

March 8, 2007

Mail Stop 6010

Stephen C. Hathaway
Chief Financial Officer and Treasurer
TomoTherapy Incorporated
1240 Deming Way
Madison, Wisconsin 53717

**Re: TomoTherapy Incorporated
Registration Statement on Form S-1
Filed February 12, 2007
File No. 333-140600**

Dear Mr. Hathaway:

We have the following comments to your filing. 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 supplemental information so we may better understand your disclosure. After reviewing this information, we may or may not 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.

Prospectus Cover Page

1. Please confirm that any preliminary prospectus you circulate will include all non-Rule 430A information. This includes the price range and related information based on a *bona fide* estimate of the public offering price within that range. Also note that we may have additional comments after you include this information.

Graphics

2. If you intend to add graphics to your prospectus please provide us with copies so that we may review them.

Summary, page 1

3. We note from pages 1 and 50 that you include a discussion of net income excluding certain items. Please revise your filing to remove these non-GAAP disclosures or provide the disclosures required by Item 10(e) of Regulation S-K and Question 8 of the Frequently Asked Questions Regarding the Use of Non-GAAP Financial Measures dated June 13, 2003.
4. Please provide us independent, objective support for the statements regarding your leadership and market standing. For example, you indicate in the summary and in other parts of your prospectus that your product is “one of the most advanced and versatile radiation therapy systems commercially available” and that your capabilities deliver treatment with “greater speed and precision than competing systems.”
5. Please provide us with support for the market data you have included in your prospectus. Clearly mark the relevant sections that support the data you have included and the page number of your prospectus where such data has been used. Also tell us whether the sources of the cited data have consented to your use of their names and data and whether any of the reports were commissioned by you or prepared specifically for your use.
6. In the forepart of the prospectus, including the summary and the risk factors, please limit the use of technical jargon and terms that may not be familiar to investors, including terms and abbreviations such as “ring gantry,” “linear accelerator,” “C-Arm,” “helical delivery pattern,” “radiation beam-shaping technology,” and “Multi-leaf Collimator.” Where you believe it is essential to use technical terms and abbreviations, please define them when you use them.

Special Note Regarding Forward Looking Statements, page 25

7. We note your reference to the safe harbor provisions under the Private Securities Litigation Reform Act of 1995. As these provisions are not applicable to initial public offerings, please remove such reference.

Capitalization, page 27

8. In order to enhance an investors understanding of the separate events that will impact your equity in connection with this offering, please revise the capitalization table to include two separate “pro forma” columns. The first “pro forma” column should reflect the impact of the automatic conversion of your securities upon the completion of the IPO. The second column, “pro forma, as adjusted,” should reflect the combined effects of the issuance and sale of your

common stock and the automatic conversion of your securities upon the completion of the IPO. Please note this comment also applies to your disclosures on pages 7 and 28.

9. Further to the above, please explain to us why you excluded the 947,552 shares of contingent issuable shares of common stock from your pro forma column within your capitalization table even though you presented these shares as outstanding within your September 30, 2006 pro forma balance sheet on page F-3.

Dilution, page 28

10. Confirm whether the total dilution per share to new investors disclosed at the bottom of page 29 includes your issuance of the 947,552 shares of common stock in February 2000 pursuant to the investment agreement for Series A preferred stock. Revise the paragraph to make this clear. Please also provide a table similar to that provided at the bottom of page 28 to show the effects of dilution if the shares listed in the bullet points at the bottom of page 28 and top of page 29 were included in your dilution calculation.

Results of Operations, page 36

Nine Months Ended September 30, 2005 Compared to Nine Months Ended September 30, 2006, page 36

11. Please revise to discuss uncertainties surrounding the realization of the deferred tax asset as of September 30, 2006 and material assumptions underlying your determination that the net asset would not be realized as of December 31, 2004 and 2005 and would be partially realized as of September 30, 2006. If the asset's realization is dependent on material improvements over present levels of consolidated pre-tax income, material changes in the present relationship between income reported for financial and tax purposes, or material asset sales or other nonroutine transactions, describe these assumed future events, quantified to the extent practicable, in the MD&A. For example, disclose the minimum annualized rate by which taxable income must increase during the NOL carryforward period if realization of the benefit is dependent on taxable income higher than currently reported. Also, if significant objective negative evidence indicates uncertainty regarding realization of the deferred asset, identify the countervailing positive evidence relied upon by management in its decision not to establish a full allowance against the asset.
12. In this regard, we note from page F-21 that you recorded a full valuation allowance of \$13.1 million under SFAS 109 as of December 31, 2005 due to "[c]umulative losses incurred as of December 31, 2004 and 2005." On that page

you also disclose that during the nine months ended September 30, 2006, you anticipated that approximately \$5.5 million of deferred tax assets were more likely than not to become realized “as a result of the history of earnings and future forecasts.” Since you continued to have cumulative losses as of September 30, 2006 and since you had net income in 2004 and 2005, it is not clear from your disclosure why you reversed a portion of your deferred tax asset valuation allowance in the third quarter of fiscal 2006. Nor is it clear why you continued to reflect a full valuation allowance as of December 31, 2005.

Operating Capital and Capital Expenditure Requirements, page 43

13. Please quantify the period of time you are referring to when you indicate that you believe your current cash and cash equivalents, along with the cash you expect to generate from operations and from your net proceeds from this offering will be sufficient to meet your anticipated cash needs for working capital and capital expenditures for the *foreseeable future*.

Critical Accounting Policies and Estimates, page 44

14. We note that you record your warrants to purchase preferred stock at fair value and that you adjust the carrying value of your Series A, B, C, and D preferred stock to redemption value which is the greater of the original purchase price plus accrued dividends or the current fair value of your preferred stock. Please revise this section to include an enhanced discussion of the methodology and significant estimates used to value any of instruments you carry at fair value.
15. We note that you refer to using the valuation of an independent third party when determining fair value of certain of your equity instruments. Please revise the filing to name the independent valuation expert in the Experts section and to include its consent as an exhibit. Refer to Rule 436 and Item 601(b)(23) of Regulation S-K.
16. Please disclose the aggregate intrinsic value of all outstanding options based on the midpoint of the estimated IPO price range. Please also discuss each significant factor contributing to the difference between the fair value as of the date of grant and the estimated IPO price for options granted during the twelve months prior to the date of the most recent balance sheet.

Competition, page 61

17. Explain why you compete with Accuray Incorporated and BrainLAB AG to a lesser extent than the other competitors listed in this section.

Management, page 69

18. We note you only disclose the year each director commenced serving. Please disclose what month each director was appointed.

Compensation Discussion and Analysis, page 76

19. We note your disclosure that SCG considered “comparable companies in both the medical devices industry and generally” in reviewing your compensation for 2006. We also note your disclosure that your compensation committee reviews and approves stock option awards to executive officers based on a review of competitive compensation data. Please provide more specific information, including the identity of the comparable companies, the contents of the competitive compensation data and why your compensation committee used as an approximate benchmark for both the base salary of and equity incentive awards made to your named executive officers the median level of salaries of and awards made to other executive officers in comparable companies. Also disclose, if applicable, whether the amount of targeted bonuses were determined using a formula and whether the committee’s determination considered bonuses paid to executive officers of comparable companies.
20. We note Dr. Robertson’s significant role in the compensation process. Please disclose how Dr. Robertson’s compensation is determined.

Elements of Compensation, page 77

21. We note you state you have not determined “specific targets for the percentage of compensation represented by salary, equity and/or bonus.” Yet you also state that you “expect to provide a greater portion of total compensation to our executives through our stock compensation plans than through cash-based compensation.” Please disclose any other general targets for the percentage of compensation represented by the different compensation elements.

Base Salaries, page 77

22. Please explain how you determined the amount of Mr. Hughes sales commission for each system sold.

Bonuses, page 77

23. You disclose that the executive officers' bonuses were determined based solely on achievement of predetermined range of revenue and operating income targets. Please discuss these targets with greater specificity.

Employment Agreements, page 85

24. Please indicate the time period covered by the employment agreements, if applicable. Also clarify whether the change in control arrangements are part of those agreements, or separate agreements, as we note you have not filed these agreements as exhibits yet.

Director Compensation, page 86

25. If your directors receive a \$20,000 annual retainer, please tell us why some directors have received less than this amount.

Principal and Selling Shareholders, page 88

26. Please identify all individuals by name holding beneficial ownership of the entities described in the table.
27. Please tell us whether any of the selling shareholders are broker-dealers or affiliates of a broker-dealer.
28. Please describe the transactions in which each selling shareholder acquired the offered shares. Include the date of the transaction and the consideration paid.

License Agreement with Wisconsin Alumni Research Foundation, page 92

29. You disclose that the WARF license is "exclusive" except for certain rights granted to a third party prior to the execution of the license which may not be broadened or renewed. Disclose whether this third party is currently a competitor of yours or whether the scope of the license granted to such third party would enable it to market and sell radiation therapy systems.

Issuance of Contingent Common Stock, page 93

30. Please explain why the board approved the immediate issuance of the 947,552 shares of common stock given the original condition that such shares were to be issued upon closing of your initial public offering.

Rights of Appointment, page 93

31. Please identify the individuals appointed to the board under these arrangements so that it is clear which director was appointed by which investor.
32. Also, please confirm that following closing of this offering, no observers previously appointed will be entitled to attend meetings of your board of directors.

Cudahy Aircraft Agreements, page 95

33. Please update this disclosure to a date more recent than September 30, 2006.

Index to Consolidated Financial Statements, page F-1

General

34. Please revise to include updated financial statements and related disclosures in your filing to comply with Rule 3-12 of Regulation S-X.

Note A. Summary of Significant Accounting Policies, page F-8

35. Please note that the information included in the first paragraph on page F-8 is included in audited financial statements and should not include marketing terms that have not been audited by your independent public accountants.
36. We note on page 11 and throughout the filing that you have entered into collaboration agreements with hospitals, cancer treatment centers, and academic institutions. With a view towards disclosure, please tell us the significant terms of these agreements and how you are accounting for them.

-Pro Forma Shareholders' Equity (Deficit), page F-8

37. Please remove this presentation, or tell us why it is appropriate given the terms for conversion upon an IPO disclosed on page F-23. In any case, please revise throughout the document to clarify that the conversion is conditional and not automatic upon an IPO.

-Cash and Cash Equivalents, page F-9

38. Please revise so that, in addition to having short-term maturities, cash equivalents are also highly liquid investments consistent with paragraph 8 of SFAS 95.

-Warranty Cost, page F-11

39. Please revise your reconciliation, consistent with paragraph 14(b) of FIN 45, to include separate amounts for (a) the aggregate reductions in the liability for payments made under the warranty, (b) the aggregate changes in the liability for accruals related to product warranties issued during the reporting period, and (c) the aggregate changes in the liability for accrual relating to preexisting warranties.

-Revenue Recognition, page F-12

40. We note that you recognize revenue upon shipment for distributor sales to distributors who are certified to provide installation, testing, training, and post-installation warranty services to end customers. Please tell us why you recognize revenue upon shipment for your distributors based upon their certification status. Discuss your consideration of SAB Topic 13. Within your discussion, please explain to us if you would have any obligations to the end customer if your distributors failed to install, train, or provide the post-warranty obligation to the end-customer.
41. Further to the above, we note that you recognize revenue for software arrangements involving multiple elements in certain instances when the evidence of vendor specific objective evidence exists for all undelivered elements but does not exist for all delivered elements using the residual method. Please tell us and revise your filing here and within your critical accounting policies within MD&A to explain if the fair value of all of the undelivered elements for these software arrangements is less than the fair value of the arrangement fee. Refer to paragraph 6(b) of SOP 98-9.

-Stock-based compensation, page F-14

42. Please revise your filing to remove the pro forma stock disclosures for those prior reporting periods in which you used the minimum value method to determine the fair value of your stock options under APB 25 and SFAS 123. Refer to the guidance in paragraph 85 of SFAS 123(R).

-Net Income (Loss) per Share of Common Stock, page F-16

43. Please address the following:

- Please revise your filing to remove your pro forma basic and diluted net income (loss) per share disclosures related to the year ended December 31, 2003 and 2004 and the nine months ended September 30, 2005 or alternatively please explain to us why you provided this information and how it complies with Article 11 of Regulation S-X.
- Please revise your filing to label the “historical outstanding anti-dilutive securities not included in diluted earnings per share calculation” as “pro forma outstanding anti-dilutive securities not included in diluted earnings per share calculation.”

-Segment Information, page F-18

44. Please revise your filing to disclose the basis for determining revenue from external customers in your geographic regions consistent with paragraph 38(a) of SFAS 131.

Note E. Temporary Equity and Shareholders' Equity (Deficit), page F-22

45. Please reconcile the pro forma number of shares of common stock to be outstanding after the offering of 27,638,801 shown on page 5 with the pro forma number of shares of common stock issued and outstanding as of September 30, 2006 of 26,036,647. If applicable, please include the disclosures required by paragraph 41 of SFAS 128.

-Redeemable Convertible Preferred Stock, page F-22

46. Please tell us and disclose the method and significant assumptions used to determine the fair value of your preferred stock as of each reporting date.

-Warrants, page F-24

47. Please tell us and disclose the method and significant assumptions used to determine the fair value of the warrants.

48. Please disclose whether the warrants will become exercisable for common stock, instead of preferred stock, upon the completion of the offering. Please also discuss any implications to your accounting under SFAS 150-5.

From your disclosure on page F-23, we note that the warrants, in addition to being exercisable for redeemable preferred stock, were also puttable to the company at fair value. Please tell us how you considered this term, prior to your adoption of FSP 150-5, in determining that the warrants were properly recorded as equity. Cite the accounting literature upon which you relied and how you applied that literature to your facts and circumstances.

-Contingent Common Shares, page F-24

49. We note that you will issue 987,552 common shares of common stock to the Series A preferred shareholders and that you will record the fair value of these shares when it is probable that the company will be sold or an IPO will occur. Please tell us and revise your filing to disclose the conditions under which the holder would receive these shares and why you will record the fair value of these shares when it is probable that the company will be sold or an IPO will occur. Cite the accounting literature relied upon in reaching your conclusion and explain how you applied that literature to your facts and circumstances.

Note F. Stock Options, page F-24

50. Please note that we are deferring any final evaluation of stock compensation until the estimated offering price is specified, and we may have further comments in that regard when you file the amendment containing that information.

Please provide us with a schedule for your stock options showing in chronological order, the date of grant, optionee, number of options granted, exercise price and the fair value of the underlying shares of common stock for the options issued within the year preceding the contemplated IPO. Please indicate the compensation recorded for each of these issuances and reconcile to the amounts recorded in the financial statements. Tell us the objective evidence and analysis which supports your determination of the fair value at each grant and stock issuance date. Discuss the nature of any events which occurred between the dates the options were granted and the date the registration statement was filed. In addition, provide details of estimated pricing information from the underwriters and indicate whether this was considered in determining estimated fair value of the stock and options issued.

51. For options granted during the twelve months prior to the date of the most recent balance sheet, please disclose the following in the notes to your financial statements:

- For each grant date, the number of options granted, the exercise price, the fair value of your common stock, and the intrinsic value (if any) per option.
- If the valuation specialist was a related party, please disclose that fact.
- Whether the valuation was contemporaneous or retrospective.

Undertakings

52. Please note that due, in part, to the language of Securities Act Rule 430C(d), the undertakings included in Item 512(a)(5)(ii) and 512(a)(6) of Regulation S-K should be included in filings for initial public offerings. Please revise your filing to include these undertakings.

Exhibits

53. Please tell us where you have filed your manufacturing agreements for your gantry and couch components.
54. To extent required by Item 601(b)(10) of Regulation S-K, please file your distributor and research collaboration agreements as exhibits.
55. We note your reference to an application for confidential treatment. We will review and provide any comments related to your request separately. Comments must be resolved and your application must be complete before we may accelerate the effective date of your registration statement.

* * *

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 supplemental 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 filings reviewed by the staff to be certain that they have provided all information investors require for an informed 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 a 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.

Stephen C. Hathaway
TomoTherapy Incorporated
March 9, 2007
Page 13

You may contact Tara Harkins at (202) 551-3639 or in her absence, Kaitlin Tillan at (202) 551-3604 if you have questions regarding comments on the financial statements and related matters. Please contact Jay Mumford at (202) 551-3637 or me at (202) 551-3444 with any other questions.

Sincerely,

Perry Hindin
Special Counsel

cc: Gregory J. Lynch, Esq.
Geoffrey R. Morgan, Esq.