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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 IPR2014-01478  
U.S. Patent No. 7,293,520

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**PATENT OWNER PRELIMINARY RESPONSE**

Pursuant to 37 C.F.R. § 42.107(a), Patent Owner, WesternGeco L.L.C. (“WesternGeco” or “Patent Owner”), submits this Preliminary Response to the Second Petition for *Inter Partes* Review (“Petition”) against claims 1-3, 5-20, and 22-34 of U.S. Patent No. 7,293,520 (the “’520 patent”) filed by Petitioner, Petroleum Geo-Services, Inc. (“PGS” or “Petitioner”). Petitioner has also challenged claims 1, 2, 6, 18, 19, and 23 of the ’520 patent in IPR2014-00689.

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**I. The '520 Patent Claims Precision Control of Steerable Seismic Arrays**

The '520 patent, titled “Control System for Positioning of Marine Seismic Streamers,” relates to the field of marine seismic surveying. Marine seismic surveys use reflections of sound waves to analyze underwater natural resource formations. Seismic streamers are cables up to many miles in length that are towed behind survey vessels. An acoustic source, such as an air gun, is used to generate an acoustic signal towards the ocean floor. Seismic sensors, such as hydrophones, are spaced along the length of each streamer and are used to detect the reflected acoustic signal. The resulting data can be used to map the subsurface geology for natural resource exploration and management.

Historically, a single streamer was towed behind the ship for a few hundred meters. This yielded a short cross-section or “2-D” image of the subsurface geology. As the industry evolved, arrays of multiple side-by-side streamers have been deployed, allowing the capture of more robust “3-D” maps—as Petitioner’s art shows, some of these approaches date back to 1967. 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, 4:7-10.) Movement of the streamers relative to each other during surveys can lead to gaps in coverage, requiring repeated passes, or “in-fill,” over the same section of water. And turning such long arrays in the water can take

significant time and effort, and likewise increases the risk of tangling. Despite a well-known need for the ability to accurately steer these arrays, the complex nature of the problem prevented a workable solution from being developed for many years. It was not until 2000 that WesternGeco (Patent Owner) launched the industry's first steerable streamer system.

Early streamer positioning involved rudimentary devices such as deflectors and tail buoys. (Ex. 1001, 3:43-45.) Deflectors were attached to the front end of the streamer and used to horizontally spread the end of the streamer nearest the seismic survey vessel. (Ex. 1001, 3:45-47.) The tail buoy created drag on the end of the streamer farthest from the seismic survey vessel. (Ex. 1001, 3:47-49.) The tension created on the seismic streamer due to the deflector and tail buoy resulted in a roughly linear shape of the streamer. (Ex. 1001, 3:49-52.) No steering was provided for the miles of length along the streamer.

Although the need for control systems for streamer steering was known for years, no one in the industry had succeeded in developing the capability of streamer steering along the length of the streamer prior to the '520 patent. This was due to the challenges in constructing a functioning system capable of controlling hundreds of positioning devices at once, as well as designing the devices themselves.

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