CONFIDENTIAL TREATMENT REQUESTED: Certain portions of this document have been omitted pursuant to a request for confidential treatment and, where applicable, have been marked with an asterisk (“[****]”) to denote where omissions have been made. The confidential material has been filed separately with the Securities and Exchange Commission.

CONFIDENTIAL TREATMENT REQUESTED

May 9, 2006

VIA EDGAR, E-MAIL AND MESSENGER

Securities and Exchange Commission
Division of Corporate Finance
100 F Street, N.E.
Washington, D.C. 20549-6010

Mail Stop 6010

Attention: Mr. Jeffrey P. Riedler
Ms. Sonia Barros
Ms. Suzanne Hayes
Ms. Tabatha Akins
Mr. Oscar Young

Re: Luna Innovations Incorporated
Registration Statement on Form S-1 (File No. 333-131764)
Initially filed on February 10, 2006
Amendment No. 2 filed on April 10, 2006
Amendment No. 3 filed on April 28, 2006
Amendment No. 4 filed on May 9, 2006

Ladies and Gentlemen:

On behalf of Luna Innovations Incorporated (the “**Company**”), we respectfully submit this letter as a supplemental response to your request for additional information made during our telephone conversation with you on May 8, 2006. We have previously submitted to you a response letter on April 27, 2006 (the “**April 27 Response Letter**”), two supplemental response letters on May 4, 2006 (the “**First and Second Supplemental Response Letters**”), and two supplemental response letters dated May 8, 2006 (the “**Third and Fourth Supplemental Response Letters**”, and collectively with the First and Second Supplemental Response Letters, the “**Supplemental Response Letters**”). The Supplemental Response Letters were prepared in response to telephone discussions with you on May 3rd through 5th and on May 8th, 2006.

In the Supplemental Response Letters, we submitted for review the Company’s response to comments from the staff (the “**Staff**”) of the Securities and Exchange Commission (the

"**Commission**") received by letter dated April 24, 2006 (the "**April 24 SEC Comment Letter**"), relating to the Company's Amendment No. 2 ("**Amendment No. 2**") to the Registration Statement on Form S-1 (File No. 333-131764) filed with the Commission on April 10, 2006 (the "**Registration Statement**"). Concurrent with its filing of the April 27 Response Letter, the Company filed via EDGAR Amendment No. 3 to the Registration Statement ("**Amendment No. 3**"). The Supplemental Response Letters included further supplemental responses to the Staff's comment number 11 contained in the April 24 SEC Comment Letter and the letter from the Commission dated May 8, 2006. All capitalized terms not defined herein have the meanings given to them in the Registration Statement and in the Supplemental Response Letters.

Following your review of the Third and Fourth Supplemental Response Letters, the Staff requested that the Company prepare an analysis of the factors contributing to the increase in the fair value of the Company's non-voting Class B Common Stock (the "**Non-Voting Class B Common Stock**") between the date of the Company's option grants on November 11, 2005 (the "**November 11 Options**") and the end of the first quarter of 2006 (the "**Relevant Period**"). Please note that all share and per share numbers in this letter reflect a 1-for-1.7691911 reverse stock split that the Company intends to effect immediately prior to the closing of the offering.

I. VALUATION CHANGES DURING THE RELEVANT PERIOD

As previously discussed with the Staff and mentioned in the first supplemental response letter on May 4, 2006 (the "**First Supplemental Response Letter**"), the increase in valuation of the Company's Non-Voting Class B Common Stock during the Relevant Period is attributable to a number of different achievements and events that occurred after November 11, 2006 (the "**Valuation Drivers**"). Prior to the Relevant Period, the factors underlying the Valuation Drivers during the Relevant Period were uncertain, and any cash flow or revenue projections related to these Valuation Drivers were discounted to reflect this uncertainty. Moreover, it was not reasonably expected that the achievements underlying these Valuation Drivers would occur within the timeframe that they actually occurred.

A summary of the material Valuation Drivers is set forth herein. These Valuation Drivers include changes in value resulting from the increased likelihood of an initial public offering and from the specific technological milestones that were achieved during the Relevant Period for the Company's leading product candidates. As the Staff specifically requested on May 8, 2006, the following disclosure correlates such Valuation Drivers to the Company's general estimate of the change in Company's enterprise value during the Relevant Period.

A portion of the increase in fair value in the Relevant Period is attributable to an increased likelihood that the Company would be able to effect a successful initial public offering in the first half of 2006. As discussed with the Staff and disclosed in greater detail in the Registration Statement under the heading “Use of Proceeds,” a significant portion of the proceeds received from the offering will be used to further develop critical intellectual property and products, and to pursue regulatory approval of certain nanomaterials-based products and quantitative ultrasound products. In particular, the Company has identified its magnetic resonance imaging, or MRI, contrast agent products and its emboli detection and classification, or EDAC, ultrasound technology platform products as requiring significant amounts of capital to reach full commercialization such development efforts are anticipated to represent the primary uses of funds raised in the offering.

As the Company previously disclosed to the Staff in the First Supplemental Response Letter and as it has stated in subsequent discussions with the Staff, it expects that these medical-related product lines will contribute significant revenue and cash flow to the business in future years. The technological developments in these technologies and products also contributed to the majority of the increase in value during the Relevant Period, because the increased likelihood that the Company would be able to effect a successful initial public offering reduces the discount applied to these future cash flows in determining the Company’s valuation.

A. Valuation Change Attributable to Nanomaterials-based Product Milestones

The Company achieved three major technological advances related to the production of Trimetaspheres during the Relevant Period. These advances were critical to achieving the Company’s future revenue projections because they permitted the Company to advance to the next stage of development of its magnetic resonance imaging, or MRI, contrast agent product candidates. Prior to the Relevant Period, both the production and purification of Trimetasphere nanomaterials, the core building block of the MRI contrast agent products, limited the Company’s ability to commercialize these products. In particular, Trimetasphere nanomaterials manufacturing yields in the fourth quarter 2005 were so low that the Company was unable to manufacture Trimetasphere nanomaterials in sufficient quantities to begin pre-clinical studies, let alone produce agents in sufficient quantities to support later-stage clinical trials. Furthermore, the purity of the Trimetasphere nanomaterials being produced prior to the Relevant Period was insufficient to meet the quality standards necessary to begin FDA clinical trials of the Company’s MRI product candidates. Both of these roadblocks to product development were overcome during the Relevant Period. In November 2005, the Company did not have reasonable assurance that either of these technological milestones could or would be achieved.

For example, Trimetasphere nanomaterial containing soot was previously produced at rates of approximately [****] grams/hour. It was demonstrated for the first time during the first quarter of 2006 that [****]. Although these advances were necessary to successfully commercialize the MRI contrast agent products in sufficient quantities and at economically viable price-points, the Company had no assurances that such advances were possible prior to the developments achieved during the Relevant Period.

In addition, prior to the Relevant Period, the yield of Trimetasphere nanomaterials in fullerene-containing soot was less than 1%. Furthermore, previously existing technology was only capable of purifying gram quantities of soot using expensive high-pressure liquid chromatography equipment. During the Relevant Period, Company scientists discovered [****]. It is anticipated that these newly discovered chemical reactions will permit the Company for the first time to scale up to pharmaceutical production quantities of Trimetasphere nanomaterials for use as MRI contrast agents.

The third major breakthrough during the Relevant Period was that the Company developed a new chemical extraction procedure in early 2006 that enhanced the purity of its Trimetasphere nanomaterials. The Company discovered that [****]. These chemical reactions required the discovery of new reagents that reacted preferentially to extract the contaminant fullerenes and thereby provide pure Trimetasphere nanomaterials for testing, development and ultimately commercial production.

Approximately [****] percent of the increase in the enterprise value of the Company during the Relevant Period relates to developments in the Company's nanomaterial-related developments and, in particular, the Company's developments relating to the Trimetasphere-based MRI contrast agent products. The Company's independent valuation expert, the Clawson Group ("**Clawson**"), in performing a valuation of the Company's Non-Voting Class B Common Stock as of September 30, 2005, December 31, 2005 and March 31, 2005, had considered the Company's earlier projections related to revenue from its nanomaterial-related products in fiscal

years 2006 through 2009. Such projections indicated that revenue from nanomaterial-related and Trimetasphere-based products (primarily the Company's MRI contrast agents) was projected to increase to $[****] in fiscal year 2009. While such projections seemed plausible, the key milestones related to the development of these technologies had not yet been met, and therefore Clawson applied a greater discount factor to these projections.

Clawson's valuation analysis included a sensitivity analysis which considered various outcomes for future revenue, particularly as they related to the Company's nanomaterial-related products. Prior to the achievement of the milestones discussed above, Clawson had discounted the projected revenue to be received from such products as of September 30, 2005 (the basis of the value for the November 2005 option grants). This discount in turn lowered the overall terminal value and resulting enterprise value of the Company. During the Relevant Period, the Company achieved the milestones described above and Clawson was able to reduce the discount applied to the achievement of cash flows from its nanomaterial-related technology. The reduction in the applied discount and the increase in the likelihood of achieving projected results accounted for an increase in the enterprise value of approximately $[****] million during the Relevant Period. This change represented approximately [****] percent of the increase in the total enterprise value of the Company during the Relevant Period.

B. Valuation Change Attributable to Quantitative Ultrasound Product Milestones

As previously disclosed to the Staff in the Company's third supplemental response letter dated May 8th (the "**Third Supplemental Response Letter**"), the Company's first medical device product developed using its quantitative ultrasound technology platform – its Emboli Detection and Classification, or EDAC, diagnostic device – is still in pre-clinical development.

During the Relevant Period, the Company completed characterization of the digital version of its EDAC alpha hardware and software prototypes. At approximately the same time, the Company completed algorithms for its implementation of EDAC technology and specifications for these software algorithms. These prototypes and the implementation of these algorithms provided the Company's independent valuation expert with objective evidence that the Company had overcome key technological hurdles and evidence of improved reliability of the Company's available revenue and cash flow forecasts related to those products.

In addition to these technological milestones, and as the Company previously informed the Staff in the Third Supplemental Response Letter, the Company was legally precluded from manufacturing or selling this product in the United States until March 31, 2006, because a key patent on the technology was held by an independent third party. The Company executed a non-

binding letter of intent to acquire this patent and related intellectual property in January 2006. Prior to January 2006, the Company had no reasonable assurance that it would be able to acquire this technology. The acquisition of this technology and related intellectual property closed on March 31, 2006. As a result, the revenue and cash flows from this technology were not yet realizable until the second quarter 2006, and accordingly were heavily discounted in Clawson's valuation prior to January of 2006.

The developments to the Company's ultrasound technology platform also improved the likelihood that the Company will be able to achieve revenue and cash flow projections for its other quantitative ultrasound platform technology products such as the compartment syndrome monitoring and bone strength monitoring products.

Clawson's valuation analysis included sensitivity analysis which considered various outcomes for future revenue, particularly as they related to the Company's quantitative ultrasound products. Prior to the achievement of the milestones discussed above, Clawson had discounted the projected revenue to be received from such products as of September 30, 2005. This discount in turn lowered the overall terminal value and resulting enterprise value of the Company. During the Relevant Period, the Company achieved the milestones described above and Clawson was able to reduce the discount applied to the achievement of cash flows from its quantitative ultrasound technology. The reduction in the applied discount and the increase in the likelihood of achieving projected results accounted for an increase in the enterprise value of approximately $[****] during the Relevant Period. This change represented approximately [****] percent of the increase in the total enterprise value of the Company during the Relevant Period.

C. Valuation Change Attributable to Distributed Sensing System Product Milestones

The Company achieved two major technological advances during the Relevant Period related to development of is sensing products, including its Rayleigh-based distributed sensing product and its new generation optical frequency domain reflectometer, or OFDR.

With respect to its Rayleigh-based optical fiber sensing technique, the Company made a major step toward production of this unit in January 2006 by launching the first fully-functional beta software prototype to perform Rayleigh-based distributed sensing for the commercial Optical Backscatter Reflectometer, or OBR, instrument. This software prototype formed the basis for the Company's full Rayleigh-based sensing software product which was launched in March 2006. The successful beta-testing and launch of this product line was deemed a critical

milestone in the product development effort of this product, which represents a significant portion of the future revenue and cash flows of the Company's Luna Technologies Division.

The Company also achieved an important technological milestone with respect to a new potential product – its high-resolution, high-fidelity optical frequency domain reflectrometry, or OFDR. This breakthrough, which was achieved during the Relevant Period, [****]. The Company's third party valuation expert determined that this achievement significantly improved the Company's competitive position for its fiber-optic based sensing products and, in turn, improved the likelihood of it achieving its future revenue forecasts.

In November 2005, the Company did not have reasonable assurance that either of these technological milestones would be achieved. Prior to the achievement of the milestones discussed above, Clawson had discounted the projected revenue to be received from such products as of September 30, 2005. This discount in turn lowered the overall terminal value and resulting enterprise value of the Company. During the Relevant Period, the Company achieved the milestones described above and Clawson was able to reduce the discount applied to the achievement of cash flows from its sensing systems products. The reduction in the applied discount and the increase in the likelihood of achieving projected results accounted for an increase in the enterprise value of approximately $[****] during the Relevant Period. This change represented approximately [****] percent of the increase in the total enterprise value of the Company during the Relevant Period.

II. CONCLUSION

Prior to the Relevant Period, the factors underlying the Valuation Drivers were uncertain, and any cash flow or revenue projections related to these Valuation Drivers were discounted to reflect this uncertainty. The Valuation Drivers that occurred after November 11, 2005 resulted in a significant increase in the total enterprise value of the Company during the Relevant Period. This increase in enterprise value is the result of a reduction in the applied discount and the increase in the likelihood of achieving projected results.

* * *

Please direct your questions or comments to the undersigned at (703) 734-3105 (office), or (703) 864-6313 (mobile) or to Trevor J. Chaplick at (703) 734-3106 (office) or (571) 275-3333 (mobile). In addition, we would request that you provide a facsimile of any additional comments you may have to the attention of Mr. Chaplick and the undersigned at (703) 734-3199. Thank you for your assistance.

Very truly yours,
WILSON SONSINI GOODRICH & ROSATI
Professional Corporation

/s/ Mark R. Fitzgerald

Mark R. Fitzgerald

cc: Kent A. Murphy, Ph.D.
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Luna Innovations Incorporated

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May 8, 2006

VIA EDGAR, E-MAIL AND MESSENGER

Securities and Exchange Commission
Division of Corporate Finance
100 F Street, N.E.
Washington, D.C. 20549-6010

Mail Stop 6010

Attention: Mr. Jeffrey P. Riedler
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Re: Luna Innovations Incorporated
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Amendment No. 3 filed on April 28, 2006

Ladies and Gentlemen:

On behalf of Luna Innovations Incorporated (the "**Company**"), we respectfully submit this letter as a supplemental response to your request for additional information made during your conversation this morning with Scott Graeff, the Chief Financial Officer of the Company. We have previously submitted to you a response letter on April 27, 2006 (the "**April 27 Response Letter**"), two supplemental response letters on May 4, 2006 (the "**First and Second Supplemental Response Letters**"), and a supplemental response letter today dated May 8, 2006 (the "**Third Supplemental Response Letter**", and together with the First and Second Supplemental Response Letters, collectively the "**Supplemental Response Letters**"). The foregoing Supplemental Response Letters were prepared in response to telephone discussions with you on May 3rd through 5th and on May 8th, 2006.

In the April 27 Response Letter, we submitted for review the Company's response to comments from the staff (the "**Staff**") of the Securities and Exchange Commission (the "**Commission**") received by letter dated April 24, 2006 (the "**April 24 SEC Comment Letter**"), relating to the Company's Amendment No. 2 ("**Amendment No. 2**") to the Registration Statement on Form S-1 (File No. 333-131764) filed with the Commission on April 10, 2006 (the "**Registration Statement**"). Concurrent with its filing of the April 27 Response Letter, the Company filed via EDGAR Amendment No. 3 to the Registration Statement ("**Amendment No. 3**"). The Supplemental Response Letters included further supplemental responses to the Staff's comment number 11 contained in the April 24 SEC Comment Letter. All capitalized terms not defined herein have the meanings given to them in the Registration Statement and in the Supplemental Response Letters.

Following your review of the Third Supplemental Response Letter, you requested in your discussion with Mr. Graeff this morning that the Company prepare a brief analysis of the materiality of an increase in pricing of stock option grants made by the Company on November 11, 2005 (the "**November 11 Options**"). Specifically, you have asked for an analysis of the materiality of an increase in fair value from $1.77 to up to $3.00 per share of the Company's nonvoting Class B Common Stock, par value $0.001 per share (the "**Nonvoting Class B Common Stock**") underlying options granted on this date. All share and per share numbers in this letter reflect a 1-for-1.7691911 reverse stock split that the Company intends to effect immediately prior to the closing of the offering.

<u>Background</u>

On November 11, 2005, the Company granted options to purchase an aggregate of 895,813 shares of Nonvoting Class B Common Stock with an exercise price of $1.77 per share. On November 11, 2005, following delivery and review of a contemporaneous valuation report prepared by an independent third-party valuation expert, the Company's board of directors (the "**Board**') determined the fair value of the Company's Nonvoting Class B Common Stock on that date was $1.77 per share. The Board's determination of the fair value was based on a contemporaneous valuation of the Company's Nonvoting Class B Common Stock performed by the Clawson Group ("**Clawson**"), an independent third-party valuation expert. Clawson's contemporaneous third-party valuation report concluded that the value of the Nonvoting Class B Common Stock on September 30, 2005 was $1.63 per share. Given the information obtained from such contemporaneous valuation, the Board ultimately concluded that the fair value of the Company's Nonvoting Class B Common Stock was $1.77 per share.

Certain members of the Company's management and the Board (collectively, the "**Review Committee**") considered the materiality to the Company's financial statements of changes to the $1.77 fair value determination. A detailed materiality analysis is provided herein.

Materiality Analysis

In light of the fact that the valuation of the Nonvoting Class B Common Stock is not an item capable of precise measurement, the Review Committee considered a range of potential values between the $1.63 valuation provided by the independent valuation specialist as of September 30, 2005, and subsequent valuations. As a result of this analysis, the Review Committee considered a range of potential values and concluded that hypothetically if the $1.77 valuation differed by a range of 25% (i.e., $2.21 per share) to 70% (i.e. $3.00 per share), any resulting compensation charge would be immaterial to fiscal years ended December 31, 2005 and December 31, 2006 (as budgeted).

The impact of an increase in fair value of the Nonvoting Class B Common Stock to $3.00 per share for the November 11 Options would consist of a compensation charge of (i) approximately $41,000 for fiscal year ended 2005, and (ii) approximately $300,000 for fiscal year ended 2006. Additionally, the impact of stock options subject to variable plan accounting would be $100,000 for fiscal year 2005. Such options subject to variable plan accounting have been marked to fair value of $9.00 per share at March 31, 2006, and the Company will continue to mark such options to market as required until such options are exercised, forfeited or cancelled.

The effect of such hypothetical increase in fair value to $3.00 per share for the November 11 Options on the financial statements for the annual periods ended December 31, 2005 and December 31, 2006 (as budgeted) taken as a whole is summarized below for purposes of evaluating materiality (in thousands):

Impact to total assets:	$ 0 / $24,134	=	0%
Impact to total liabilities:	$ 0 / $12,775	=	0%
Impact to total equity:	$ 0 / $10,854	=	0%
Impact on pre-tax losses:	$(141) / $(2,551)	=	5.5%

Additionally, there is no impact on operating cash flows.

Projected impact on 2006 pre-tax losses:	$(300) /$([****])[1]	=	[****]

Please note that the impact to total assets, liabilities and total equity is zero because there is no impact to the balance sheet from such compensation charge, i.e. there is an equivalent increase in paid-in-capital to offset the increase in accumulated deficit.

In making this determination, the Company relied on guidance provided by SEC Staff Accounting Bulletin No. 99 – Materiality, issued August 12, 1999 (“**SAB 99**”). As part of this guidance, the Staff noted that use of quantitative thresholds or “rule of thumb” (e.g., five percent) to evaluate whether a change in an item might be considered material is appropriate only as an initial step in assessing materiality. As the Staff points out in SAB 99, exclusive reliance on this or any percentage or numerical threshold has no basis in the accounting literature or the law. Rather, a matter is “material” if there is a substantial likelihood that a reasonable person would consider it important. In its Statement of Financial Accounting Concepts No. 2, the FASB stated that “the omission or misstatement of an item in a financial report is material if, in the light of surrounding circumstances, the magnitude of the items is such that it is probable that the judgment of a reasonable person relying upon the report would have been changed or influenced by the inclusion or correction of the item.”[2]

Under the governing principles of SAB 99, an assessment of materiality requires that one views the facts in the context of the “surrounding circumstances” (as the accounting literature puts it), or the “total mix” of information (in the words of the U.S. Supreme Court). In the

[1] The 2006 pre-tax loss of [****] thousand is based upon a pre-initial public offering budget, and does not take into account use of funds from this offering, and is therefore subject to revision by management of the Company.

[2] The SEC further noted that this formulation in the accounting literature is in substance identical to the formulation used by the courts in interpreting federal securities laws.

context of a misstatement of a financial statement item, SAB 99 notes that the “total mix” includes the size of the misstatement as well as the factual context in which the user of financial statements would view the financial statement item. In short, an analysis of materiality must consider both quantitative and qualitative factors. Accordingly, with respect to a potential misstatement of the valuation of the Company’s Nonvoting Class B Common Stock on November 11, 2005, the Company and its Board considered the following factors:

- a change in compensation expense related to the November 11 Options is a non-cash charge to operations that is amortized over the relevant vesting period of such options (i.e., generally four years) and, as a result, a misstatement of this item would not mask a change in operating results or other trends;
- a misstatement of this item does not change a net loss into net income, or vice versa, during the relevant audit period (as noted in the Company’s consolidated statement of operations, it sustained a pretax loss of approximately $2.5 million for the year ended December 31, 2005);
- a misstatement of this item does not affect the Company’s compliance with SEC regulatory requirements;
- a misstatement of this item does not affect the Company’s compliance with loan covenants or other contractual obligations or requirements; additionally, the Company has no outstanding borrowings under its current credit facility;
- a misstatement of this item does not involve concealment of an unlawful transaction, and further, the Company believes that it has appropriately applied GAAP and has used best practices provided by the AICPA in accounting for its equity arrangements;
- although there would potentially be a compensation charge, the adjustment would not have any impact on total assets, total liabilities, or stockholders’ equity; and
- the nature of such an adjustment is highly judgmental and is subject to significant assumptions and estimates.

Therefore, after consideration of both qualitative and quantitative factors surrounding a potential misstatement of compensation expense due to a change in valuation of 25% to 70%, the Company has concluded that such a misstatement would not be material to the Company’s financial statements for the annual period ended December 31, 2005 and December 31, 2006 (as budgeted).

* * *

Please direct your questions or comments to the undersigned at (703) 734-3106 (office), or (571) 275-3333 (mobile) or to Mark R. Fitzgerald at (703) 734-3105 or (703) 864-6313 (mobile). In addition, we would request that you provide a facsimile of any additional comments you may have to the attention of Mr. Fitzgerald and the undersigned at (703) 734-3199. Thank you for your assistance.

Very truly yours,
WILSON SONSINI GOODRICH & ROSATI
Professional Corporation

/s/ Trevor J. Chaplick
Trevor J. Chaplick

cc: Kent A. Murphy, Ph.D.
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