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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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PETROLEUM GEO-SERVICES INC.  
and  
ION GEOPHYSICAL CORPORATION  
AND ION INTERNATIONAL S.A.R.L.  
Petitioners

v.

WESTERNGECO, LLC  
Patent Owner

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Case IPR2014-00689<sup>1</sup>

U.S. Patent No. 7,293,520

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**PETITIONER'S UPDATED EXHIBIT LIST**

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<sup>1</sup> Case IPR2015-00565 has been joined with this proceeding.

**‘520 APPENDIX OF EXHIBITS (IPR2014-00689)**

<b>Exhibit No.</b>	<b>Description</b>
PGS 1001	U.S. Patent 7,293,520 B2 (Hillesund)
PGS 1002	Declaration of Dr. Brian J. Evans, Ph.D.
PGS 1003	Declaration of Dr. Jack H. Cole, Ph.D.
PGS 1004	U.S. Patent 5,790,472 (Workman)
PGS 1005	U.S. Patent 3,581,273 (Hedberg)
PGS 1006	WO 98/28636 (‘636 PCT)
PGS 1007	WO 84/03153 (‘153 PCT)
PGS 1008	U.S. Patent 4,890,568 (Dolengowski)
PGS 1009	U.S. Patent 3,605,674 (Weese)
PGS 1010	U.S. Patent 4,231,111 (Neeley)
PGS 1011	U.S. Patent 4,486,863 (French)
PGS 1012	David H. Johnston <i>et. al.</i> , “Time-Lapse Seismic analysis of the North Sea Fulmer Field,” SEG Extended Abstracts (1997).
PGS 1013	Jury Verdict in re: <i>WesternGeco L.L.C. v. Ion Geophysical Corporation</i> , Civil Action No. 4:09-CV-01827, DE 536, dated August 16, 2012.
PGS 1014	Memorandum and Order in re: <i>WesternGeco L.L.C. v. ION Geophysical Corporation</i> , Civil Action No. 4:09-CV-01827, DE 634, dated June 19, 2013
PGS 1015	Memorandum and Order in re: <i>WesternGeco L.L.C. v. ION Geophysical Corporation</i> in re: Civil Action No. 4:09-CV-01827, DE 120, dated July 16, 2010
PGS 1016	WesternGeco’s Opposition to ION’s Motion for a New Trial on Invalidity Under 35 U.S.C. §§ 102 and 103 in re: <i>WesternGeco L.L.C. v. ION Geophysical Corporation</i> Civil Action No.4:09-CV-01827, DE 574, dated October 26, 2012
PGS 1017	U.S. Patent 5,532,975 (Elholm)
PGS 1018	U.S. Patent 6,011,752 (Ambs)
PGS 1019	WesternGeco’s Opposition to Defendants’ Motion for Summary Judgment of Invalidity of the Bittleston Patents in re: <i>WesternGeco L.L.C. v. ION Geophysical Corporation</i> , Civil Action No. 4:09-CV-01827, DE 287, dated April 20, 2012
PGS 1020	WesternGeco’s Reply Claim Construction Brief in re: <i>WesternGeco L.L.C. v. ION Geophysical Corporation</i> Civil Action No. 4:09-CV-01827, DE 77, dated March 12, 2010

PGS 1021	Richard C. Dorf & Robert H. Bishop, <i>Modern Control Systems</i> (8th ed. 1998) at 2 and 11
PGS 1022	WesternGeco's Motion for Summary Judgment of Willful Infringement of Valid Claims of the '520 Patent in re: <i>WesternGeco L.L.C. v. ION Geophysical Corporation</i> Civil Action No. 4:09-CV-01827, DE 276, dated March 30, 2012
PGS 1023	Memorandum and Order in re: <i>WesternGeco L.L.C. v. ION Geophysical Corporation</i> , Civil Action No. 4:09-CV-01827, DE 345, dated June 11, 2012
PGS 1024	Jury Instructions in re: <i>WesternGeco L.L.C. v. Ion Geophysical Corporation</i> , Civil Action No. 4:09-CV-01827, DE 530, dated August 14, 2012.
PGS 1025	INTENTIONALLY LEFT BLANK
PGS 1026	U.S. Patent 4,671,235 (Hosaka)
PGS 1027	U.S. Patent 4,408,292 (Nakatani)
PGS 1028	Louis Whitcomb et al., <i>Towards Precision Robotic Maneuvering Survey, and Manipulation in Unstructured Undersea Environments</i> , Robotics Research – The Eighth International Symposium (1998) at 5-6
PGS 1029	Kenneth M. Sobel & Eliezer Y. Shapiro, <i>Eigenstructure Assignment for Design of Multimode Flight Control Systems</i> , 5 <i>Control Systems Mag.</i> (1985) at 9 and 14
PGS 1030	U.S. Patent 4,885,726 (Myers)
PGS 1031	U.S. Patent 3,412,704 (Buller)
PGS 1032	U.S. Patent 4,033,278 (Waters)
PGS 1033	U.S. Patent 4,404,664 (Zachariadis)
PGS 1034	Stuart Bennett, <i>A Brief History of Automatic Control</i> , 16 <i>Inst. Of Electrical and Electronics Control Systems Magazine</i> (June 1996) at 17
PGS 1035	Karl J. Åström & Björn Wittenmark, <i>Computer-Controlled Systems: Theory and Design</i> (3d ed. 1997) at 2-6
PGS 1036	U.S. Patent 5,200,930 (Rouquette)
PGS 1037	U.S. Patent 6,011,753 (Chien)
PGS 1038	Brian J. Evans, <i>A Handbook for Seismic Data Acquisition in Exploration</i> (David V. Fitterman & William H. Dragoset, Jr. eds., (1997)
PGS 1039	E. J. W. Jones, <i>Marine Geophysics</i> (1999) at 89
PGS 1040	W.R. Cotton & J.I. Sanders, <i>The Reality of Trace Binning in 3-D Marine Surveying</i> (1983) at 565

PGS 1041	Biondo L. Biondi, 3D Seismic Imaging (2006) at 123-124
PGS 1042	Christopher L. Liner, Elements of 3-D Seismology (1999) at 104-105, 206-209
PGS 1043	Gerald H.F. Gardner & Anat Canning, <i>Effect of irregular sampling on 3-D prestack migration</i> , SEG Abstracts (1994) at 1553-1556
PGS 1044	Christopher L. Liner & Ralph Gobeli, <i>Bin Size and Linear v(z)</i> , Society of Exploration Geophysics Technical Program Expanded Abstracts (1996) at 47
PGS 1045	<i>Towed Streamer Seismic – More Efficiency</i> , Petroleum Geo-Services, <a href="http://www.pgs.com/Geophysical-Services/Towed-Streamer-Seismic/More-Efficiency/">http://www.pgs.com/Geophysical-Services/Towed-Streamer-Seismic/More-Efficiency/</a> (last visited April 22, 2014)
PGS 1046	International Application No. PCT/IB99/01590 (September 28, 1999)
PGS 1047	WesternGeco filed continuation application No. 11/455,042 on June 16, 2006
PGS 1048	August 18, 2006 Office Action in re: '520 Patent
PGS 1049	October 18, 2006 Terminal Disclaimer file by Applicant in re: '520 Patent
PGS 1050	January 5, 2007 Information Disclosure Statement (IDS) in re: '520 Patent
PGS 1051	August 24, 2007 Notice of Allowability in re: '520 Patent
PGS 1052	U.S. Patent 6,932,017 (Hillesund)
PGS 1053	Defendants' Amended Response in Opposition to Westerngeco LLC's Motion for Summary Judgment of Willful Infringement of Valid Claims of the '520 Patent (DE 298)
PGS 1054	Levin, Geophysics. 49(8); pp. 1386-1387 (1984)
PGS 1055	U.S. Patent 4,992,990 (Langeland)
PGS 1056	INTENTIONALLY LEFT BLANK
PGS 1057	Vassilis N. Gikas, [Full Thesis] (Aug. 1996)
PGS 1058	Gikas et al., Hydrographic J., Vol. 77; pgs. 11-24 (1995)
PGS 1059	U.S. Patent 4,809,005 (Counselman)
PGS 1060	Thor Fossen, Guidance and Control of Ocean Vehicles 288 (1994)
PGS 1061	Gregory E. Upchurch., Intellectual Property Litigation Guide: § 155 Overview – Effective filing date, 2 IP Litigation Guide: Patents & Trade Secrets
PGS 1062	Shashank Upadhye., Generic Pharmaceutical Patent and FDA Law § 171 Section 119 Claiming foreign priority – Section 102(b)
PGS 1063	Simon Bittleston Trial Transcript in re: <i>WesternGeco L.L.C. v. Ion Geophysical Corporation</i> , Civil Action No. 4:09-CV-01827, ECF 433, dated July 25, 2012 at 578.

PGS 1064	Transcript of Joinder Board Call of March 25, 2015
PGS 1065	Email to Charles Carvill from Robin Walker
PGS 1066	Drawing by Robin Walker
PGS 1067	Drawing by Robin Walker
PGS 1068	N6 Answer Product Workshop OTC dated March 8, 2006
PGS 1069	Excerpt of Exhibit 2131, a spreadsheet titled H12305-0007-075305
PGS 1070	Curriculum vitae of Robin Walker
PGS 1071	Brice et al., <i>Perturbations in 4D marine seismic</i> (ASEG 15th Geophysical Conf. & Exhibition, 2001)
PGS 1072	Martin et al., <i>Acquisition of marine point receiver seismic data with a towed streamer</i> (SEG Expanded Abstracts, 2000)
PGS 1073	McBarnet, <i>Moving up the Q</i> , Offshore Engineer (June 2008)
PGS 1074	Deposition Transcript of Robin Walker in re: <i>WesternGeco L.L.C. v. Ion Geophysical Corporation</i> , Civil Action No. 4:09-cv-01827, dated September 13, 2011
PGS 1075	Declaration of David J. Healey in Support of ION Geophysical Corp. and ION International S.A.R.L.'s Motion for <i>Pro Hac Vice</i> Admission
PGS 1076	Curriculum vitae of Simon Bittleston
PGS 1077	Society of Exploration Geophysicists (SEG) Application for Active Membership
PGS 1078	WesternGeco's Opening Claim Construction Brief in re: <i>WesternGeco L.L.C. v. Ion Geophysical Corporation</i> , Civil Action No. 4:09-cv-01827, dated February 10, 2010
PGS 1079	Claim Construction Expert Report of Peter H. Canter in re: <i>WesternGeco L.L.C. v. Ion Geophysical Corporation</i> , Civil Action No. 4:09-cv-01827, dated December 15, 2009
PGS 1080	Application 09/787,723, Office Action, dated February 21, 2003
PGS 1081	Patent Application Number 9821277.2, dated October 1998
PGS 1082	European Patent Office Opposition Division Provisional Opinion in re: Patent No. 1850151, dated September 4, 2014
PGS 1083	Opening Expert Report of Michael S. Triantafyllou in re: <i>WesternGeco L.L.C. v. Ion Geophysical Corporation</i> , Civil Action No. 4:09-cv-01827, dated February 21, 2012
PGS 1084	Drawing by Michael S. Triantafyllou
PGS 1085	R. P. Loweth, <i>Manual of Offshore Surveying for Geoscientists and Engineers</i> , Chapters 3, 4, and 5 (1997)
PGS 1086	Diagram
PGS 1087	Paddy Smith, <i>It's all acquisition's fault</i> , Exploration & Production,

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