throughout the filing assumes that the reader has a good understanding of your industry and the related terminology. In many instances, the disclosure uses terms that are specific to your industry for which no definition is provided. Please review this section and revise the document with a view towards clearly explaining your business and the related industry terms to a reader who is not familiar with your industry. A few examples of the technical jargon include “zwitterionic-aromatic push-pull” and “nitrogenous heterocyclical structure” at page 8 and “CSC (Cyclical Surface Conduction) theory” at page 9.
3. Please explain the business purpose of the October 20, 2006 transaction in which PSI-TEC Holdings, Inc. and PSI-TEC Corp. merged. Explain whether the transaction entailed a change of control or domicile, and briefly explain PSI-TEC Holdings’ relationship to the company prior to the merger.
4. Where you cite test results and similar information that has been prepared or quoted by third parties, please provide us supplementally with a copy of the report or other data that you are quoting from, and mark it to show where the information you cite or refer to in your registration statement appears. For example, please provide this information in relation to the disclosure that appears beginning on page 18 under the subheading “Air Force Research Laboratory (AFRL)”.
5. We note your discussion of the Frost & Sullivan award you received on page 7 and elsewhere in the filing. Please explain further how you were selected to receive this award, and whether you were its sole recipient.
6. You mention the potential size of your potential market according to “industry experts” (page 9). Please clarify whether you are referring to the Triple Play report, as it, according to your disclosure elsewhere in the filing, appears to provide similar information.

7. You refer to a comprehensive report you received from Triple Play at page 14 that cites historical and projected performance for the global high-speed optical equipment market and the emerging 40Gb/s telecommunications market. Please provide us with a complete copy of the report. With all materials that you provide for our reference, mark the materials to indicate where support appears for the various claims you make in your document.
8. Ensure that you file as exhibits all material contracts, including any related to the strategic relationships you discuss starting at page 14. For example, if you have any agreement in place with DARPA, please include it as an exhibit to the registration statement, or tell us supplementally why it is not a material contract.

Our Competition, page 19

9. Explain the Company's competitive position in the industry. Also tell us in specific terms how the company intends to compete.

Risk Factors Related to Our Business, page 20

10. Please revise your Risk Factor disclosure to address if there is a reasonable likelihood that the company will have a material exposure as a result of the matters you discuss under "Legal Proceedings". Please also revise to quantify your potential exposure, if possible. We may have additional comments upon your response.
11. Please include, under an existing risk factor or a new one, the disclosure that discusses the fact that you received a going concern opinion.

Shares eligible for sale in the future . . . page 35

12. Please disclose how many shares you are referring to when you say "all but approximately 3,748,785 shares . . ." so that investors will better understand how many shares are eligible for resale.

Management's Discussion and Plan of Operation, page 35

13. Please expand your discussion to more clearly explain your plan of operation for the 12 month period following your latest balance sheet date, including a reasonably detailed explanation of your expected cash inflows and outflows, with a focus on commitments, trends, and uncertainties. Please better explain the expected timing of any milestones in your plan and any potential difficulties that might postpone your plan. See Item 303(a) of Regulation S-B.
14. You discuss an agreement you have with Photon-X in the fourth paragraph, stating that the agreement will provide you with access to a full suite of fabrication facilities. You discuss another agreement with Photon-X in the sixth paragraph, stating that you will provide Photon-X with your material to be tested and used on certain niche devices. Please consolidate your discussion of your relationship with Photon-X and describe all of its material terms, including the material terms of the contract you have filed as an exhibit.

Management Discussion and Analysis of Financial Condition and Results of Operations

Recent Developments, page 39

Stock Issuances, page 39

15. Please disclose how you accounted for the registration rights related to the amended private offering. Please tell us what consideration you gave to EITF 00-19, FAS 133 and EITF 05-4 in your analysis of the accounting for your registration rights. Please also disclose the maximum cash penalty under the registration rights agreement, if applicable.

Results of Operations, page 40

16. Please explain your reference to being a public company, since this is your initial registration statement and you had no reporting obligation prior to its becoming effective.

Comparison of Fiscal 2006 to Fiscal 2005, page 40

17. Please disclose and explain the decrease in general and administrative expenses from fiscal 2005 to fiscal 2006. Please also disclose and explain the increase in general and administrative expenses from fiscal 2004 to fiscal 2005. Your discussion and analysis should provide investors with sufficient information to

understand historical trends and expectations for the future through the eyes of management.

Operating Expenses, page 40

18. Please explain why your general and administrative expenses declined from \$894,332 in 2005 to \$671,096 in 2006. We note that you attribute your overall increase in expenses to, among other things, hiring additional personnel.

Directors and Executive Officers, page 48

19. Revise the biographies as necessary to cover the most recent five years with no gaps. As necessary, provide the month and year for each position held during that time. Also explain how Mr. Bennett “turned around” Research Systems, or eliminate that statement.

Legal Proceedings, page 55

20. If appropriate, discuss the 2005 stock sale in your risk factors discussion.

Financial Statements

General

21. Please update your financial statements to comply with Item 310(g) of Regulation S-B, as applicable.

Statement of Stockholders’ Equity, page F-5

22. Please revise your statement of stockholders’ equity to include the disclosures required by paragraph 11(d)(1)-(3) of SFAS 7. SFAS 7 requires that for each issuance, your statement of stockholders equity should include the date and number of stock, warrants, rights or other equity securities issued, the per share dollar amounts assigned to the consideration received and the nature of the consideration received.

23. On page 39, you indicate that during 2004 you raised \$30,000 from the sale of common stock. Please confirm whether this was a result of a sale of common stock as reflected in your statement of cash flows or the conversion of a note payable as stated in your statement of stockholders' equity. Please revise your filing accordingly.

Note 3 – Deferred Charges

24. Please tell us how you determined that it was appropriate to classify all of your deferred charges as current on your balance sheet.
25. Please tell us how you determined the appropriate measurement date for the equity instruments included in deferred charges. Since it appears that the counterparty's performance is not complete, please discuss and disclose whether there is a significant disincentive for non-performance by the counterparties. Please refer to EITF 96-18.

Note 4 – Investments, page F-11

26. Please tell us how you determined the fair value of your available-for-sale securities in a related party. Please disclose on the face of the balance sheet that these securities are related party securities. Please also tell us how you determined that the unrealized losses on your available-for-sale securities are other than temporary.

Note 10 – Stockholders' Equity, page F-14

Common Stock, page F-14

27. On page 40, you indicate that you authorized the issuance of 60,000 shares of your common stock to a consulting firm pursuant to a consulting agreement. Please disclose how you accounted for this transaction in your financial statements.
28. On page 57, you disclose several transactions in which you issued shares of common stock in exchange for consulting and management advisory services. Please tell us how you determined the fair value of the stock issued for these services. Please tell us the accounting literature supporting your conclusions.

Note 11 – Stock Based Compensation, page F-17

29. On page 51, you indicate that you granted 500,000 options to purchase shares of common stock and cancelled a previously issued warrant to purchase 100,000 shares of common stock. Please disclose how you accounted for the issuance and cancellation of these options and warrants. You also indicate that you extended the option expiration date and modified the vesting schedule of various options. Please disclose how you accounted for the modification of these options. Please cite the accounting literature supporting your accounting.

Note 14 - Subsequent Events, page F-19

30. Please ensure that your updated financials statements address how you account for the issuance of 1,148,000 shares of common stock and warrants to purchase 574,000 shares of common stock for proceeds of \$574,000. You should also address how you accounted for the issuance of 1,151,785 shares of common stock for consulting services valued at \$686,250. Please cite the accounting literature used to support your accounting.

**General**

As appropriate, please amend your filing and respond to these comments within 10 business days or tell us when you will provide us with a response. You may wish to provide us with marked copies of the amendment to expedite our review. Please furnish a cover letter that is filed on EDGAR 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 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 Exchange Act 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;

Mr. Frederick J. Goetz  
Third-Order Nanotechnologies, Inc.  
May 9, 2007  
Page 8

- 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.

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.

Sincerely,

Pamela A. Long  
Assistant Director