Neutral Citation Number: [2019] EWHC 1260 (Ch)

Case No: HC-2010-000018

IN THE HIGH COURT OF JUSTICE
BUSINESS AND PROPERTY COURTS
BUSINESS LIST (CHANCERY DIVISION)

Rolls Building
Fetter Lane, London, EC4A 1NL

Date: 21 May 2019

Before :

MR JUSTICE ARNOLD

- -

Between :

GLOBAL ENERGY HORIZONS CORPORATION	**Claimant**
- and -	
ROBERT GRESHAM GRAY	**Defendant**

- -
- -

Richard Millett QC and **Adam Woolnough** (instructed by **Kobre & Kim (UK) LLP**) for the **Claimant**
Timothy Dutton CBE, QC and **Philip Ahlquist** (instructed by **Enyo Law LLP**) for the **Defendant**

Hearing dates: 3, 7-9, 13 May 2019

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Approved Judgment

I direct that pursuant to CPR PD 39A para 6.1 no official shorthand note shall be taken of this Judgment and that copies of this version as handed down may be treated as authentic.

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MR JUSTICE ARNOLD

MR JUSTICE ARNOLD :

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Introduction

1. By paragraph 1 of an order dated 17 January 2013 Vos J (as he then was) declared, for the reasons given in his judgment dated 21 December 2012 [2012] EWHC 3703 (Ch), that the Defendant ("Mr Gray"):

> "acted in breach of his fiduciary duty to [the Claimant, 'GEHC'] and is liable to account for all monies and benefits received by him directly or indirectly arising out of Mr Gray's actions in:
>
> (1) putting himself in a position from 17 March 2006 onwards where his duties to GEHC conflicted or might possibly conflict with his personal interest in relation to the Acquisition Strategy and the ultrasound technology; and
>
> (2) taking advantage of a maturing business opportunity of GEHC, namely the opportunity to participate in the Acquisition Strategy and to obtain rights in the ultrasound technology, in breach of the no profit rule."

2. By paragraph 1 of an order dated 28 July 2015 Asplin J (as she then was) declared, for the reasons given in her judgment of the same date [2015] EWHC 2232 (Ch), that Mr Gray:

> "received the following assets directly or indirectly as a result of the breaches of fiduciary set out in the Order of Mr Justice dated 17 January 2013 and is liable to account to … GEHC … in respect thereof:
>
> …
>
> (d) 51% of 15% of the issued shares in PetroSound held for Mr Gray through Chiloquin;
>
> (e) 51% of 15% of the issued shares in PetroSound held for Mr Gray by Professor Vladimir Abramov or Mr Sergey Volchenkov and/or Mr Vyacheslav Ivanov;
>
> (f) a 51% interest in 51% of Petrosound's international ultrasound technology business (also referred to as OpCo).

> The meanings of the terms used in paragraphs 1(a) to (f) above shall be as found in, and construed in accordance with, the Judgment."

3. By paragraph 15 of her order Aspin J directed a further hearing, at that stage reserved to herself, to determine the value of the assets referred to in paragraphs 1(d), (e) and (f) ("the Assets").

4. By paragraph 16 of her order Asplin J ordered as follows:

> "GEHC has permission to adduce expert evidence from Dr Becker and Mr Gray has permission to adduce expert evidence from Mr MacGregor on the value to be attributed to the following interests:
>
> (a) the interests referred to in paragraph 1(d) and 1(e) above, on the basis of the findings made in the Judgment, and in particular (but without prejudice to the generality of the foregoing) the Judge's conclusions as to the viability of the Ultrasound Technology in paragraphs 231 to 232 of the Judgment and her conclusions in respect of the valuation evidence to date in paragraphs 249 to 256 of the Judgment;
>
> (b) the interest referred to in paragraph 1(f) above, on the basis of the findings made in the Judgment, and in particular (but without prejudice to the generality of the foregoing) the Judge's conclusions as to the viability of the Ultrasound Technology in paragraphs 231 to 232 of the Judgment and her conclusions in respect of the valuation evidence to date in paragraphs 249 to 256 of the Judgment."

5. The basis for those paragraphs of the order can be seen very clearly from Asplin J's judgment. As she explained in the paragraphs of the judgment which are referred to in the order, which are set out below, she was concerned that neither of the experts instructed by the parties had approached the valuation of the Assets upon the correct basis, and accordingly she did not feel able to arrive at a reliable valuation for the Assets. As she concluded at [256]:

> "In the circumstances, despite the considerable costs which must already have been expended on experts, in my judgment, it is necessary that further expert evidence be filed based on my findings of fact as to viability and that further submissions are made in this regard."

6. It can be seen from Asplin J's judgment and paragraphs 15 and 16 of her order that the further hearing ("the Valuation Hearing") was to be (i) solely concerned with the valuation of the Assets on the basis of (ii) the findings of fact contained in the judgment and (iii) further expert valuation evidence. Consistently with that interpretation, Asplin

J gave no permission for any further factual evidence to be adduced at the Valuation Hearing.

7. On 22 February 2016 Asplin J gave the parties liberty to approach third parties to obtain for the purpose of the Valuation Hearing "trading, financial and other relevant information in respect of Petrosound Ltd, Sonoplus Limited, Viatech LLC, CUT Servis LLC. OOO Ultrasonic, OOO Tekhnoplus, Sonovita LLC, Sonotech LLC and any of their subsidiaries and/or affiliates and/or licensees and/or joint venture partners". She also directed that there be a case management conference to consider whether, and if so how and on what terms, any such information was to be put before the Court.

8. On 20 October 2016 Asplin J gave further directions for the Valuation Hearing which included permission to adduce expert evidence from Dr Becker and Mr MacGregor "on the basis of the findings made in the Judgment … and taking into account any documents disclosed pursuant to the order … dated 22 February 2016 which the parties choose to provide to the experts".

9. On 10 April 2017 Asplin J made an order for the issue of letters of request for the production of documents from four companies within the Resero Group and Vibrant AG, and for those documents to be read and given in evidence at the Valuation Hearing subject to any further order of the Court regarding their proof. Subsequently documents were obtained by GEHC from those companies and disclosed to Mr Gray.

10. Asplin J did not vary any of the relevant provisions of her order dated 28 July 2015, and in particular paragraph 16, in any of her subsequent orders.

11. Unhappily, the preparations for and listing of the Valuation Hearing took much longer than Asplin J had envisaged on 28 July 2015, and in the meantime she was promoted to the Court of Appeal. As a result, I was appointed by the Chancellor as the docketed judge for this case in her place.

12. On 23 March 2018 I gave further directions for the Valuation Hearing, including a direction that the parties should identify and notify to each other any further documents to be relied upon at the Valuation Hearing by a certain date and for the service of further expert evidence after that date.

13. On 23 March 2018 and 20 June 2018 I made orders for further disclosure to be given by Mr Gray. Subsequently Mr Gray did disclose some further documents. On 19 July 2018 I made an order for further third party disclosure by Venture Investments & Yield Management LLP ("VIYM LLP"), which had already provided third party disclosure prior to the trial before Asplin J ("the Enquiry Trial"). Subsequently VIYM LLP did disclose further documents.

14. The Valuation Hearing eventually took place in May 2019. This is my judgment as to the value of the Assets. Unless otherwise stated, all figures in dollars are US dollars.

Factual background as found by Vos and Asplin JJ

15. The background facts are set out in the judgments of Vos and Asplin JJ referred to above. For the reasons explained above, it is not open either to the parties or to me to depart from the findings of fact contained in those judgments. Reference should be

made to those judgments for the full findings. The history is a complex one, and far from easy to summarise shortly and accurately, but I shall do my best.

16. The relevant events began in around 2002, when Brian de Clare was first introduced by a Chilean inventor, Alfredo Zolezzi, to ultrasound technology. Mr Zolezzi and his scientific partners, including Oleg and Vladimir Abramov and their colleagues ("the Russian Scientists"), were developing ultrasound technology so as to increase the production of oil and gas, in particular from mature and underperforming wells. Both Mr Zolezzi and Juan Hurtado, a Chilean investor, held shares in Klamath Falls Inc, a company incorporated in the British Virgin Islands, through which Mr Zolezzi held his interests in the technology.

17. In essence, the ultrasound technology with which this case is concerned ("the Ultrasound Technology" or "UST" also referred to as "Acoustic Well Stimulation" or "AWS") applies ultrasound stimulation to the wellbore area in order to diminish wellbore damage and restore or enhance production from the well. Tools delivering ultrasonic stimulation are inserted into the wellbore and apply a wide range of frequencies and power in continuous or pulse modes.

18. In December 2003, at Mr Zolezzi's suggestion, Mr de Clare met Mr Hurtado in London to discuss the commercialisation of the Ultrasound Technology. Mr de Clare and Mr Gray discussed the Ultrasound Technology and setting up a business to exploit it at a chance meeting in London in January 2004. On 15 April 2004 Mr de Clare incorporated GEHC.

19. Later in 2004 Mr de Clare introduced Mr Gray to Mr Zolezzi and the Russian Scientists, and GEHC introduced Mr Gray to two maturing business opportunities relating to the Ultrasound Technology which GEHC was seeking to develop and take advantage of, namely (i) the opportunity to obtain rights in the Ultrasound Technology and (ii) the opportunity to participate and obtain a carried interest in what was referred to as "the Acquisition Strategy". That was a strategy whereby one or more special purpose vehicles (SPVs) would purchase and/or invest in late life and underperforming oil and gas assets and use the Ultrasound Technology on them so as to increase their remaining production and/or reserves, the ultimate goal being to obtain beneficial interests in the assets or SPVs used to acquire the assets and/or revenue sharing agreements with the owner or service company.

20. Vos J found that Mr Gray agreed and allowed himself to be treated as a member of GEHC's Acquisition Strategy deal team in return for a share of the potential revenues. Mr Gray's percentage share of such revenues was the same as that of Mr de Clare, being 22%. Furthermore, Vos J found that Mr Gray owed GEHC a duty of loyalty in relation to the Acquisition Strategy and the Ultrasound Technology from December 2004 and that the opportunities in relation to it came to Mr Gray as part of his involvement with GEHC.

21. In January 2005 Mr Gray introduced both the Ultrasound Technology and the Acquisition Strategy on GEHC's behalf to El Paso Exploration and Production Company ("El Paso"), a mid-sized US oil and gas exploration company. El Paso together with the US Department of Energy undertook testing of the Ultrasound Technology on its oil wells in Utah during 2005, leading to results described by Mr Gray in November 2005 as "extraordinary". The conclusion of the US Department of

Energy was that, if the Ultrasound Technology were widely adopted, "there may be a large increase in production".

22. In December 2005 Mr Gray became a 31.33% shareholder of GEHC. At around the same time, Mr Gray was approached by Pieter Heerema, a Dutch billionaire and owner of the Heerema Group of companies, and asked by him to set up and manage a $500m fund to hold energy-related private equity investments, in particular in late-life oil and gas fields. Mr Gray subsequently agreed to help Mr Heerema to set up and manage the fund on the basis that Mr Gray would receive a 20% carried interest in the profits of the fund after a 6% hurdle and a full catch up, plus a 2% management fee for managing the investments. At the same time, Mr Gray introduced (on behalf of GEHC) the Ultrasound Technology and the Acquisition Strategy to Mr Heerema, who expressed an interest in investing from at least January 2006.

23. Vos J found that from this point Mr Gray was in breach of his duty of good faith to GEHC and that Mr Gray had an actual conflict of interest as a result of owing conflicting duties to GEHC and Mr Heerema. Furthermore, Vos J found that, from 17 March 2006, Mr Gray had an actual conflict between his personal interest and his duty to GEHC because at that point it was proposed that, if Mr Heerema were to invest in the Acquisition Strategy, Mr Gray would have 20% of the ordinary shares as well as the 2% management fee. Vos J also found that when Mr Gray finally made clear to GEHC on 6 December 2006 that he would be acting solely in the best interests of himself and Mr Hereema, he was doing so knowing that he had a duty of loyalty and with the intention of taking advantage of an opportunity, namely the possibility of contracting with Klamath Falls for a licence to the Ultrasound Technology and a share of the profits that would thereby be derived, that had come to him as GEHC's fiduciary agent.

24. On 1 February 2007 Mr Gray took a 20% share as limited partner in RegEnersys LP, the vehicle set up to run the investment fund. The other limited partner, with an 80% share, was a Heerema entity, RegEnersys Inc, now known as Celloteck Holdings Inc ("Celloteck"). RegEnersys LP owned 100% of an SPV called RegEnersys Investment I Ltd ("RegEnersys I"), the vehicle formed in due course to exploit Klamath Fall's patents on the Ultrasound Technology. Also on 1 February 2007, RegEnersys (Bermuda) Ltd entered into an Advisory Agreement with ReVysion LLP, which was owned by Mr Gray, under which ReVysion would provide investment advice to the fund in return for which RegEnersys (Bermuda) Ltd would pay its general partner's share to ReVysion.

25. On 6 June 2007 Celloteck acquired a 10% stake in Klamath Falls. It also entered into a non-exclusive Licence Agreement with Klamath Falls in respect of the Ultrasound Technology. In addition, Celloteck entered into a Cooperation Agreement with Klamath Falls and others under which the parties would cooperate towards the testing and commercialisation of the Ultrasound Technology. Celloteck's interest in the Licence and Cooperation Agreements was assigned to RegEnersys I on 3 August 2007.

26. In mid-May 2008, RegEnersys I entered into an agreement with El Paso to test the Ultrasound Technology on twelve of its oil wells located in Utah. The testing continued until around April 2009. The testing was relatively expensive to carry out, but the results generated enthusiasm about the technology.

27. During the testing of the technology in Utah, relations between RegEnersys I, Mr Zolezzi and Mr Hurtado soured. In June 2009 Celloteck and RegEnersys I began arbitration proceedings in Chile against Klamath Falls, Mr Zolezzi and others for breach of the Licence Agreement and the Cooperation Agreement.

28. Meanwhile, from early 2009, RegEnersys had started funding the Russian Scientists, whose work had been recognised as being important to the successful development and commercial use of the Ultrasound Technology. Between June and December 2009, a total of $636,268 was transferred to a company controlled by the Russian Scientists, and on around 15 December 2009 a further $266,386 was paid to "keep operations afloat", in exchange for which it was envisaged that RegEnersys would take up additional new equity in a Russian vehicle.

29. On 30 March 2010 Mr Gray and his associate Graham Knight met the Russian Scientists in Moscow. A proposal was put forward under which Mr Gray would invest $1.5 million personally to purchase equity of 51%.

30. On 14 April 2010 GEHC's then solicitors wrote a letter before action to Mr Gray enclosing draft Particulars of Claim.

31. On around 1 July 2010 $250,000 was paid to companies owned or controlled by the Russian Scientists. On around 5 July 2010 there was a meeting between Mr Knight and the Russian Scientists in Moscow. At that stage the corporate vehicles being discussed were two Russian companies, Sonovita LLC and CUT Servis LLC.

32. There was a further meeting between Mr Gray, Mr Knight and the Russian Scientists in Stuttgart in October 2010. Subsequently $250,000 was paid to one of the Russian Scientists' companies on 29 October 2010. The payments to the Russian Scientists in 2010 were made by Celloteck, but deducted from management fees due to Mr Gray.

33. Asplin J found that, by 25 October 2010, a secret agreement had been concluded between Mr Gray and the Russian Scientists that RegEnersys was to have a 30% interest in the Russian business exploiting the Ultrasound Technology and a 51% interest in an intended international business exploiting the Ultrasound Technology.

34. On 8 December 2010 GEHC commenced these proceedings.

35. By a Share Purchase Agreement dated 31 December 2010 ("the 2010 SPA") RegEnersys was restructured, so as to wind up RegEnersys LP and sell its assets including the shares in RegEnersys I to RegEnersys (UK) LP ("RegEnersys UK"). The purchase price was $65,495,402. By clause 3.3 of the 2010 SPA, RegEnersys UK directed RegEnersys LP to apply the purchase price in "discharging the debt owed by [RegEnersys LP] to [Celloteck]". On the same date, a Loan Agreement was entered into between RegEnersys UK and Celloteck by which Celloteck advanced the purchase price of $65,495,402 in the form of an unsecured loan at a nil rate of interest.

36. As a result of a Limited Partnership Agreement also dated 31 December 2010, Eager Resources LLP, controlled by Mr Gray, held 51% of RegEnersys UK, the remaining 49% being held by Celloteck. This entitled Mr Gray to 90% of the profits of its investments (including the Ultrasound Technology) once the $65 million loan had been repaid. The Limited Partnership Agreement also provided that 50% of any proceeds of

sale from any of RegEnersys UK's investments is to be applied by it towards the discharge of the loan, with the remaining 50% being distributed by RegEnersys UK to its partners (split 90% to Mr Gray, and 10% to Celloteck until the loan had been repaid).

37. On 2 February 2012 RegEnersys I entered into a settlement agreement with Klamath Falls in respect of the Chilean arbitration, under which it was agreed that Klamath Falls would pay not less than $5.1 million to RegEnersys I and Celloteck. $2.1 million of that sum was used to purchase the remaining shares in Klamath Falls held by Mr Hurtado. Ownership of the controlling stake in Klamath Falls was transferred to Chiloquin Manana Investments I Ltd ("Chiloquin"), a company incorporated in Curacao as a subsidiary of Celloteck. Mr Gray signed the agreement on behalf of Celloteck and his associate Adam Kantor signed the share purchase agreements on behalf of Chiloquin. On the same day, Mr Gray was appointed as a director and authorised signatory of Klamath Falls. Thereafter, on 13 September 2012, RegEnersys Inc, RegEnersys I and Klamath Falls entered into a settlement agreement with Mr Zolezzi and his company, Technical Research, transferring his remaining interests in Klamath Falls to RegEnersys I.

38. From January to April 2012, Venture Investments & Yield Management LLC ("VIYM"), a Russian private equity company, was considering investing in the Ultrasound Technology. In April 2012 an Information Memorandum was prepared in respect of the investment. On 19 April 2012 VIYM's investment was approved at a VIYM investment committee meeting. The minutes referred to the creation of a parent company in which Mr Gray and two of the Russian Scientists would own 74.9% and VIYM would own 25.1% in return for an investment of $3 million.

39. From April 2012, Mr Gray and his associates circulated a number of emails regarding a planned corporate restructuring for a joint venture between Celloteck and the Russian Scientists. This involved the incorporation of a "HoldCo/ParentCo" for the Russian business, in which Celloteck would take 30%, and an "OpCo" for the international business, in which Celloteck would take 51%.

40. Asplin J found that on or about 21 April 2012 there was discussion between Mr Gray and Nico Pronk, Chief Financial Officer of the Heerema Group, of a proposal to put Chiloquin (and therefore Klamath Falls) together with RegEnersys I into Celloteck and that Celloteck would take a 30% stake in the "HoldCo" and a 51% stake in the "rest of the World Company". This led to a secret agreement the effect of which was that Mr Gray retained a 51% beneficial interest in these stakes despite apparently selling his interest on 17 August 2012 as referred to below.

41. On 29 May 2012 the Russian Scientists incorporated Petrosound Ltd in the Seychelles. Asplin J found that Petrosound was the "HoldCo" in the structure referred to above.

42. On 6 July 2012 Sonoplus Ltd was incorporated in Cyprus as a 100% owned subsidiary of Petrosound. On 3 September 2012 Sonoplus issued 335 shares (25.1%) to VERLYS Nominees Ltd ("VERLYS"), a Cypriot nominee for VIYM. This left Petrosound with a 74.9% share in Sonoplus. On 21 September 2012 Viatekh LLC became a 100% subsidiary of OOO Tekhnoplus which itself was owned by Sonoplus (99.9%) and OOO Ultrasonic (0.1%). OOO Ultrasonic was owned 99.9% by Sonoplus and 0.1% by Tekhnoplus, thus making Viatekh a wholly owned subsidiary of Sonoplus. Also on 21 September 2012, CUT Servis became a wholly owned subsidiary of OOO Ultrasonic.

On 1 October 2012, the shares in Sonovita were transferred to Sonoplus, making Sonovita a wholly-owned subsidiary of Sonoplus.

43. Meanwhile, on 17 August 2012, RegEnersys UK (in which Mr Gray held a 51% stake) sold its wholly-owned subsidiary Chiloquin (which owned Klamath Falls) to Celloteck (a 100% Hereema Group company). The Sale and Purchase Agreement was accompanied by a loan reduction agreement.

44. On 20 December 2012 Celloteck was registered as owner of Chiloquin pursuant to the 17 August 2012 agreement. On the same date, Celloteck was sold for $1 to Anmich Holding Inc, a Mauritian company purportedly owned by Gregory Elias, the owner of a company which provides corporate services to clients including the Heerema Group. Asplin J found that this transaction did not alter the true beneficial ownership of Celloteck.

45. On 21 December 2012 Vos J handed down his judgment finding in favour of GEHC.

46. On 16 October 2013 Petrosound International Ltd ("PIL") was incorporated in England and Wales with Mr Knight as the sole registered shareholder. Asplin J found that PIL was the intended vehicle for the international business exploiting the Ultrasound Technology i.e. "OpCo".

47. On 13 November 2013 Celloteck and Petrosound entered into an agreement which provided, amongst other things, that: Celloteck would receive 15% of the issued shares in Petrosound in exchange for the transfer of all of the patents held by it and its subsidiaries in the Ultrasound Technology; Petrosound's 74.9% subsidiary Sonoplus would acquire shares in PIL "created for the purpose of expanding the international operations of its ultrasound technology outside the Russian Federation and certain former Soviet Republics", with the remaining shares to be apportioned by PIL by way of equity financing; and Celloteck would provide Petrosound and Sonoplus with its ultrasound generators, for which a payment of $250,000 would be made upon the completion of subscription of the shares in PIL.

48. On 22 November 2013 the Russian Scientists transferred a 15% shareholding in Petrosound to Chiloquin in accordance with the 13 November 2013 agreement. They also gave 15% to two VIYM employees, Mr Volchenkov and Mr Ivanov, possibly as nominees for Prof Abramov. Asplin J found that, as a result of the agreements referred to above, Mr Gray retained a 51% interest in each of these shareholdings.

49. Mr Knight accepted in cross examination before Asplin J that it was envisaged that the Russian business (through Sonoplus) would have 49% of PIL, leaving 51% for "new investors". In fact, in January 2014 a new investor was rejected on the basis that PIL had decided to "self fund". Thereafter, Mr Knight had worked on a detailed business plan for PIL in November and December 2013, and signed a Technology Licence and Service Agreement between PIL and Sonoplus in April 2014.

50. Mr Knight also gave evidence that PIL had been dormant since January or February 2014 and that he had closed it down in the three or four weeks before the hearing.

The conclusions reached by Asplin J at [231]-[232] and [249]-[256]

51. As noted above, in paragraph 16 of her 28 July 2015 order Asplin J directed that the Assets were to be valued on the basis of the findings made in her judgment, and in particular her conclusions as to the viability of the Ultrasound Technology at [231]-[232] and as to the existing valuation evidence at [249]-[256].

52. Asplin J's conclusions as to the viability of the Ultrasound Technology were as follows:

> "230. Having considered all of this evidence in the round and in the light of the contracts entered into as recently as 2014, I have come to the conclusion that the technology is not fully ready to roll out commercially without more. ….
>
> 231. …. It seems to me, taking all matters into consideration, including the papers written by the Russian Scientists, which I accept may be overly optimistic, that the technology already has some application, on a semi experimental basis demonstrated for example, by the joint venture in Tatarstan, albeit that it has not been fully tried and tested, but that full and widespread commercialization would require further focused testing. To put the matter another way, I do not consider that the technology can be treated as if it were possible immediately to market it fully throughout the world with certainty as to its efficacy and its likely effects in particular rock formations. …"

53. Her conclusions as to the existing valuation evidence were as follows:

> "249. Although the difference in the burden of proof must not be forgotten, it seems to me that the approach in the *Chilukuru* case is instructive when determining the value to be placed upon the assets and opportunities which accrued to Mr Gray as a result of his breaches of fiduciary duty. It is important to keep a proper grip on reality. I fully accept that the circumstances of this case are not as extreme as those pertaining to the shareholding in the *Chilukuru* case. Nevertheless, it is important to bear in mind that Dr Lake accepted that the technology remains experimental and that a detailed testing programme would assist with commercialization. As I have already mentioned, I weigh against that the fact that the reports of testing available to the court are for the most part positive, that a joint venture is underway in Tatarstan in which oil sharing appears to be operative and that there was nothing to suggest that the treatments carried out in 2014 were not effective.
>
> 250. It is also important not to lose sight of the asset which is to be valued, namely first, the minority interest in Petrosound which does not itself own the technology and which is dependant upon the Russian Scientists and economic and political environment in Russia. Dr Becker accepted that he had not factored in these

realities and had assumed that funding would be readily available.

251. Next, it is important to bear in mind that Dr Becker has based his report as he put it, upon a car ready to run down the road. However, it seems to me that Dr Lake's evidence in cross examination made clear that although the car may not still be a prototype, it is not a fully finished tried and tested product ready to start, run and market in the real world without some amount of further input. Another important feature of his evidence was that further testing would assist in both commercialisation and fund raising. I have described the present state of the technology on the basis of the expert viability evidence and the contracts of which the court is aware, inexpertly as 'semi-experimental'. In such circumstances, it seems to me that Dr Becker's conclusions are based upon a false premise both as to the present status of the technology and the realities in which it has to operate.

252. I am also concerned about the reliance upon a valuation based upon 25% share of incremental production when the only real evidence of oil sharing is in relation to the joint venture in Tatarstan. It seems to me that there is insufficient basis to assume that all contracts would be on such a basis or that 25% would be the level agreed. Dr Becker does not appear to have taken into consideration that there may be a more variable approach.

253. Lastly, I also have considerable reservations about the adoption of a dcf model based upon a random choice of hypothetical wells which is itself based upon the data from 33 of 161 wells which Dr Lake accepted were representative of nothing but themselves. I agree with Mr Cavender and Mr MacGregor that such a model is an insufficiently sound basis for a valuation in the circumstances of this case where, as far as the evidence before the court goes, there are no positive cash flows at present, the discount rate is already very high without taking into account realities in Russia, the technology is not fully ready for commercialisation without more, there is a need to raise funding and the model produces a relatively wide range of results which are different each time it is run.

254. Having said this, I am also not satisfied that Mr MacGregor is correct that despite all the uncertainties and the present state of the testing of the technology, that it has no value at all. He seems also to have failed to take into account the realities of the situation which include the recent contracts and the joint venture and the technical papers which have been published. It seems to me therefore, that both experts have proceeded on a false premise.

> 255. The same points apply in relation to the potential interest in an Opco. I do not consider that Mr Knight's evidence that he had closed down Petrosound International recently is relevant in this regard. It is not like the winding up petition in the *Chilukuru* case which was a real and serious impediment to the operations of the joint venture which would create value in the shareholding in question. In this case, the international roll out of the technology has not begun and Petrosound International was no more than a corporate shell intended for the purpose. Another can just as easily be formed.
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> 256. Given my findings in relation to viability and the form of and premise upon which the large quantity of expert valuation evidence is based, I am unable to arrive at a reliable valuation for the shareholdings on the basis of the materials which have been produced. …"

54. Asplin J referred a number of times in this passage, and elsewhere in her judgment, to *Chilukuri v RP Explorer Master Fund* [2013] EWCA 1307, in which Briggs LJ (as he then was) stated at [52]:

> "It is axiomatic that in any complicated process of valuation, the valuer must take the relevant aspects of the world as he finds them (unless constrained by his instructions), and that he must, after looking at each element of the process, stand back and ask himself whether his provisional valuation makes commercial or business sense, viewed in the round."

The Valuation Date

55. It is common ground that the Assets are to be valued as at 28 July 2015 ("the Valuation Date").

The approach to valuation

56. It is common ground that the Assets are to be valued at the prices which would have been agreed between a willing buyer and a willing seller in the light of the information reasonably available to them as at the Valuation Date.

The evidence for the Valuation Hearing

57. For the reasons explained above, the primary evidence at the Valuation Hearing consisted of expert evidence from Dr Stephen Becker instructed on behalf of GEHC and from Gervase MacGregor instructed on behalf of Mr Gray. No evidence from any witness of fact was adduced by either party, no permission for such evidence having been granted.

58. As a result of the orders made subsequent to 28 July 2015, a considerable quantity of documentary evidence has become available, and in particular documentary evidence as to the operational performance and financial position of the relevant entities, which was not available at the time of the Enquiry Trial. In addition, there is some

documentary evidence which was available at that time, but which was not referred to during the Enquiry Trial. There is no dispute as to the authenticity of any of these documents. Nor is there any dispute that the documents are to be treated as evidence of the facts stated in them. Accordingly, the documents have been considered by the experts in their reports.

59. Since the Enquiry Trial, the experts have prepared a number of reports for the purposes of the Valuation Hearing. The most relevant reports are Dr Becker's reports dated 16 November 2018 and 2 January 2019 and Mr MacGregor's report dated 17 December 2018, since those reports take into account documents which were not available at the time of the experts' earlier reports. Save where otherwise stated, references in this judgment to the experts' reports are to those reports. In addition, the experts prepared a joint statement dated 1 February 2019 setting out areas of agreement and disagreement.

The documentary evidence

60. In order to assess the evidence of the experts, it is first necessary to consider the picture shown by the documentary evidence which is now available. I re-iterate that it is not open to me to depart from the findings of fact made by Asplin J, and I do not intend to do so. The documentary evidence which is now available does, however, reveal considerable additional information which is relevant to the valuation exercise which I am required to undertake.

61. To a considerable extent, the documentary evidence speaks for itself, but I have had the assistance of the experts in understanding what the documents show about the operational performance and financial position of the relevant entities.

62. In one respect, the picture revealed by the documentary evidence is inconsistent with the findings of Asplin J concerning Petrosound's international business. I shall explain the inconsistency, and consider its implications, below.

63. Before turning to consider the picture revealed by the documentary evidence, it is necessary to address two issues of principle.

Documents after the Valuation Date

64. It is common ground that documents which post-date the Valuation Date should be taken into account in so far as they contain information which is likely to have been available as at the Valuation Date.

65. It is also common ground that documents which provide reliable information about events subsequent to the Valuation Date may be taken into account in order to cross-check the reasonableness of assumptions made and inferences drawn by the experts from the information available as at the Valuation Date.

66. Mr Gray contends that the Court can, if necessary, go further, and take into account all information which is presently available as to the value of the Assets. GEHC disputes this. GEHC accepts that information which post-dates the breach of an obligation may be used for the purpose of assessing compensation for loss occasioned by that breach: see in particular *Bwllfa and Mthyr Dare Stream Colliers (1891) Ltd v Pontypridd Waterworks Co* [1903] AC 426. GEHC contends that the position is different when the

court is assessing the value of an asset as at a particular date, relying in particular on *Re Thoars* [2002] EWHC 2416 (Ch), [2003] 1 BCLC 499 at [17]-[21] (Morritt VC) and *Lindsley* v *Woodfull* [2004] EWCA Civ 165, [2004] BCLC 131 at [42] (Arden LJ). In my judgment GEHC is correct on this point. A simple and familiar illustration is the valuation of real property as at a particular date. This is not affected by movements in the market after that date.

The incompleteness of the documentary evidence

67. It is common ground that, even now, the documentary evidence as to the operational performance and financial position of the relevant entities as at the Valuation Date is incomplete. Furthermore, although a certain amount of material is available concerning events which occurred after the Valuation Date, the material is even more incomplete, particularly so when one gets closer to the present day.

68. The parties are divided as to the consequences of such incompleteness. In considering this question, it is convenient to begin by distinguishing between two categories of information. The first is information which would have been available to a willing buyer of the Assets as at the Valuation Date, but which is not available to this Court because of the exigencies of litigation. The second is information which would not have been available to a willing buyer for whatever reason.

69. As to the first category of information, counsel for GEHC suggested in opening that the incompleteness of the documentary evidence was attributable to default on the part of Mr Gray and that adverse inferences should be drawn against Mr Gray as a result. This suggestion was not pursued in closing submissions. In my view counsel for GEHC was correct not to pursue this suggestion, since there is no evidence of any relevant default by Mr Gray. On the contrary, after the judgment of Asplin J, Mr Gray was pro-active in obtaining documentary evidence for the Valuation Hearing. As noted above, he has also given further disclosure.

70. Turning to the second category of information, it is common ground that a willing buyer of the assets in question would have required the willing seller to engage, and the willing seller would have engaged, in a due diligence exercise. It is likely that such an exercise would have resulted in more information being available to the willing buyer than is available to the Court, but one cannot know how much more information would have been available. Take, for example, transactional documents which, so far as the evidence before the Court goes, were in existence at the Valuation Date, but had not been executed. This may be because the documents were executed, but the executed versions have not found their way into evidence; or it may be because they were not executed. If the documents were not executed, it may have been through oversight, and the parties proceeded as if they had been; or it may have been because the intended transaction was not proceeded with.

71. Counsel for Mr Gray submitted that the Court should do the best it could with the available information, making any justified inferences, but without speculating. I did not understand counsel for GEHC to dispute this, but he submitted that the lack of information meant that, at least in relation to Assets (d) and (e), Dr Becker's approach to valuation was to be preferred to Mr MacGregor's approach. I shall consider this submission in context below.

The picture revealed by the documentary evidence

72. There is little dispute as to what the documents show, as opposed to the inferences which should be drawn and the approach to valuation which should be adopted in the light of them.

Langosta

73. Andrey Yakunin, a partner in VIYM LLP, states in a witness statement dated 4 December 2014 (i.e. prior to the Enquiry Trial) that VIYM was acting for Langosta Investment Corporation ("Langosta"), rather than on its own behalf. This evidence is supported by other evidence referred to below. The ownership of Langosta is unknown. Mr Yakunin states that the owner is not Mr Gray, but that is as far as the evidence goes.

Petrosound's business and assets as at the Valuation Date

74. As at the Valuation Date, Petrosound was a holding company which itself had no trading business, whether in the Russian Federation or internationally (i.e. outside the Russian Federation). Petrosound's only material asset was its 74.9% shareholding in Sonoplus. That shareholding was partially encumbered as discussed below. It was later reduced to 55% following the issue of shares to Langosta on 2 October 2015 as discussed below.

Ownership of Sonoplus as at the Valuation Date

75. As at the Valuation Date, Petrosound and VERLYS, on behalf of VIYM and hence Langosta, were the shareholders of Sonoplus, with shareholdings of 74.9% and 25.1% respectively. As explained below, VERLYS/VIYM/Langosta's shareholding was accompanied by an investment of capital by Langosta of $3 million and substantial lending by Langosta to Sonoplus of up to $3.8 million.

76. The terms of VERLYS/VIYM/Langosta's investment were governed by a shareholders' agreement dated 18 September 2012 ("the Sonoplus SHA"). The Sonoplus SHA:

    i) gave VERLYS (and therefore Langosta) substantial control over the company, which was beyond what would be expected for the size of shareholding taken. That control included the right to appoint half of the board of Sonoplus, the requirement of unanimity for all board resolutions and actions which, in combination with appointment rights, gave a veto at board level, equivalent provisions for appointing 40% of directors of subsidiary companies, as well as requirements that many operational matters be approved by shareholders unanimously; and

    ii) provided that shareholders in Sonoplus were not entitled to receive distribution of any profit until "VERLYS's Equity Loans" were repaid. Those loans ("the Langosta Loans") are discussed below. The Sonoplus SHA also provided for the conversion of the debt to equity if it was not repaid, along with consequences for the shares which had been pledged to VERLYS.

77. There is evidence that there were significant pledges to Langosta of Petrosound's shares in Sonoplus as at the Valuation Date:

    i) A loan agreement between Langosta and Sonoplus dated February 2013 required 124 shares in Sonoplus belonging to Petrosound (i.e. 9% of Sonoplus' share capital) to be pledged to VERLYS as security for the loans. A partially executed and undated pledge of 124 shares is in evidence.

    ii) A loan agreement between Langosta and Sonoplus dated June 2013 required the pledging of "69 (one hundred twenty four) shares". This is an obvious drafting error, but it indicates that this loan agreement was intended to be accompanied by a pledge of either 124 shares or, if that figure was erroneously left over from the previous agreement, 69 shares (i.e. 5% of Sonoplus shares). In my judgment the latter is more likely.

    iii) A loan agreement between Langosta and Sonoplus dated 7 October 2013 provided for an additional 107 shares (8% of Sonoplus shares) to be pledged to VERLYS. An email circulating a draft deed of pledge pursuant to that loan agreement is in evidence. The email refers to the draft being "in the form used for conclusion of previous deeds of pledge", as well as referring to attaching an example of a signed deed. The reference to previous deeds (plural) suggests that the two previous loan agreements had indeed been accompanied by executed pledges of shares. Although there is no evidence that the pledge referred to in the third agreement was executed, it is more likely than not that it was.

78. As a consequence of the foregoing, Petrosound was not entitled to any income from Sonoplus or its subsidiaries until the Langosta Loans had been repaid in full, and Petrosound's shareholding in Sonoplus was partially pledged (22% out of its holding of 74.9%) as security for repayment of those loans.

Sonoplus' business as at the Valuation Date

79. As at the Valuation Date, Sonoplus itself had no operational business exploiting the Ultrasound Technology, whether in the Russian Federation or internationally. In the Russian Federation, such business was carried on by Sonoplus' subsidiaries. Internationally, Sonoplus was attempting to exploit the Ultrasound Technology by granting licences to exploit the Ultrasound Technology, and in particular the relevant patents and other intellectual property rights. As at the Valuation Date, an attempt by Sonoplus to negotiate a licence for South East Asia had just failed, as discussed below; and Sonoplus was in the midst of concluding agreements for the grant of a licence to Vibrant for the Americas with a sub-licence to Resero Corp (a Canadian company), as also discussed below.

Sonoplus' financial position as at the Valuation Date

80. As at the Valuation Date, Sonoplus owed substantial debts. In particular:

    i) The VIYM investment committee minutes envisage, and the Sonoplus SHA provides for, a shareholder loan by VERLYS/VIYM/Langosta to Sonoplus of a maximum of $3.8 million for a term of five years at 22.5% interest. This suggests that Langosta saw the loan as high risk.

ii) Between late 2012/early 2013 and April 2014 Langosta advanced the Langosta Loans to Sonoplus, namely loans subject to the three loan agreements referred to in paragraph 77 above and two further agreements, one of unknown date and one dated April 2014. Consistently with the VIYM investment committee minutes and the Sonoplus SHA, the loan agreements provide for a term of five years and 22.5% interest. The Langosta Loans totalled $3.45 million. Various documents show that, as at 31 December 2014, Sonoplus had debts to Langosta of approximately $4.67 million. Allowing for the continued accrual of interest at the contractual rate, Sonoplus' debt as at the Valuation Date would have been around $5.12 million.

iii) Of the total of $3.45 million loaned by Langosta and the $3 million injected through share capital, $6.3 million was then advanced by Sonoplus as loans to its subsidiaries.

iv) In addition, 25% of the share capital of each of the operating Sonoplus subsidiaries stood as security for a loan or loans (the details of which are unknown).

81. In the financial statements for the years ending 31 December 2013 and 31 December 2014, Sonoplus' net assets are recorded at $2.65 million and $1.98 million respectively. For the same years, Sonoplus' accounts show the debts owed by its subsidiaries as an asset worth $5.83 million and $6.67 million. In both years, inter-company debt represented the vast majority of Sonoplus' total assets. Accordingly, the solvency of Sonoplus was dependent on its subsidiaries being able to repay the inter-company loans. As at the Valuation Date, there was no evidence that they would be able to do so for the reasons explained below.

Operating performance and financial position of Sonoplus' subsidiaries as at the Valuation Date

82. Of Sonoplus' subsidiary companies, only three companies had any significant assets or trading activity as at the Valuation Date: Sonovita, CUT Servis and Viatekh. CUT Servis and Viatekh also held between them a 60% shareholding in Sonotekh, a joint venture company which was intended to operate in the Republic of Tatarstan (part of the Russian Federation). I will discuss Sonotekh separately below.

83. The Sonoplus subsidiaries were not trading profitably and showed no signs of trading profitably in the future. In particular:

i) Sonovita reported no revenue in 2014 or 2015.

ii) Viatekh reported operating losses of $60,000 in 2014 and $222,000 in 2015, with a net profit in each year of $1,000.

iii) CUT Servis reported a net profit of $11,000 in 2014 and a net loss of $981,000 in 2015, leaving it balance-sheet insolvent at the end of the year.

84. The number of wells being treated using the Ultrasound Technology was far lower than had originally been contemplated when Langosta invested in Sonoplus in 2012, as demonstrated by the low level of income in the Sonoplus subsidiaries' ledgers

attributable to customer receipts. Whereas the VIYM information memorandum envisaged CUT Servis treating a total of 475 wells in 2012 and 2013, the evidence suggests that in fact CUT Servis only treated about 70 wells in that period. (This shortfall in the level of treatments achieved is corroborated by later evidence as discussed below.)

85. The evidence from the financial statements is corroborated by contemporaneous email exchanges. In particular:

    i) There is an email from the General Director of CUT Servis dated 21 July 2014 seeking an additional $400,000 of funding to resolve "significant problems with funding of operations" which had led to the majority of employees of Viatekh being placed on unpaid leave, and which he warned may "contribute to suspension of the company's activities".

    ii) On 22 August 2014 a further email was sent describing the situation in CUT Servis' Nizhnevartovsk branch as "extremely critical", saying that 'the complete stoppage of the enterprise cannot be ruled out'. CUT Servis' General Director ended his email with the statement that he expected to be "sent on leave without pay" the following month.

86. In so far as Sonoplus and its subsidiaries had any identifiable sources of current or likely future income, the level of that income fell far short of the income required to repay Sonoplus' debts, which was the pre-condition for any income being obtained by Petrosound or its shareholders.

The Tatarstan joint venture

87. Asplin J refers in a number of places in her judgment to a joint venture in Tatarstan. This was established by an agreement dated 21 March 2014 between OOO Tsentr Transfer Tekhnology ("TTT", a Tatarstan state company) and what was referred to as the Viatekh Group of companies: Viatekh, Sonovita, Ultrasonic and CUT Servis. As mentioned above, Sonotekh was subsequently established as the joint venture vehicle.

88. The 21 March 2014 agreement envisaged the investment by TTT of RUB 99 million, almost all of which was for "Acquisition of Equipment/Transfer to Service Company [i.e. Sonotekh] under lease", and the investment by the Viatech Group of RUB 175 million, RUB 150 million of which was for "Exclusive rights for use of intellectual property (licence agreements)".

89. The only evidence as to the operational performance and financial position of Sonotekh as at the Valuation Date comes from Sonotekh's financial statements for 2015. It is common ground that the information contained in annual financial statements such as these should be taken into account in so far as it reflects financial information which would have been available as at the Valuation Date. In the case of Sonotekh's 2015 statements these show Sonotekh's balance sheet as at 31 December 2014 and as at 31 December 2015 and its profit and loss for both 2014 and 2015. These show that:

    i) Fixed assets increased from RUB 20.4 million as at 31 December 2014 to RUB 22.5 million as at 31 December 2015, intangible development assets and stock both remained at zero and cash increased from RUB 62,000 to RUB 350,000

while authorised capital was static at RUB 10,000, long-term borrowing was static at RUB 23.9 million and short-term borrowing increased from RUB 184,000 to RUB 2.2 million. This indicates that, as at the Valuation Date, the investment from the Viatech Group had not materialised and that, although Sonotech had acquired fixed assets, perhaps from TTT, this had been funded by debt and not equity.

ii) There was no activity in 2014, and so the profit and loss statement shows no profit or loss. In 2015 revenue was RUB 263,000 (about $4,000) yielding a profit of RUB 17,000 (about $280).

iii) Accordingly, as at the Valuation Date, Sonotekh was under-capitalised, indebted and not generating any material profits.

Operational performance and financial position of Sonoplus and its subsidiaries after the Valuation Date

90. After the Valuation Date:

i) In a debt-for-equity swap transaction on 2 October 2015, Langosta acquired 484 shares (27%) in Sonoplus in return for setting off $841,798 and €484 against existing debts. This transaction evidently reflected Langosta's preferential position as an existing shareholder and major creditor of Sonoplus.

ii) Between December 2015 and February 2018, Langosta advanced further loans of more than $500,000 to Sonoplus and its subsidiaries.

iii) Sonoplus' subsidiaries continued to struggle financially:

a) Sonovita remained a near-dormant holding company with minimal activity.

b) No financial data are available for CUT Servis in 2016, but in 2015 it reported net losses of $981,000 and was balance-sheet insolvent with a net liability of $2.6 million.

c) Viatekh had a minimal net profit of $2,000 in 2016, a figure which was boosted by unspecified other income of $1.2 million.

91. The number of wells treated was confirmed as being far lower than expected. The VIYM Investment Memorandum in 2012 had contemplated over 455 treatments by CUT Servis (plus 455 by a new company in Samara and 430 by a new company in Siberia or Northern Russia) in 2014 alone. A CUT Servis presentation which appears to date from some time in 2016 states that "more than 100 wells" were treated in each of the periods 2011-2013 and 2013-2015. Mr MacGregor estimated from Sonoplus' financial data that the whole Sonoplus group treated 130 wells in 2014 and only 21 in 2015. Accordingly, it appears that no more than around 250 wells were treated in the period 2011-2015.

92. This evidence corroborates the conclusion to be drawn from the material available at the Valuation Date, which is that Sonoplus' trading subsidiaries were not operating profitably and showed no signs of being able to do so to any material extent.

93. The same is true of Sonotekh. Sonotekh's 2016 financial statements show a balance sheet which was little changed as at 31 December 2016, zero revenue in 2016 and a loss of RUB 2.3 million ($34,000). A risk report dated 25 September 2018 states that in 2017 Sonotekh generated no revenue and made a loss of RUB 3.2 million ($55,000).

Sonoplus' international business as at the Valuation Date: the Americas

94. On 15 April 2015 Sonoplus entered into a Memorandum of Understanding with Novarius AG, a Swiss company of unknown ownership, with a view to commercialising the Ultrasound Technology in the Americas through a new Swiss company, Vibrant. At that stage, it appears that it was intended that Vibrant would be a joint venture between Sonoplus and Novarius, that Sonoplus would assign the relevant patents to Vibrant, and grant Vibrant an exclusive licence of the other intellectual property rights, for the Americas and that Vibrant would grant a licence and sub-licence to Resero. It appears that the proposed arrangements were subsequently modified, however. It also appears that, in the event, Vibrant did not become a joint venture company. Vibrant's ownership is unknown, although it may be owned by Novarius.

95. Two agreements were entered into by Vibrant as Licensor and Resero as Licensee which are expressed to be effective as of 20 May 2015, although not executed by Resero until 3 June 2015: a Patent and Technology Licence Agreement ("the Vibrant-Resero Licence") and a Framework Rent, Supply and Service Agreement. The Vibrant-Resero Licence recites that Vibrant is owner of the Patents and the exclusive licensee of the Other IPR in the Territory (all as defined), which it was not as at 20 May 2015 (or 3 June 2015).

96. It is plain that these agreements were entered into in anticipation of a Licence Agreement entered into by Sonoplus as Licensor and Vibrant as Licensee which is expressed to be effective as of 30 August 2015, although not executed by Vibrant until 9 October 2015 ("the Sonoplus-Vibrant Licence"). The copy of the Sonoplus-Vibrant Licence in evidence has not been executed by Sonoplus, but it is probable that it was executed by Sonoplus on the same date or shortly afterwards given that the shareholders in Sonoplus (Petrosound and VERLYS) unanimously resolved on 30 September 2015 that Sonoplus should conclude the agreement.

97. I do not understand it to be in dispute, but in any event I find, that it is probable that, as at the Valuation Date, the Sonoplus-Vibrant Licence had been substantially negotiated and it was anticipated that it would be executed in the near future.

98. The key features of these licences were as follows:

    i) Under the Sonoplus-Vibrant Licence, Vibrant was granted an exclusive licence under the Patents (defined as the patents and applications listed in Schedule 1, namely various patents granted and applications filed in countries in the Territory) and Other IPR (defined as intellectual property rights relating to the Patents and the Technology listed in Schedule 1) within the Territory (namely the Americas). In consideration of this, Vibrant was required to fund field tests, and to pay Sonoplus 30% of ultrasonic tool rental fees due from any sub-licensees.

ii) The Vibrant-Resero licence granted an exclusive licence of the same scope as the Sonoplus/Vibrant licence, in return for which Resero was required to pay a one-off fee of $1.8 million, annual royalties of 30% of its net profits, and rent for ultrasonic tools in accordance with the Framework Agreement ($750,000 per tool per annum).

99. Mr Gray contends, and I agree, that the structure of the Sonoplus/Vibrant/Resero contracts confirms the poor financial position of Sonoplus. Rather than pursuing the deployment of the Ultrasound Technology itself, it licensed it to a third party on terms which allowed that party, once it had paid for field tests and purchased the tools, to keep 70% of the rental income from the company operating the tools, as well as the one-off $1.8m fee and an annual royalty amounting to 30% of the sub-licensee's profits. It may be inferred that Sonoplus would not have granted a licence allowing a middle man to take such a cut of the potential profits had it been able to fund the field tests and capital cost of tools and operating costs itself.

100. GEHC relies heavily on a Business Plan in the name of Resero dated August 2015. It is common ground that it is likely that this was in an advanced state of preparation as at the Valuation Date. I will discuss it below. At this stage the point to note is that, as at the Valuation Date, Resero's business had not yet commenced: it hoped to conclude its first contract in Canada in December 2015 and its first contract in the USA in the second quarter of 2016. Thus there was no income from this source to Vibrant or from Vibrant to Sonoplus.

Sonoplus' international business as at the Valuation Date: South East Asia

101. In 10 December 2014 the Viatekh group/Sonoplus entered into a memorandum of understanding with Escindo Group with regard to a proposed 50/50 joint venture to serve the territory of Malaysia, Indonesia, Brunei and Vietnam. By July 2015 the proposed joint venture was being discussed between Vibrant and Escindo Group, but on 15 July 2015 Vibrant informed Escindo Group that Vibrant was not interested in a joint venture, but was prepared to discuss licensing the Ultrasound Technology for use in the same territory. On 28 July 2015 Escindo Group informed Vibrant that it was not interested in discussing a licensing deal.

102. Accordingly, as at the Valuation Date, Vibrant had failed to license the Ultrasound Technology for use in South East Asia, and thus Sonoplus had no business in that area of the world. There is no evidence that the position changed after the Valuation Date.

Sonoplus' international business after the Valuation Date: the Americas

103. Resero did not raise CAD$16 million. There is evidence that it raised (it is unclear whether CAN or US) $2.5 million. Some draft financial statements as at 31 March 2016 show a total deficit of $2.3 million, net liabilities of $1.3 million and nil revenue for the three months to 31 March 2016.

104. It is clear that Resero failed to carry out anywhere near the number of well treatments projected in the Resero Business Plan, and that by the summer of 2016 it was in difficulties:

i) In an email dated 22 May 2016 a representative of Resero wrote, following the treatment of four Teine wells:

> "Our business plan is not progressing if the truck is parked and no revenue is coming in. Too [sic] suggest the only thing lacking is more investment is foolhardy and perhaps chasing good money after bad. Further investment in this company is at risk and highly unlikely without test wells and data, neither are in the foreseeable and that is inexcusable. Expectations were high on my part, I shared these expectations with potential investors and I can not go back to these investors with these disappointing Teine results and in good conscience ask for an investment."

ii) In a Resero board presentation dated 23 June 2016, it was recorded that Resero had zero contracts and negative EBITDA of CAN$283,306 for that month. The presentation stated that "Company requires funds to move into July" to execute treatments for four customers and that "Assuming restructuring/concessions from Vibrant Resero can execute on a lean capital and operating units to execute the program".

105. Resero did not meet its payment obligations under its agreements with Vibrant. On 14 February 2017 Resero wrote to Vibrant asking to renegotiate the terms of the Vibrant-Resero Licence, saying that, when entering into that agreement, Resero had "underestimated the effects and longevity of the global oil and gas depression … which has materially and directly impacted the sales and revenue of the Company". On 27 April 2017 Vibrant terminated the Vibrant-Resero Licence with more than $3.5 million outstanding. There is an undated letter in evidence from a director of Resero which appears to date from around this time stating that "there is no value in … Resero" and that, since "Resero has no assets with which to pay its debts", "bankruptcy would be the only option".

106. Vibrant did not pay the sums due to Sonoplus under the Sonoplus-Vibrant Licence. Two payments were made by Vibrant totalling just over $80,000, with a further $114,980 being paid by Resero to Sonoplus directly. No other sums were received from Vibrant, which terminated the Sonoplus-Vibrant Licence during 2017.

The witnesses

107. Dr Becker obtained a BSE in Computer Science and Engineering from the University of Pennsylvania in 1981, an MBA from the University of Texas at Austin in 1986 and a PhD in Public Policy from the latter institution in 1998. Since 1990 he had provided financial, economic and litigation services to clients in a wide variety of industries, until 1998 through Becker & Associates and since 1999 through Applied Economics Consulting Group, Inc. Since 1995 he has acted as an expert witness in many cases, mainly in the USA. Much of his work had been patent-related and he has frequently been engaged to provide opinions regarding the value of oil and gas assets. Although Dr Becker was in some ways well qualified as an expert, he is not an accountant, still less a forensic accountant, and that placed him at a disadvantage compared to Mr MacGregor.

108. There was a striking contrast between Dr Becker's reports and his oral evidence. In his oral evidence, Dr Becker was careful and measured. His reports were neither careful nor measured.

109. So far as lack of care is concerned, Dr Becker made at least three basic errors in his reports. First, in his 2018 report he proceeded as if the Resero Business Plan contained figures in US dollars, when (unsurprisingly for a Canadian company) it was clearly stated to be in Canadian dollars. After Mr MacGregor had pointed this out, Dr Becker corrected his figures in his 2019 report. Secondly, in his 2018 report he stated that he had applied a 15% uplift to the value of OpCo to reflect Asian market potential, but in fact he applied a 17.6% uplift. Although Mr MacGregor pointed this out in his report, Dr Becker did not correct his calculation in his 2019 report and was unable to explain why not in cross-examination. Thirdly, Dr Becker set off the two adjustments he made to the value for Sonoplus he derived from the VIYM transaction and applied a net downwards adjustment. In cross-examination he accepted that, as Mr MacGregor had pointed out in the joint statement, he should have applied the adjustments sequentially.

110. A separate example of Dr Becker's lack of care is that, unlike Mr MacGregor, he failed to consider the Sonoplus ledgers.

111. As for not being measured, Dr Becker's reports contained several passages which amounted to partisan advocacy on behalf of GEHC rather than independent and objective expert analysis. In cross-examination Dr Becker accepted that this was so. He attributed this to the passages having been drafted by an over-enthusiastic assistant whom he had failed to rein in, but accepted that he was responsible for adopting those passages in his report. As if this were not bad enough, some of these passages involved Dr Becker mischaracterising Mr MacGregor's evidence in his report in order to cast unjustified aspersions on Mr MacGregor's approach. It hardly needs stating that this is not acceptable conduct on the part of an expert witness.

112. In addition to the matters mentioned above, there were three other problems with Dr Becker's evidence, not all of which were his fault. The first is that Dr Becker was not shown all of the relevant documents by those instructing him.

113. The second is that, in certain respects, Dr Becker was instructed to adopt an incorrect approach. First, he appears to have been instructed to disregard Asplin J's finding that the Ultrasound Technology was semi-experimental. Secondly, he was instructed to apply (or least understood from his instructions that he should apply) a hard cut-off date of 30 September 2015, and disregarded any documents dated later than that. Thirdly, in his 2018 report he was instructed to assume that Sonoplus owned 74% of OpCo, whereas even on GEHC's case the correct figure is 49%. Despite Mr MacGregor querying this in his report, Dr Becker proceeded on the same basis in his 2019 report. Dr Becker recorded in the joint statement that at that time he had been asked to assume the 49% figure and would update his calculations prior to the Valuation Hearing to reflect this; but he did not do so, and it was only done after the experts had finished giving evidence.

114. The third problem is that Dr Becker was forced to concede a number of flaws in his methodology during the course of cross-examination (including, but not limited to, the matters mentioned in paragraphs 109 and 113 above).

115. A final point to note about Dr Becker's evidence is that his valuations of the Assets changed quite markedly over time. Even as between his 2018 and his 2019 reports, the valuations changed as a result of Dr Becker correcting his error regarding the currency in the Resero Business Plan. The figures on which GEHC finally relied upon were re-calculated after the experts had finished giving evidence to correct the two errors accepted by Dr Becker noted in paragraph 109 above and to correct the erroneous instruction regarding OpCo noted in paragraph 113 above.

116. Mr MacGregor obtained a BSc from Liverpool University in 1980 and worked as a petroleum geologist in Australia and West Africa before joining a predecessor firm to BDO in 1982. He qualified as a Charted Accountant in 1986, was made a partner in BDO in 1991 and became Head of the Litigation Support and Forensic Accounting Department in 1994. His current title is Head of Forensic Services. Since 1993 he has given evidence in 58 cases before courts, tribunals and arbitrators. Between 1998 and 2002 he was the main accounting advisor appointed by Panels of Commissioners at the United Nations Compensation Commission assessing damages claims against Iraq arising from its invasion of Kuwait in 1990: many of these claims concerned the oil and related energy sectors. From 2000 to 2001 he was the expert instructed by Director-General of Fair Trading in a successful challenge to resale price maintenance on OTC medicines. From 2005 to 2009 he was a Government appointed inspector (together with Guy Newey QC, as he then was) into MG Rover. In 2009 and 2010 he was appointed by the Financial Services Authority under section 168 of the Financial Services and Markets Act as investigator into capital raising by various banks prior to the financial crash. In 2010, 2011 and 2013 he was appointed by Ofgem to enquire into the accounting disclosures of the big 6 UK energy suppliers. In short, Mr MacGregor is an extremely experienced and distinguished expert, and he has extensive experience in the energy sector.

117. Mr MacGregor's report was an impressive document: it was thorough, meticulous in its attention to detail and clearly and convincingly reasoned. Although cross-examination showed that a couple of sentences could have been more clearly expressed, it did not reveal any errors or methodological flaws. Counsel for GEHC submitted that Mr MacGregor had been unduly negative in his approach, and had adopted an extreme view at points. I do not accept these submissions. I have no doubt that Mr MacGregor gave me his independent professional opinions, and I found his reasons for expressing those opinions cogent.

118. For the reasons given above, I consider that Mr MacGregor's evidence should be accorded significantly more weight than that of Dr Becker. It remains the case, however, that the Assets are to be valued by the Court, not by the experts. While I must take the expert evidence into account, I should not surrender my judgment to any expert. It follows that what matters are the experts' reasons for expressing the opinions they expressed.

Valuation of 51% of 30% of the issued shares in Petrosound

119. As explained above, Petrosound was not itself a trading business as at the Valuation Date, and its only material asset was its partially encumbered 74.9% shareholding in Sonoplus. What price would a willing buyer and a willing seller agree for 51% of 30% (i.e. 15.3%) of the shares in Petrosound in the light of the information reasonably available to them as at that date?

Dr Becker's approach

120. In outline, Dr Becker's approach was as follows:

i) he started with the value of Sonoplus implied by the sale of a 25.1% shareholding in Sonoplus to VIYM (acting for Langosta) in 2012 for $3 million, namely $11,952,191, and assumed that this represented the value of Sonoplus' (and hence Petrosound's) Russian business;

ii) he then made adjustments to bring the valuation up to date as at the Valuation Date: he adjusted downwards by 35% to take account of Russian market conditions and upwards by 28% to take account of "developments in the technology life cycle";

iii) he took account of interest expenses on the Langosta Loans;

iv) in his "high" model, he added an uplift for the Tatarstan JV, whereas in his "low" model he did not;

v) he assumed that Sonoplus owned 74% of OpCo i.e. Petrosound's international business (although, as noted above, this was subsequently corrected to 49%) which needed to be brought into account;

vi) he calculated 74.9% of the value of Sonoplus' shares to reflect Petrosound's shareholding; and

vii) he calculated 15.3% of the value of Petrosound's shares.

121. Taking into account the corrections to his calculations, Dr Becker's approach gives a "high" value of $2,954,837 and a "low" value of $1,426,773. The "high" value is predicated not only on the uplift for the Tartarstan joint venture, but also on the first of Dr Becker's two valuations of OpCo discussed below. The "low" value not only involves no uplift for Tatarstan, but also relies upon Dr Becker's second valuation of OpCo.

122. *The VIYM transaction*. Mr MacGregor accepted that, in principle, valuing a company by reference to a comparable transaction at market value was the best method of valuation. Mr MacGregor's opinion, however, was that the VIYM transaction in 2012 was not a reliable starting point for the valuation for a number of reasons.

123. First, Langosta invested both equity and debt in 2012. Mr MacGregor's opinion was that it was not possible to de-couple the two and treat the equity investment as if it were a stand-alone transaction. Rather, the debt had to be taken into account. Contrary to the submission of counsel for GEHC, I do not consider that it is an answer to this to say that the equity value derived by Dr Becker implicitly took the debt into account.

124. Secondly, the transactions are not comparable:

i) Langosta was not investing in a business which owed $5.1 million in secured debt to a third party. By contrast, the notional willing buyer of 15.3% of Petrosound's shares at the Valuation Date would be investing in such a business.

ii) It is evident from the VIYM Information Memorandum that Langosta was investing in a business which was considered to be "a working business generating a positive cash flow". The document gives net profit figures for the group of $70,000 and $87,000 for 2010 and 2011. By contrast, the notional willing buyer of 15.3% of Petrosound's shares at the Valuation Date would be investing in a business which, as a group, was not trading profitably and showed no signs of trading profitably in the future.

iii) Langosta obtained a greater degree of control of Sonoplus than would normally be expected for a 25% shareholding. By contrast, the notional willing buyer of 15.3% of Petrosound's shares at the Valuation Date would not obtain that level of control.

125. Thirdly, too much time had passed since the 2012 transaction. Reliance upon a transaction three years before was, as Mr MacGregor put it, "a big stretch" when valuing any company, but wholly inappropriate given what was known about what happened within the Sonoplus group during that period.

126. In my judgment these reasons are compelling. Accordingly, I conclude that the VIYM transaction is not a reliable starting point for valuing this Asset. It follows that I do not accept Dr Becker's approach.

127. I would add that, in any event, I do not accept that the VIYM transaction can be taken to represent the value only of Sonoplus' (and hence Petrosound's) Russian business, since it appears that at that time Sonovita owned the worldwide intellectual property rights (insofar as such rights existed) to the Ultrasound Technology (or at least the aspects developed by the Russian Scientists); the VIYM Information Memorandum refers to Viatekh providing services outside Russia (including in Germany, UK, USA, Japan, Israel and Chile); the VIYM Information Memorandum states that one of the main objectives of the investment is to enable Viatekh to develop the Ultrasound Technology for heavy crude oil, which it has tested in the USA; and the minutes of the VIYM investment committee meeting refer to patents in the EU and the USA.

128. For completeness, however, I will briefly consider the remaining steps in Dr Becker's approach.

129. *Adjustment for market conditions*. Mr MacGregor's opinion was that 44% to 59% was more appropriate. If I were to adopt this approach, I would take the mid-point of Mr MacGregor's range, namely 51.5%.

130. *Adjustment for developments*. Mr MacGregor's opinion was that Dr Becker's uplift of 28% was unjustified. I agree with this. It can be seen from Dr Becker's 2018 report that this uplift is premised upon ignoring Asplin J's finding that the Ultrasound Technology was semi-experimental.

131. *Application of the adjustments*. In his calculations Dr Becker set off the two adjustments and applied a net downwards adjustment of 7%. As noted above, in cross-examination he accepted that he should have applied them sequentially. The revised calculations produced subsequently correct this.

132. *Interest*. Dr Becker applied a downward adjustment of $577,919 to reflect the net interest expense incurred by Sonoplus in 2014. Mr MacGregor's opinion was that this adjustment made "no sense whatsoever": it appeared to be an attempt by Dr Becker to make an adjustment for an element of the debt funding of Sonoplus without fully taking the debt into account. I agree with this. Moreover, this adjustment is inconsistent with the proposition that the equity value which Dr Becker derived from the VIYM transaction already took the debt into account.

133. *Tatarstan joint venture*. Dr Becker's opinion was that the March 2014 agreement was an arm's length transaction which ascribed a value to the joint venture of $7.6 million, of which Sonoplus' subsidiaries would have 60% by virtue of a $689,665 cash investment, and hence valued Sonoplus' intellectual property at $4,137,000. Dr Becker adjusted this figure downwards by 15.5% to $3,495,124 to allow for the change in market conditions between 21 March 2014 and the Valuation Date. Dr Becker's opinion was this sum should be added to the value of Sonoplus, resulting in his "high" model. In the alternative, Dr Becker expressed the view that the value of Sonoplus' intellectual property derived in this manner was a useful cross-check which showed that his valuation of Sonoplus, and hence Petrosound, was conservative.

134. Mr MacGregor's opinion was that the Tatarstan joint venture would not have been treated by a willing buyer and willing seller of any value at the Valuation Date because, on the evidence, neither party had made the investments envisaged in the 21 March 2014 agreement and Sonotekh was not generating any material profits. I agree with this.

Mr MacGregor's approach

135. Given the absence of any suitable comparable transaction, Mr MacGregor's approach was to consider what a willing buyer would pay for 15.3% of Petrosound as at the Valuation Date having regard to the information as to the operational performance and financial position of Petrosound, Sonoplus and Sonoplus' subsidiaries which would reasonably have been available then. His opinion was that a willing buyer would not have been willing to pay anything because, in short, Sonoplus was burdened with debt and its subsidiaries were neither profitable nor likely to be so in the foreseeable future. Furthermore, it was his opinion that the information which is now available as to what had happened subsequently corroborated that assessment. I find Mr MacGregor's analysis entirely convincing.

136. Counsel for GEHC submitted that the absence of more complete information regarding Petrosound, Sonoplus and Sonoplus' subsidiaries as at the Valuation Date meant that Mr MacGregor's approach should be rejected, and Dr Becker's approach preferred. Mr MacGregor did not accept this. Although he accepted that some information was lacking, he considered that the information which was available was sufficient to arrive at a reliable valuation. I agree with this. Moreover, there is no reason to think that more complete information would indicate that any of these entities had greater value; if anything, the reverse is the case.

137. In the alternative, counsel for GEHC submitted that the Langosta debt-for-equity swap transaction on 2 October 2015 showed that 15.3% of Petrosound was not worthless, because it implied a value of Sonoplus of approximately $3.16 million which in turn implied a value of 15.3% of Petrosound of approximately $266,000. I do not accept this, for three reasons. First, there is no evidence that the transaction had been agreed,

or was being negotiated or even in contemplation, at the Valuation Date. On GEHC's own case, therefore, it is inadmissible as a basis for valuation. Secondly, it is common ground that the transaction was not arms' length. Moreover, it is also common ground that information is lacking as to the circumstances of the transaction. As counsel for GEHC himself submitted, it follows that it is not a reliable reference point for valuing Sonoplus. Thirdly, I agree with Mr MacGregor's assessment of the transaction, which is that it indicates that Langosta decided that it was better to write off some of its loans to Sonoplus, and take equity instead, rather than attempt to enforce its security. While that shows that Langosta hoped that Sonoplus would become profitable in the future, it does not show that Langosta reasonably expected Sonoplus to do so. Still less does it show that an unconnected willing buyer of 15.3% of Petrosound would do so.

Valuation of a 51% interest in 51% of Petrosound's international Ultrasound Technology business (also referred to as OpCo)

What is the business to be valued?

138. There is a considerable dispute between the parties as to the business which is to be valued.

139. It is convenient to start with the suggestion advanced by counsel for GEHC that it was significant that paragraphs 1(d) and (e) of the order dated 28 July 2015 referred to "PetroSound" whereas paragraph 1(f) referred to "Petrosound". There is no foundation for this suggestion. There is nothing in Asplin J's judgment to suggest that any such distinction was intended: for the most part, she refers in her judgment to "Petrosound", and the only reference to "PetroSound" to which my attention was drawn, or that I can find, is at [55]. Similarly, Asplin J's order dated 22 February 2016 refers to "Petrosound". Indeed, GEHC's own skeleton argument and closing submissions for the Valuation Hearing refer throughout to "Petrosound". In any event, paragraph 1 of the order dated 28 July 2015 states that the terms used are to be construed in accordance with the judgment, and in the judgment Asplin J defined Petrosound Ltd as "Petrosound" at [49].

140. Next, it is common ground that Asplin J was explicit at [255] that it was irrelevant that PIL had been closed down, since another corporate shell could be used for international roll out of the Ultrasound Technology. It remains the case, however, that the interest which she declared Mr Gray to have received 51% of 51% of was *Petrosound's* international Ultrasound Technology business, not some other business.

141. At this stage it is necessary for me to explain my understanding of the basis for Asplin J's findings that Mr Gray owns a 51% interest in 51% of Petrosound's international business *as well as* 51% of 30% of the shares in Petrosound. She found that Petrosound was the HoldCo which had been envisaged, that Sonoplus was a 100% subsidiary of Petrosound, that PIL was the OpCo which had been envisaged and that PIL could be replaced by another OpCo. She also found that Petrosound was to conduct the Russian business and that OpCo was to conduct the international business. She recorded that it was GEHC's contention that Sonoplus had a 49% stake in PIL and that Mr Knight had accepted that that was the intention. As I understand it, therefore, she found that Sonoplus owned 49% of OpCo, leaving 51% which Mr Gray had a 51% interest in.

142. As was common ground by the end of the Valuation Hearing, there is an inconsistency between Asplin J's findings of fact and the picture revealed by the documentary evidence now before the Court. It is now known that, in fact, as at the Valuation Date: (i) Petrosound exploited the Ultrasound Technology both in the Russian Federation and internationally through Sonoplus; and (ii) Sonoplus was exploiting the Ultrasound Technology (a) in the Russian Federation through operational subsidiaries (including the joint venture in Tatarstan) and (b) internationally through licensing, in particular to Vibrant, and thence Resero, in the Americas. This implies that there was no OpCo if OpCo is taken to mean an operational company separate from Petrosound (or Sonoplus).

143. The parties were divided as to how the Court should deal with this inconsistency. The primary submission of counsel for Mr Gray was that, since the international business was carried on by Sonoplus, which was wholly owned by Petrosound, there was no value in Petrosound's international business which could be separated from the value of Petrosound's shares for which Mr Gray was liable to account. His alternative submission was that, since the international business was carried on by Sonoplus, it had to be valued by reference to Sonoplus. He also submitted, however, that the inconsistency did not matter, because in any event the value of Petrosound's international business was nil. The primary submission of counsel for GEHC was that the Court's task was to value the opportunity to carry on an international operational business as at the Valuation Date even though Sonoplus had in fact adopted a different business model. His alternative submission, as I understood it, was that the international business carried on by Sonoplus should be valued as if it were separate from, and unencumbered by, the Russian business carried on by Sonoplus.

144. My conclusion is as follows. I am required to value a 51% interest in 51% of Petrosound's international business. Although Asplin J found that it had been intended that the international business would be carried on by PIL, she also found that it could take a different form. Although an operating company was envisaged, there is nothing in her judgment to exclude the adoption of a different business model. It is now known that, as at the Valuation Date, Petrosound's international business was being carried on by its subsidiary Sonoplus and took the form of a licensing business. Accordingly, I must value that business. The fact that it can now be seen that Petrosound's international business was subsumed within Petrosound (which is why Dr Becker included a value for OpCo in his valuation of Petrosound) is a conundrum for the Court of Appeal to attempt to resolve if need be. It is not my function to value the opportunity to carry on an operational business, even if that is legally possible, because that is not what the order dated 28 July 2015 requires. Moreover, as will appear, that was not the approach which Dr Becker adopted. Finally, I consider that the reality principle means that Sonoplus must be taken as it was on the Valuation Date, namely a company which was carrying on both the Russian business and the international business and whose financial position was as described above.

Dr Becker's approach

145. In outline, Dr Becker's approach was as follows:

i) he assumed that he was valuing OpCo on the basis that OpCo was a licensing company whose primary revenue derived from the royalties flowing to Sonoplus from Vibrant;

ii) he adopted an income valuation using the discounted cash flow (DCF) method;

iii) he started with the projections contained in the Resero Business Plan, which cover a five year period;

iv) he assumed a growth rate of 2% in years 6-10;

v) he assumed that Sonoplus would have overheads equating to 6% of its revenues;

vi) he applied a discount rate of 24.6%;

vii) he applied a 15% uplift for expansion in Asia;

viii) he did not allow for taxation;

ix) he did not apply a minority interest discount; and

x) he calculated the value of a 26% (i.e. 51% x 51%) share in OpCo.

146. Dr Becker produced two versions of his calculations. The first of these proceeded as if the Sonoplus-Vibrant Licence provided for Sonoplus to receive a percentage of Vibrant's income from both rental fees for tools and royalties received from Resero, but that is not the case. The second calculation proceeded on the correct basis that the Sonoplus-Vibrant Licence provided for Sonoplus only to receive a percentage of Vibrant's income from rental fees for tools. GEHC's written closing submissions realistically concluded by inviting me to accept the second calculation, although counsel for GEHC informed me in his oral submissions that he was not instructed to abandon the first calculation. The second calculation produces a figure of $1,636,433.

147. *Assumption as to OpCo*. The difference between Dr Becker's assumption and my conclusion is that Dr Becker proceeded on the basis that Petrosound's international business consisted of Sonoplus' prospective income from Vibrant-Resero divorced from the remainder of Sonoplus' business, and therefore its liabilities, whereas I do not consider that it is legitimate to disregard the latter.

148. *DCF method*. Dr Becker continued to use the DCF method despite Asplin J's conclusion that it was inappropriate. As counsel for GEHC pointed out, some of her reasons for rejecting it related to the use of a random choice model of wells. Other reasons she gave did not, however: "there are no positive cash flows at present, the discount rate is already very high without taking into account realities in Russia, the technology is not fully ready for commercialisation without more, there is a need to raise funding". As counsel for GEHC also pointed out, Dr Becker started with the Resero Business Plan, which was not available at the Enquiry Trial. Accordingly, the appropriateness of the DCF method depends on whether reliance on the Resero Business Plan avoids the problems which Asplin J identified with Dr Becker's previous DCF models.

149. *The Resero Business Plan*. In summary, the Resero Business Plan projects that, assuming an investment of CAN$16,060,000:

i) Resero will carry out 217 well treatments in year 1, rising to 2,720 in year 5.

ii) Resero will generate revenue of CAN$7,762,500 in year 1, rising to CAN$142,800,000 in year 5.

iii) Resero will achieve a gross margin of 26.41% in year 1, rising to 69.03% in year 5 and net earnings of 0.35% of sales in year 1, rising to 64.93% in year 5.

iv) Resero will generate EBITDA of CAN$77,000 in year 1, rising to CAN$92,723,320 (taking the figure given in the tables: the text gives the figure of CAN$104,017,971) in year 5.

150. Mr MacGregor's opinion was that the figures in the Resero Business Plan were not sufficiently reliable for a DCF calculation for a number of reasons.

151. First, the Resero Business Plan was plainly produced for the purpose of raising CAN$16 million. Moreover, it contains a clear disclaimer: "The financial and other projections contained in the Plan reflect the expectations of the management of the Company, and no assurance can be given that the projections will be indicative of actual results for the periods indicated". On the face of the document, therefore, the projections cannot be relied upon. Contrary to the submission of counsel for GEHC, it is no answer to this that (a) the Resero Business Plan claims that the projections are conservative and (b) those behind Resero included a number of apparently experienced Canadian oil and gas industry professionals as well as Prof Abramov, his daughter and one of his colleagues.

152. Secondly, the projections are on their face extremely optimistic. The Resero Business Plan states that the total number of well treatments carried out over the previous five years was 300 (although no source is given for this figure), yet Resero projects that 217 wells will be treated in its first year. Further, the number of well treatments is projected to rise more than 10-fold in five years. EDITDA is projected to rise from just CAN$77,000 to CAN$92,723,320 in the same period. Mr MacGregor's opinion was this looked too good to be true.

153. Thirdly, Resero was projecting only slightly fewer heavy oil well treatments in Canada and the USA in year 1 than had, on the available evidence, been carried out on light oil wells in Russia during the period 2011 to 2015. Thus the projections were not supported by the historic data. Contrary to the submission of counsel of GEHC, it is no answer to this to say that (i) the projections relate to a different market and (ii) the historic figures cover 2014, which was a difficult year in the oil industry. The difference in the market means that caution was required, not optimism. The historic figures cover 2011-2013 as well as 2014. (Moreover, the financial information dating from after the Valuation Date indicates that 2014 was not a particularly bad year for well treatments, although 2015 was.)

154. Fourthly, as at the Valuation Date, Resero had not raised the investment on which the plan was predicated. (There is evidence that it had purchased CAN$20,000 worth of tools under a contract dated 17 June 2015, but no evidence as to how the purchase was funded.) Mr MacGregor's opinion was that the willing buyer of 51% of 51% of Petrosound's international business would be sceptical as to Resero's prospects of raising the funds.

155. In my judgment these reasons are compelling. Moreover, as Mr MacGregor pointed out, they are corroborated by what in fact happened subsequently: Resero did not raise the CAN$16 million it needed, it failed to carry out anywhere near the number of well treatments projected, it failed to make the payments due to Vibrant and Vibrant terminated the Vibrant-Resero Licence. Accordingly, I conclude that the Resero Business Plan does not provide a reliable basis for a DCF calculation.

156. Counsel for GEHC submitted that, rather than discounting the Resero Business Plan entirely, Mr MacGregor should have produced a DCF calculation based on what Mr MacGregor considered to be more reasonable projections. Mr MacGregor did not accept this, and nor do I. Mr MacGregor is not a North American oil and gas expert, and therefore lacked the expertise to make his own projections (as opposed to considering the reasonableness of the Resero projections in the way that a willing buyer of the Asset would do). Accordingly, any such exercise would have inevitably involved speculation on his part. I would add that GEHC could have instructed Dr Becker to carry out a DCF calculation using more realistic projections, but it did not.

157. In addition to the points considered above, as Mr MacGregor pointed out, there is a timing issue with Dr Becker's model. Dr Becker assumed that the first year's cash flow arose on 28 July 2016, but as noted above the Resero Business Plan itself assumed that the first contract would be in December 2015, implying that the first year's cash flow would arise in December 2016.

158. I will nevertheless briefly consider the remaining aspects of Dr Becker's model.

159. *Growth rate*. As Mr MacGregor pointed out, there appears to be no basis for Dr Becker's assumption of continued growth at 2% per annum in years 6-10. Dr Becker's only justification for it was that it was conservative compared to the growth rate projected in the Resero Business Plan, but that simply highlights the optimistic nature of the latter.

160. *Sonoplus overheads*. As Mr MacGregor pointed out, there appears to be no basis for Dr Becker's assumption that Sonoplus would have overheads of just 6% of its revenues. Moreover, the figure is at odds with the figure of 20% assumed by Dr Becker in his 2015 reports. Dr Becker attempted to explain the inconsistency by saying that the earlier figure was for an operational business rather than a licensing business, but in fact it was for one "in a pure licensing mode" as Dr Becker himself put it in the experts' joint statement in April 2015. Accordingly, I consider that the appropriate figure would be the 20% figure which the experts agreed in April 2015.

161. *Discount rate*. Dr Becker used the build-up method to determine the discount rate. The rate he used was precisely the same rate he had used in his 2015 reports. Mr MacGregor did not take issue with that general approach, but pointed out that Dr Becker had failed to take into account (i) Asplin J's conclusion that the Ultrasound Technology was semi-experimental, (ii) the fact that Resero was a start-up business and (iii) the debt funding of Sonoplus (meaning that the income from the international business would first go to the repayment of that debt). Furthermore, Mr MacGregor pointed out that Dr Becker had applied a company-specific risk premium of just 4.15%, which was less than that applicable to many well-known multinationals. I agree with Mr MacGregor that, for all of these reasons, Dr Becker's discount rate is too low.

162. *Uplift for expansion in Asia*. As discussed above, Dr Becker intended to apply an uplift of 15% for expansion in Asia, although what he actually did until the calculations were corrected was to apply a 17.6% uplift. Mr MacGregor's opinion was that this uplift was completely unjustified given the failure of the negotiations between Vibrant and Escindo Group on the Valuation Date. I agree with this. I would add that there is little or no evidence as to what, if any, patents or other intellectual property rights Sonoplus had in Asia. Certainly, Dr Becker accepted that he had not investigated this question.

163. *Taxation*. Dr Becker did not include taxation in his calculation. He explained that this was because he was instructed not to. Counsel for GEHC sought to justify this on the basis that OpCo was a notional entity which could be established in a jurisdiction with no corporation tax. As Mr MacGregor pointed out, however, Sonoplus' financial statements show that it incurred corporation tax at 12.5%. Given that Petrosound's international business was carried on through Sonoplus, this has to be taken into account.

164. *Minority interest*. Dr Becker did not apply a minority interest discount. Counsel for GEHC sought to justify this on the basis that 51% of 51% was a majority interest in a majority interest. But this ignores the fact that Asplin J did not find that Mr Gray was entitled to a 51% shareholding in a company which had a 51% shareholding in a company which carried on the business in question. What she found was that Mr Gray had a beneficial interest to the extent of 51% of 51% in Petrosound's international business. As discussed above, it is now known that business was carried on through Sonoplus. In substance, therefore, it seems to me that the interest in question is a minority one.

Mr MacGregor's approach

165. Given the absence of any suitable comparable transaction or reliable cash flows, Mr MacGregor's approach was to consider what a willing buyer would pay for 51% of 51% of Petrosound's international business as at the Valuation Date having regard to the information as to the operational performance and financial position of Sonoplus, Vibrant and Resero which would reasonably have been available then. His opinion was that a willing buyer would not have been willing to pay anything because, in short, Sonoplus was burdened with debt and had no realistic prospect of receiving income from Vibrant deriving from Resero. Furthermore, it was his opinion that the information which is now available as to what had happened subsequently corroborated that assessment. I find Mr MacGregor's analysis entirely convincing.

Conclusion

166. For the reasons given above, I conclude that the value of the Assets at the Valuation Date was nil.