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Transcript of **MICHAEL S. TRIANTAFYLLOU, Sc.D**

Date: May 22, 2015

Case: PETROLEUM GEO-SERVICES INC., ET AL v. WESTERNGECO LLC

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DEPOSITION OF MICHAEL S. TRIANTAFYLLOU, Sc.D
CONDUCTED ON FRIDAY, MAY 22, 2015

1	1 UNITED STATES PATENT AND TRADEMARK OFFICE 2 BEFORE THE PATENT TRIAL AND APPEAL BOARD 3 -----x 4 PETROLEUM GEO-SERVICES INC. : Cases 5 and ION GEOPHYSICAL CORPORATION : IPR2014-00687 6 AND ION INTERNATIONAL S.A.R.L., : (U.S. Patent No. 7,162,967) 7 Petitioners,: IPR2014-00688 8 v. : (U.S. Patent No. 7,080,607) 9 WESTERNGECO, LLC, : IPR2014-00689 10 Patent Owner.: (U.S. Patent No. 7,293,520) 11 -----x 12 13 Deposition of MICHAEL S. TRIANTAFYLLOU, Sc.D 14 Alexandria, Virginia 15 Friday, May 22, 2015 16 8:35 a.m. 17 18 19 20 Job No.: 83209 21 Pages: 1 - 422 22 Reported by: Leslie A. Todd	3
2	1 APPEARANCES 2 ON BEHALF OF PETITIONER: 3 DAVID I. BERL, ESQUIRE 4 THOMAS S. FLETCHER, ESQUIRE 5 JESSAMYN BERNIKER, ESQUIRE 6 ALEC SWAFFORD, ESQUIRE 7 WILLIAMS & CONNOLLY LLP 8 725 Twelfth Street, N.W. 9 Washington, D.C. 20005 10 (202) 434-5000 11 12 ON BEHALF OF THE PATENT OWNER: 13 MICHAEL L. KIKLIS, ESQUIRE 14 CHRISTOPHER RICCIUTI, ESQUIRE 15 OBLON, SPIVAK, McCLELLAND, MAIER & 16 NEUSTADT, LLP 17 1940 Duke Street 18 Sixth Floor 19 Alexandria, Virginia 22314 20 (710) 413-3000 21 22	4
2	1 Deposition of MICHAEL S. TRIANTAFYLLOU, Sc.D, held 2 at the offices of: 3 4 5 OBLON, SPIVAK, McCLELLAND, MAIER & 6 NEUSTADT, LLP 7 1940 Duke Street 8 Sixth Floor 9 Alexandria, Virginia 22314 10 (710) 413-3000 11 12 13 14 15 Pursuant to Notice, before Leslie Anne Todd, 16 Court Reporter and Notary Public in and for the 17 Commonwealth of Virginia, who officiated in 18 administering the oath to the witness. 19 20 21 22	4
2	1 APPEARANCES CONTINUED 2 ON BEHALF OF THE PATENT OWNER: 3 RYAN KANE, ESQUIRE 4 KIRKLAND & ELLIS LLP 5 601 Lexington Avenue 6 New York, New York 10022 7 (212) 446-4800 8 9 ALSO PRESENT: 10 KEVIN M. HART, Petroleum Geo-Services, Inc. 11 TRISHA JHUNJHNUWALA 12 13 14 15 16 17 18 19 20 21 22	4

DEPOSITION OF MICHAEL S. TRIANTAFYLLOU, Sc.D
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4 "Opening Expert Report of

5 Michael S. Triantafyllou" 338

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8 OTHER EXHIBITS REFERRED TO AND ATTACHED:

9 Exhibit 1001 U.S. Patent No. US 7,162,967

10 U.S. Patent No. US 7,080,607

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12 Exhibit 1002 Declaration of Dr. Brian Evans,

13 PhD. 55

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1 PROCEEDINGS

2 -----

3 MICHAEL S. TRIANTAFYLLOU, Sc.D,

4 having been duly sworn, was examined

5 and testified as follows:

6 MR. BERL: Let's do, for the record,

7 appearances.

8 David Berl, Williams & Connolly. With me

9 is Tom Fletcher, also from Williams & Connolly. And

10 Trisha Jhunjhnuwala, a summer associate with us at

11 Williams & Connolly, and also Kevin Hart from

12 Petroleum Geo-Services, Inc.

13 MR. KIKLIS: Mike Kiklis from Oblon for

14 the patent owner. With me is Ryan Kane from Kirkland

15 and Chris Ricciuti from Oblon as well.

16 EXAMINATION BY COUNSEL FOR PETITIONER

17 BY MR. BERL:

18 Q Good morning, Doctor.

19 A **Good morning.**

20 Q You've done this before, Doctor, right,

21 given a deposition?

22 A **Yes.**

8

1 Q So you understand I'm going to ask you a

2 series of questions over the next two days, and you

3 will provide answers to those questions.

4 A **Exactly.**

5 Q If you don't understand my questions, you

6 can just tell me, and I will try to explain it or ask

7 it a different way. Okay?

8 A **Okay.**

9 Q And is there any reason you can't give

10 truthful testimony today?

11 A **There is no reason.**

12 Q Doctor, I would like to hand you the

13 declaration that you submitted in these three cases

14 that's been marked as Exhibit 2042, I believe in each

15 of the three cases.

16 Is this in fact the declaration that you

17 submitted in connection with the three IPRs?

18 A **It's a long declaration, but, yes, it**

19 **appears to be.**

20 Q And at the end of it after page 88, your

21 signature appears; is that right?

22 A **Correct.**

9

1 Q And you signed that on or about
2 March 20th, 2015?
3 A Yes.
4 Q In Singapore?
5 A In Singapore.
6 Q And you reviewed the declaration before
7 you signed it?
8 A Yes.
9 Q You believed it to be truthful before you
10 signed it?
11 A Yes, I did.
12 Q And if you reviewed it and believed it to
13 contain errors, you would have changed those errors
14 before you signed it, correct?
15 A Correct.
16 Q Are you aware of any errors in your
17 declaration as you sit here today?
18 A Not as I sit today.
19 Q I notice you brought with you a binder.
20 What's in that binder?
21 A In the binder there is a copy of what you
22 just handed me, and there are four principal

10

1 references that were used in the declaration.
2 Q Okay. Now, appended to your declaration
3 was Exhibit A to 2042. I suppose we can mark this
4 as -- let's keep this as part of 2042 since that's
5 how it was submitted in connection with your
6 declaration.
7 And for the record, I'm also handing you
8 what was marked as Exhibit B to your declaration,
9 2042, as well as Exhibit C to your declaration, 2042.
10 Do you have those documents, sir?
11 A Yes, I do.
12 Q Exhibit A is a copy of your curriculum
13 vitae; is that right?
14 A Yes, it is.
15 Q And that was current as of March 2015?
16 A Yes.
17 Q And your curriculum vitae provides some
18 of your research and experience, right?
19 A Correct.
20 Q And on the first page it has a paragraph,
21 the second paragraph about your journal articles and
22 research interests, right?

11

1 A Yes.
2 Q And it says that you pioneered the
3 development of science-driven biomimetic robots to
4 study the basic mechanisms of flow control that lead
5 to the outstanding agility of fish and cetaceans; is
6 that right?
7 A Yes.
8 Q That's one of your research interests?
9 A It is.
10 Q And it says further down that you're
11 currently studying the physics of flow sensing in
12 fish and marine mammals to achieve
13 supermaneuverability in ocean vehicles through flow
14 feedback control; is that right?
15 A Right.
16 Q That's another one of your research
17 interests?
18 A Yes.
19 Q There's nothing in the summary of your
20 research interests about marine seismic surveys,
21 right?
22 A This is implied because the whole area I

12

1 developed on fish hydrodynamics and the like sprang
2 out of my work on cables, towed cables and the like.
3 Q But with respect to marine seismic
4 surveys, there is nothing in the summary of your
5 research interests that talks about that, right?
6 A It is implied, as I told you, and if you
7 look back in my references you can find plenty of
8 such references. So this is -- we're looking at the
9 cutting edge of the moment which we will advertise in
10 this caption. This is for various reasons.
11 Q It's for various what?
12 A We do this for reasons of promoting the
13 students and the like. But this whole research area
14 came as a result of my cable mechanics, which is my
15 sort of bread and butter. That's how I got tenure at
16 MIT.
17 Q Okay. And my question, though, is a
18 simple one. In this summary of your research
19 interests, it does not say anything about marine
20 seismic surveys, right?
21 MR. KIKLIS: Objection. Form.
22 THE WITNESS: To a layperson, maybe no.

13

1 But to those who can read through the words, it says
2 plenty.
3 BY MR. BERL:
4 Q It may say plenty, but it doesn't say
5 "marine seismic surveys," right?
6 MR. KIKLIS: Objection. Form.
7 THE WITNESS: It comes together with all
8 the publications here.
9 BY MR. BERL:
10 Q Okay. So let's look at the publications.
11 You have a 21-page curriculum vitae, correct?
12 A Yes.
13 Q And the term "marine seismic survey" does
14 not appear in the 21-page curriculum vitae, correct?
15 A It is an application of all the things
16 that I have published on the dynamics of translating
17 cables. For example, number 8 on dynamics of --
18 THE REPORTER: Excuse me?
19 THE WITNESS: Number 7 and 8 of my
20 publications.
21 Let me point you out to another one which
22 will be more relevant. The review papers.

14

1 BY MR. BERL:
2 Q Those are on page 11?
3 A Page 11, number 2. "Dynamics of cables,
4 Towing Cables and Mooring Systems." The Shock and
5 Vibrations Digest is a journal where people review
6 the literature to find out what is the state of the
7 art, what is the most advanced, what is missing from
8 the area. Whereas, you can see I reviewed the
9 relevant area which is where all the work on towed
10 arrays is based on.
11 Q Let's take a look at reference number 7
12 that you identified. That's on page 3. That's the
13 Kim article from 1984. Correct?
14 A Yes.
15 Q That does not address marine seismic
16 surveys, does it?
17 A It has applicability to it, not in -- in
18 the application of commercial application. But all
19 this work was the basis for deriving the fundamentals
20 of how towed arrays and the like move.
21 Q You don't discuss in that paper marine
22 seismic surveys, do you?

15

1 A I discuss the basics on which the towed
2 arrays are based. If you don't know the basics, you
3 cannot do any progress in the area.
4 Q I understand that, but my question is
5 very simple. You don't discuss in that paper marine
6 seismic survey.
7 MR. KIKLIS: Objection. Form.
8 THE WITNESS: The fundamental --
9 MR. KIKLIS: Michael, let me get a chance
10 to object.
11 Objection. Form.
12 THE WITNESS: The fundamentals for the
13 paper are very pertinent, whereas you can find from
14 my declaration, that's where I base the whole
15 discussion on the towed arrays. If you don't know
16 those principles that I explained in those papers,
17 you cannot do towed arrays.
18 BY MR. BERL:
19 Q That may be true, but my question is
20 different.
21 You don't actually discuss marine seismic
22 surveying in that paper, do you?

16

1 MR. KIKLIS: Objection to form.
2 THE WITNESS: I have answered the
3 question more than once.
4 BY MR. BERL:
5 Q Well, you've answered about whether you
6 think it has applicability to marine seismic surveys.
7 I understand that answer.
8 My question is a different question, and
9 I'm entitled to an answer to my question, which is
10 that paper does not discuss marine seismic surveys,
11 correct?
12 MR. KIKLIS: Objection to form.
13 THE WITNESS: It discusses the principles
14 that apply to the towed arrays.
15 BY MR. BERL:
16 Q But not seismic surveys itself.
17 MR. KIKLIS: Objection to form.
18 THE WITNESS: It applies to seismic
19 arrays as well.
20 BY MR. BERL:
21 Q But it does not discuss seismic --
22 A But it applies to seismic arrays as well.

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