



DIVISION OF
CORPORATION FINANCE
MAIL STOP 4628

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549-4628

May 17, 2010

Via U.S. Mail and Facsimile

R. Brian Hanson
Executive Vice President and Chief Financial Officer
ION Geophysical Corporation
2105 CityWest Blvd., Suite 400
Houston, TX 77042-2839

Re: ION Geophysical Corporation
Form 10-K for Fiscal Year Ended December 31, 2009
Filed March 1, 2010
Definitive Proxy Statement on Schedule 14A
Filed April 21, 2010
File No. 001-12691

Registration Statement on Form S-3
Filed April 20, 2010
File No. 333-166200

Dear Mr. Hanson:

This is to advise you that we are limiting our review of your registration statement to ensure compliance with the outstanding comments on your Form 10-K. We will not conduct any further review of the registration statement aside from this outstanding matter. Please be advised that comments on your Form 10-K must be resolved before the desired effective date of the registration statement.

With respect to your Form 10-K, please provide a written response to our comments. 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 filings. 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 Fiscal Year Ended December 31, 2009

Regulatory Matters, page 16

1. We note your statement that you are subject to laws and regulations concerning protection of the environment. We also note that many, if not all, of your SPANS are for offshore locations. Given recent events in the Gulf of Mexico, please advise of any provisions in your contracts that might subject you to environment-related penalties or damages or that would indemnify you for such amounts. Also, tell us whether you carry any insurance against such events and, if so, the amounts of that coverage.

Management's Discussion and Analysis of Financial Condition and Results of Operations, page 39

Results of Operations, page 46

2. We note in your discussion of gross profit and gross profit percentage your explanation that the steady increase in your gross profit percentage from 29.0% in 2007 to 30.6% in 2008 to 31.5% in 2009 was primarily due to the mix of business from year to year. We also note the steady decline in your Land Imaging and Marine Imaging Systems. Please discuss in greater detail the profitability of each of your business segments. For instance, where known trends, demands, commitments, events or uncertainties within a segment had a material effect, please describe them. Refer to SEC Release No. 34-26831, Parts III.D and III.F.1, available on our website at <http://www.sec.gov/rules/interp/33-6835.htm>. In this regard, providing separate discussions of the results of each of your segments rather than addressing them all in one paragraph would make your disclosure clearer.

Liquidity and Capital Resources, page 50

3. Please enhance your discussion by describing in greater detail your working capital requirements.

Cash Flow from Operations, page 57

4. Please enhance your discussion of cash flow from operations to provide greater detail concerning the causes of the line item changes. For instance, we note your statement on page 57 that the decrease in net cash provided by your operating activities from \$111.7 million for 2008 to \$52.0 million for 2009 was primarily due to decreased accrued liabilities and accounts payable as well as deferred income tax. Please disclose whether these changes are tied to declining revenues in one or more of your business segments or geographic areas, or perhaps some other factor. In this regard, please explain your statement at the bottom of page 57 that you are continuing to adjust your manufacturing and purchasing plans in order to focus on making sales from remaining inventory, thereby further reducing your current levels of inventory. Refer to Instruction 4 to Item 303(a) of Regulation S-K.

Controls and Procedures, page 66

5. We note your statement on page 66 that “even effective disclosure controls and procedures can only provide reasonable assurance of achieving their control objectives.” In future filings, please state clearly, if true, that your disclosure controls and procedures are designed to provide reasonable assurance of achieving their objectives and that your principal executive officer and principal financial officer concluded that your disclosure controls and procedures are effective at that reasonable assurance level. In the alternative, you may omit the reference to the level of assurance of your disclosure controls and procedures. Refer to SEC Release No. 34-47986, available on our website at <http://www.sec.gov/rules/final/33-8238.htm>. Please confirm that the conclusions disclosed in this filing would not have changed had this revised disclosure been provided.

Definitive Proxy Statement on Schedule 14A

Executive Compensation, page 26

6. With respect to the comments on your executive compensation disclosure, please show us how you intend to comply with our comments in the future by providing us with draft disclosure based on information and data from 2009.

7. We note your disclosure on page 30 that in 2009 the board and the compensation committee considered permitting certain employees to exchange underwater stock options, but determined ultimately not to implement the proposed Replenishment Program, even after obtaining shareholder approval. Please disclose the rationale for the decision not to implement the program.
8. We note your disclosure on pages 34-35 that the compensation committee evaluated each executive's performance during 2009 in light of established financial and individual objectives, including "pre-designated personal critical success factors" in the case of your chief executive officer. Please revise your disclosure to describe the specific contributions of individual executives considered by the committee in its evaluation and determination of the bonus amount awarded to each named executive officer, based on the relevant facts and circumstances. We note your statement on page 36 that the committee "took into consideration not only the company's ability to weather the downturn effectively but to make changes and accomplish initiatives critical to positioning the company for future long-term growth." Refer to Item 402(b)(2)(vii) of Regulation S-K.
9. In your discussion of potential payments upon termination or a change of control, beginning on page 51, please include the definition of a "change of control," instead of merely referring to each individual executive's employment agreement and the applicable stock plans.
10. In your discussion of potential payments upon termination or a change of control, it appears that you are missing disclosure concerning James R. Hollis' employment agreement. Even though Mr. Hollis is no longer employed at ION, he was a named executive officer for 2009 and you were required to provide disclosure as to all aspects of his compensation. In your response letter to us, please disclose the information required under Item 402(j) of Regulation S-K, describing the effect of his termination of employment on January 29, 2010. If he was not entitled to any payment due to his resignation, advise us accordingly.

Closing Comments

As appropriate, please 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 any amendment to expedite our review. Please furnish a letter 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 these filings to be certain that the filings include all information required under the Securities Exchange Act of 1934 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, and in the event that you request acceleration of the effective date of the pending registration statement, 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 filings;
- staff comments or changes to disclosure in response to staff comments do not foreclose the Commission from taking any action with respect to the filings;
- the action of the Commission or the staff, acting pursuant to delegated authority, in declaring the registration statement effective, does not foreclose the Commission from taking any action with respect to the filings; and
- the company may not assert staff comments or the staff's 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 filings or in response to our comments on your filings.

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 registration statement. We will act on the request and, pursuant to delegated authority, grant acceleration of the effective date.

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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 Alexandra M. Ledbetter, Staff Attorney, at (202) 551-3317 or me at (202) 551-3740 with any questions.

Sincerely,

Roger Schwall
Assistant Director

cc: Marc H. Folladori, Esq.
Mayer Brown LLP
Facsimile No. (713) 238-4696