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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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PETROLEUM GEO-SERVICES INC.  
Petitioner

v.

WESTERNGECO LLC  
Patent Owner

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Case IPR2014-01477  
U.S. Patent No. 7,080,607

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**PATENT OWNER RESPONSE**

Pursuant to 37 C.F.R. § 42.120, Patent Owner, WesternGeco L.L.C (“WesternGeco” or “Patent Owner”), submits this Response to the Petition for *Inter Partes* Review (“Petition”) of U.S. Patent No. 7,080,607 (the “’607 patent”) filed by Petitioner, Petroleum Geo-Services, Inc. (“PGS” or “Petitioner”).

## TABLE OF CONTENTS

|      |  |    |
|------|--|----|
| I.   | THE '607 PATENT CLAIMS PREDICTIVE STEERING OF STREAMER ARRAYS.....                     | 1  |
| II.  | CLAIM CONSTRUCTION .....   | 5  |
| A.   | Predict Positions of at Least Some of the Streamer Positioning Devices .....           | 5  |
| B.   | Using the Predicted Positions to Calculate Desired Changes.....                        | 10 |
| C.   | Global Control System.....   | 12 |
| III. | PRIOR ART.....   | 17 |
| A.   | Gikas.....   | 17 |
| B.   | The '636 PCT Does Not Teach “Predict Positions” or “Calculating Desired Changes” ..... | 22 |
| i.   | The '636 PCT Does Not Teach a Global Control System.....                               | 23 |
| ii.  | The European Patent Office (“EPO”) Rejected PGS’s Theory Regarding Claims 19-23.....   | 25 |
| C.   | Spink.....   | 28 |
| D.   | The '394 PCT .....   | 29 |
| IV.  | THE '607 PATENT IS NOT OBVIOUS .....   | 30 |
| A.   | The '636 PCT and Gikas Do Not Render Claims 16 and 17 Obvious .....                    | 30 |
| B.   | Claims 18-20 Are Not Rendered Obvious By the '636 PCT, Gikas, and Spink.....           | 34 |
| i.   | Claim 18 Is Not Rendered Obvious By the '636 PCT, Gikas, and Spink .....               | 34 |
| ii.  | Claim 19 Is Not Rendered Obvious By the '636 PCT, Gikas, and Spink .....               | 36 |

|              |  |           |
|--------------|--|-----------|
| <b>C.</b>    | Claims 21-23 Are Not Rendered Obvious By the '636 PCT,<br>Gikas, Spink, and the '394 PCT ..... | 41        |
| i.           | Claim 21 Is Not Rendered Obvious By the '636 PCT,<br>Gikas, Spink, and the '394 PCT .....      | 41        |
| ii.          | Claim 22 Is Not Rendered Obvious Due to the '636 PCT,<br>Gikas, Spink, and the '394 PCT .....  | 41        |
| <b>V.</b>    | <b>PETITIONER'S EXPERTS ARE NOT CREDIBLE .....</b>   | <b>42</b> |
| <b>A.</b>    | Dr. Evans .....  | 42        |
| i.           | Dr. Evans Made Fundamental Errors In His Analysis .....  | 42        |
| <b>B.</b>    | Dr. Cole .....   | 45        |
| <b>VI.</b>   | <b>OBJECTIVE INDICIA OF NONOBVIOUSNESS .....</b>   | <b>45</b> |
| <b>VII.</b>  | <b>THE PETITION IS TIME-BARRED UNDER 35 U.S.C. § 315(b).....</b>                               | <b>51</b> |
| <b>A.</b>    | Privity is Flexibly Applied and Broader Than Real Party-In-<br>Interest .....                  | 51        |
| <b>B.</b>    | PGS's Relationship to the ION Litigation Establishes Privity .....                             | 53        |
| <b>C.</b>    | PGS's Substantive Legal Relationship With ION Establishes<br>Privity .....                     | 56        |
| <b>D.</b>    | ION is a RPI Under the Guidelines .....  | 58        |
| <b>E.</b>    | Additional Discovery was Prejudicially Denied .....  | 59        |
| <b>F.</b>    | Multi Klient Invest AS is an RPI .....   | 60        |
| <b>VIII.</b> | <b>CONCLUSION.....</b>   | <b>60</b> |

## I. THE '607 PATENT CLAIMS PREDICTIVE STEERING OF STREAMER ARRAYS

The '607 patent claims methods and apparatus for using predicted positions of streamer positioning devices to calculate steering commands to steer miles-long streamer arrays despite limited location data in order to better image geological structures, improve the streamers' effectiveness, repeat surveys over time to manage resource recovery, and more safely and rapidly deploy and turn the arrays.

Early streamer positioning involved rudimentary devices such as deflectors and tail buoys. (Ex. 1001, 3:34-39; Fig. 1 elements (16) and (20, respectively).)<sup>1</sup> Deflectors were associated with the front end of the equipment and used to horizontally spread the cables or other tethers at the point nearest the seismic survey vessel. (Ex. 1001, 1:34-41.) Tail buoys, as the name implies, were associated with ropes or cables secured to the end of the streamer furthest from the

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<sup>1</sup> Although Figure 1 is captioned "prior art," one of ordinary skill would recognize that much of that figure was not prior art, but instead inventive contributions to the state of the art, such as the global control system, its functionality (*e.g.*, predictive analysis, streamer positioning device control, etc.), and the distributed processing control architecture. (Ex. 2075, ¶ 60.) Indeed, the specification refers to Figure 1 in its "Detailed Description of the Invention," and Figure 1 is never referenced as prior art within the actual text of the specification.

seismic survey vessel, and created drag on that end of the streamer. (*Id.* at 1:39-41; 3:37-39.) The tension created on the seismic streamer by the deflector and tail buoy resulted in a roughly linear shape of the streamer, but only in ideal conditions. (*Id.* at 1:34-41.) No steering or lateral forces were provided for the miles of length along the streamer, leaving the middle of the streamer susceptible to the environmental factors discussed above.

Streamer positioning devices are generally spaced every 200 to 400 meters along the length of a streamer. (Ex. 1001, 1:48-49.) For a modest streamer array consisting of 4-6 individual streamers, this means hundreds of separate streamer positioning devices are deployed on a given array. Simultaneously controlling this multitude of independent positioning devices is no easy feat. While it is easy to set a target depth and little risk exists if that depth is overshot, lateral steering requires a more holistic consideration of the dynamic movement of neighboring streamers (including the propagation of forces imparted along the length of each streamer), and obstructions along miles of cable deployed in the ever-changing open-water environment of the deep seas.

The complexity of these streamer arrays led to several widely acknowledged, decades-old problems, including the risk of tangling, a potentially catastrophic and dangerous failure. (Ex. 1001, 4:5-7.) Movement of the streamers relative to each other during surveys can lead to gaps in coverage, requiring

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