Federal Court  Cour fédérale

Date: 20210120

Docket: T-1069-14

Citation: 2021 FC 10

Ottawa, Ontario, January 20, 2021

PRESENT: The Honourable Mr. Justice Fothergill

BETWEEN:

JASON SWIST AND
CRUDE SOLUTIONS LTD.

Plaintiffs
(Defendants by Counterclaim)

and

MEG ENERGY CORP.

Defendant
(Plaintiff by Counterclaim)

PUBLIC JUDGMENT AND REASONS

Table of Contents

I. Overview

[1] Canadian oil sands are a particular type of hydrocarbon reservoir. A hydrocarbon is a compound of hydrogen and carbon, the chief components of petroleum and natural gas.

[2] The oil contained in the oil sands is at an early stage of maturity. It is designated as heavy oil, and is often referred to colloquially as bitumen. Bitumen is too thick to be pumped out of the ground directly. Special methods must therefore be used to mobilize the oil in the reservoir before extracting it.

[3] Two principal techniques are employed to make heavy oil mobile in the reservoir: cyclic steam stimulation [CSS] and steam assisted gravity drainage [SAGD]. Both CSS and SAGD fall within the general class of techniques known as "steam floods", *i.e.*, methods of thermal recovery that involve pumping steam generated at the surface into a subterranean reservoir to reduce oil viscosity.

[4] Canadian Patent 2,800,746 [746 Patent] is titled "Pressure Assisted Oil Recovery", and relates generally to "second stage oil recovery and more specifically to exploiting pressure gradients in oil recovery". The named inventor of the 746 Patent is the Plaintiff Jason Swist.

[5] The invention claimed by the 746 Patent is a modification of SAGD, whereby a third well is positioned between two adjacent SAGD well pairs. Activation of the third well before the merger of adjacent steam chambers is said to generate a large singular zone of increased mobility, resulting in the more rapid and efficient extraction of oil from the reservoir.

[6] Mr. Swist assigned ownership of the 746 Patent to the Plaintiff Crude Solutions Ltd [CSL] shortly before commencing this litigation. CSL is a holding company for Mr. Swist's

patents that he owns jointly with his wife. In these reasons I refer to Mr. Swist and CSL collectively as “Swist”.

[7] MEG Energy Corp [MEG] is a company that produces oil in the southern Athabasca region of Alberta. The corporation has been in business for more than 20 years and employs hundreds of people. MEG transports and sells oil to refiners throughout North America and internationally.

[8] MEG uses two methods to extract oil at its Christina Lake operation. MEG calls these methods “enhanced modified steam and gas push” [eMSAGP] and “enhanced modified vapour extraction” [eMVAPEX]. MEG holds patents related to each of these methods. The former invention is claimed in Canadian Patent 2,776,704 [704 Patent], while the latter is claimed in Canadian Patent 2,912,159 [159 Patent].

[9] Swist alleges that MEG’s use of eMSAGP and eMVAPEX at Christina Lake infringes claims 1 to 6 and 8 of the 746 Patent. MEG denies infringement, and counterclaims that claims 1 to 8 of the 746 Patent are invalid.

[10] For the reasons that follow, I conclude that MEG’s use of eMSAGP and eMVAPEX at Christina Lake does not infringe the specified claims of the 746 Patent. Furthermore, claims 1 to 8 of the 746 Patent are anticipated by the prior art and lack utility. They are therefore invalid.

II. Extraction Methods in the Canadian Oil Sands

[11] The following summary of extraction methods in the Canadian oil sands is adapted and condensed from the technical primer provided by Dr. Vikram Rao in his initial expert report.

[12] CSS, also known as “huff and puff”, involves a three-step cycle, which is usually repeated multiple times: steam injection; a soak period; and production. In the first step, steam is injected into a well. In the second step – the soak period – steam is no longer injected, but rather the existing steam enters the formation, usually at pressures near but below the fracture pressure of the formation. In the third step, the well is used to produce oil, and the water is separated from the oil when it reaches the surface.

[13] CSS involves a fairly long period of time and high injection pressures. The injection phase and the soak period each last for weeks or months. CSS typically releases no more than 20% of the oil in place. The CSS method can be used as a stand-alone recovery process, or it may be part of a larger recovery process. For example, CSS may be used in association with the other principal recovery process, SAGD.

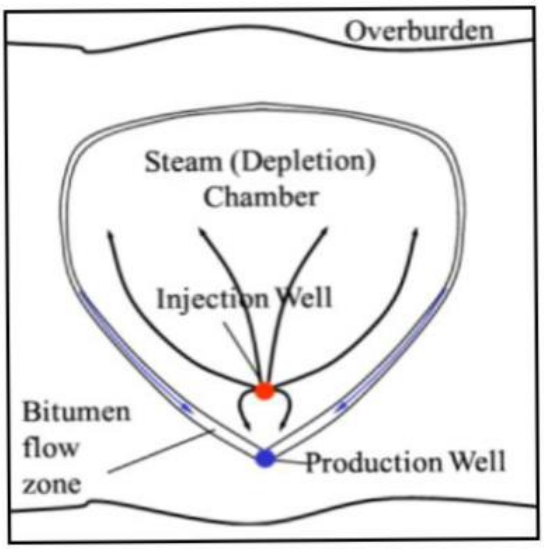
[14] SAGD, like CSS, falls into the class of steam floods, but is a particularly effective variant. It was invented by Dr. Roger Butler in the late 1970s and early 1980s, while he was an engineer with Imperial Oil in Canada.

[15] In SAGD, a pair of parallel horizontal wells are vertically separated by a distance that typically ranges from four to eight metres. Steam is injected in the top well of the pair [injector well] for an extended period, until a "steam chamber" is formed above and around the injector well. This chamber has a roughly triangular profile along the entire length of the injector well. The steam, and any associated gas, rise in the formation because they are lighter than the resident oil.

[16] The steam heats the oil and reduces its viscosity. The now mobile oil drains down by gravity into the bottom well of the pair [producer well], together with hot water from the condensing steam. The heated oil and water mixture can then be pumped to the surface from the producer well.

[17] New steam and associated gas, if any, occupies the space left by the departing oil and heats the remaining oil. As more steam is injected and oil flows down into the producer well, the steam chamber above the injector well expands in size, and the process continues. A SAGD operation typically takes place over several years.

[18] A vertical cross section of a traditional SAGD well pair is illustrated below (Maureen Austin-Adigio and Ian Gates, "Non-condensable gas Co-Injection with steam for oil sands recovery" (2019) 179 Energy 736 at 737, Figure 1):



[19] SAGD is usually much more effective than CSS. Recoveries with SAGD can be well in excess of 60% of the oil in place, and numbers as high as 80% have been claimed.

[20] While steam is commonly injected during SAGD, steam and non-condensable gas [NCG] can also be co-injected. The NCG is usually methane, which unlike steam does not become liquid at typical pressures and temperatures experienced in the reservoir. The NCG moves to the top of the steam chamber, where it exerts pressure on any fluids it encounters.

[21] Steam and Gas Push [SAGP] is a variant of SAGD. SAGP introduces a NCG (such as methane) with or without a portion of steam. The gas rises through the steam chamber and occupies the space vacated by steam condensation. It exerts pressure to drive oil down in the same manner as steam, but more efficiently. Vapor-assisted petroleum extraction [VAPEX] involves injecting a gas mixture comprising molecules larger than ethane or methane (e.g., propane or butane) to reduce oil viscosity.

III. Pleadings and History of the Proceedings

[22] On October 2, 2013, Mr. Swist provided written notice to MEG of his assertion of rights arising from the 746 Patent. On April 3, 2014, Mr. Swist assigned ownership of the 746 Patent to CSL.

[23] Swist commenced this action by Statement of Claim dated April 29, 2014. Initially, Swist claimed that MEG was infringing all claims of the 746 Patent. However, following amendment of its pleadings on June 23, 2014, July 27, 2018, and July 26, 2019, Swist limited the scope of the action to claims 1 to 6 and 8.

[24] MEG filed its Statement of Defence and Counterclaim on July 23, 2014. Its pleadings were subsequently amended on September 12, 2014, August 8, 2018, and July 16 and August 6, 2019. MEG's amended Counterclaim alleged that claims 1 to 8 of the 746 Patent were invalid on the grounds of anticipation, obviousness, overbreadth, lack of utility/sound prediction, insufficiency, ambiguity, and omission under s 53 of the *Patent Act*, RSC 1985, c P-4. In closing submissions, MEG informed the Court that it was no longer advancing the grounds of insufficiency, ambiguity, and omission under s 53 of the *Patent Act*.

IV. 746 Patent

[25] The priority date of the 746 Patent is May 19, 2011, the date of Swist's US provisional application (US201161487770P). The filing date of the 746 Patent is May 15, 2012. Its publication date is November 22, 2012. The 746 Patent was issued on September 24, 2013.

[26] In April 2011, Mr. Swist contacted Dr. Ergun Kuru of the University of Alberta to perform simulations to test the inventions described in the 746 Patent. Dr. Kuru prepared a report titled "Numerical Study of Pressure Assisted Oil Recovery Technique for Optimizing Thermal Recovery" dated February 28, 2012 [Kuru Report]. Swist paid approximately $4,000.00 for the Kuru Report. Most, but not all, of the results contained in the Kuru Report are included in the 746 Patent.

[27] Swist also retained a company in Edmonton called Alberta Innovates Technology Futures [AITF] to review the Kuru Report and perform further simulations. This resulted in a report titled "Evaluating the Performances of SAGD Processes" dated May 2012 [AITF Report]. Swist paid approximately $5,000.00 for the AITF Report. The AITF Report results are not included in the 746 Patent.

[28] The 746 Patent states that the Field of Invention "relates to oil recovery and more specifically to exploiting pressure in oil recovery."

[29] The Background of the Invention describes the evolution of CSS and SAGD, and notes some limitations with both techniques. With respect to SAGD, the 746 Patent identifies:

> […] the need to more quickly achieve production from the SAGD wells, the need to heat the formation laterally between laterally spaced wells to increase the oil recovery percentage; and provide SAGD operating over deeper oil sand formations.

[30] The Background of the Invention concludes as follows:

> […] the inventor has established that beneficially pressure differentials may be exploited to advance production from SAGD wells by increasing the velocity of heavy oils, that pressure differentials may be exploited to adjust the evolution of the steam chambers formed laterally between laterally spaced wells to increase the oil recovery percentage, and provide SAGD operating over deeper oil sand formations.

[31] According to the Summary of the Invention, one of its objects is "to enhance second stage oil recovery and more specifically to exploiting pressure in oil recovery". "Second stage oil recovery" refers to the injection of an external fluid, such as water or gas, into a reservoir to facilitate extraction.

[32] The 746 Patent provides a Brief Description of the Drawings and describes the embodiments of the invention "by way of example only". The 746 Patent then provides a Detailed Description of the invention, followed by 17 claims.

V. Claims in Issue

[33] Swist alleges infringement of claims 1 to 6 and 8 of the 746 Patent. MEG denies infringement, and counterclaims that claims 1 to 8 are invalid.

[34] Claim 1 is independent, and reads as follows:

> 1. A method comprising:
>
> providing first and second well pairs separated by a first predetermined separation, each well pair comprising:
>
> a first well within an oil bearing structure; and
>
> a second well within the oil bearing structure at a first predetermined vertical offset to the first well, substantially parallel to the first well and a first predetermined lateral offset to the first well;
>
> providing a third well within the oil bearing structure at a predetermined location between the first and second well pairs;
>
> selectively injecting a first fluid into the first well of each well pair according to a first predetermined schedule under first predetermined conditions to create a zone of increased mobility within the oil bearing structure; and
>
> generating a large singular zone of increased mobility by selectively injecting a second fluid into the third well according to a second predetermined schedule under second predetermined conditions at least one of absent and prior to any communication between the zones of increased mobility.

[35] Claims 2 to 8 depend from claim 1. They are described as follows:

2. A method according to claim 1 wherein,

the second predetermined schedule begins injection of the second fluid into the third well before a depletion zone resulting from injection of the first fluid into the first well of the first well pair merges with another depletion zone resulting from concurrent operation of the second well pair disposed in mirror relationship with respect of the third well with the first well pair.

3. The method according to claim 1 wherein at least one of:

the first well in at least one of the first and second well pairs does not inject the fluid whilst the second well of the at least one the first and second well pairs is producing; and

the fluid is at least one of steam, water, carbon dioxide, nitrogen, propane and methane.

4. The method according to claim 1 wherein,

injection into the third well is made at a higher pressure than injection into the first wells of each well pair.

5. The method according to claim 1 wherein,

at least one of:

the second predetermined conditions comprise at least injecting the second fluid at a pressure that is substantially at least one of lower and higher than the pressure at that at region of the oil bearing structure within which the second well of at least one of the first and second well pairs is disposed; and

the second predetermined schedule comprises at least operating the third well to extract oil from the oil bearing structure, and operating the third well whilst injecting a second fluid into the first well of at least one of the first and second well pairs under second predetermined conditions.

6. The method according to claim 1 wherein,

at least one of the:

first and second wells form a well pair comprising a predetermined portion of an array of well pairs and the third well is disposed in predetermined relationship between two well pairs; and

> the first and second wells are disposed towards the lower boundary of the oil bearing structure and the third well is disposed vertically towards the upper boundary of the oil bearing structure.
>
> 7. The method according to claim 1 further comprising;
>
> a second injection well disposed in predetermined relationship to the third well.
>
> 8. The method according to claim 1 wherein,
>
> the large singular zone substantially depletes the oil bearing reservoir between the first and second well pairs.

VI. Issues

[36] The issues raised in these proceedings are whether claims 1 to 6 and 8 of the 746 Patent are infringed by MEG's Christina Lake operation, and whether claims 1 to 8 are valid.

VII. Evidence

A. *Fact and Expert Witnesses*

(1) Swist's Witnesses

[37] **Mr. Ronald Jason Swist** is the named inventor of the 746 Patent and, together with his wife, is the owner of CSL. Mr. Swist was called as a fact witness.

[38] **Dr. Vikram Rao** is a metallurgist with nearly 40 years of varied experience in the oil and gas industry. He was qualified as an expert in the oil and gas industry, in particular horizontal well drilling and extraction, methods of heavy oil recovery, and evaluation of oil fields including understanding the characteristics of underground heavy oil reservoirs.

[39] **Mr. Dale Walters** is the Engineering Manager at the Calgary office of CGG, a geoscience consulting company. He specializes in analyzing thermal recovery processes related to bitumen and heavy oil production, and has 33 years of experience in the petroleum industry. He was qualified as an expert in reservoir analysis and modelling, computer-assisted simulations of oil-bearing reservoirs, including modelling of thermal recovery processes for heavy oil extraction, and reservoir simulation technology.

(2) MEG's Witnesses

[40] **Dr. Bruce Carey** is an independent technical evaluator of Alberta heavy oil recovery processes. He is a Research and Engineering Advisor specialized in the field of thermal recovery research and industry surveillance at Peters & Co Ltd. He was qualified as an expert engineer in thermal oil recovery.

[41] **Dr. Thomas Boone** is an engineering consultant and registered professional engineer with the Association of Professional Engineers and Geoscientists of Alberta. He has more than 30 years of experience in the oil industry. He was qualified as an expert professional engineer in

heavy oil and conventional enhanced oil recovery projects, simulations and research, including thermal recovery processes, infill well fields, and 4-D seismic monitoring of infill well fields.

[42] **Mr. Chi-Tak Yee** is the Chief Operating Officer of MEG. He has more than 35 years of experience in oil sands extraction, including extensive involvement in SAGD projects. He worked under Dr. Butler as a graduate student and alongside him at GravDrain, a consultancy they established together. Mr. Yee was called as a fact witness.

[43] **Dr. Ian D. Gates** is a Professor in the Department of Chemical and Petroleum Engineering at the University of Calgary. His research and teaching focus on key concepts related to thermal bitumen extraction, including SAGD and its modifications. He is also a consultant on SAGD, CSS and other recovery methods. He was qualified as an expert in reservoir and petroleum engineering, especially in the area of SAGD and its variants.

B. *Observations Regarding the Evidence*

[44] The parties largely agreed upon the qualifications of the witnesses who were called to give expert opinion evidence. However, MEG expressed reservations about Dr. Rao's expertise, noting that he was not active in the field of bitumen recovery or SAGD as of May 2011, the priority date of the 746 Patent. At all relevant times, Dr. Rao worked at Research Triangle Energy Consortium, an organization founded in 2007 by a number of American universities and a non-profit research institute with the aim of solving technical, economical, societal and public policy problems related to the use of energy. MEG notes that Dr. Rao's expertise in drilling is

largely irrelevant to the 746 Patent, and none of Dr. Rao's patents concern methods of practising SAGD or modifications of SAGD.

[45] While I have accepted Dr. Rao as an expert in the oil and gas industry, including methods of heavy oil recovery, I acknowledge that CSS and SAGD are not his principal areas of focus. Nevertheless, I am satisfied that he is sufficiently qualified to offer the opinions he did. The weight to be given to those opinions is another matter, and this is addressed at the appropriate juncture below.

[46] Swist maintains that Dr. Gates should not be accepted as an expert witness, or alternatively that his testimony should be given little to no weight. MEG says that Dr. Gates failed to comply with the Court's Code of Conduct for Expert Witnesses [Code of Conduct], and demonstrated a lack of candour and a lack of impartiality.

[47] The Code of Conduct states that an expert witness "has an overriding duty to assist the Court impartially", and an expert report shall include "particulars of any aspect of the expert's relationship with a party to the proceeding or the subject matter of his or her proposed evidence that might affect his or her duty to the Court". Swist asserts that Dr. Gates did not comply with the Code of Conduct by neglecting to disclose the following:

(a) Dr. Gates communicated with Mr. Swist in 2012 before this litigation was commenced to discuss simulations relating to the 746 Patent, and received information that was confidential at the time.

(b) Dr. Gates and Mr. Swist discussed avenues to commercialize Mr. Swist's invention.

(c) Dr. Gates gave no indication at the time that he thought the 746 Patent contained any flaws, and instead conveyed a positive impression of the patent, with words of encouragement such as "congrats on the claims" and "looks good".

(d) When asked by Mr. Swist to assist as an expert in these proceedings, Dr. Gates declined and said that he preferred to "stay out of legal jousts".

(e) Dr. Gates met Mr. Swist in person after these proceedings were commenced to discuss another invention developed by Mr. Swist in relation to the oil and gas industry.

[48] MEG responds that Mr. Swist has not established any conflict of interest. Dr. Gates testified that, at the time of his retainer by MEG, he had simply forgotten his prior involvement with Mr. Swist. The research project he discussed with Mr. Swist did not ultimately proceed. To the extent that any documents provided to Dr. Gates by Mr. Swist were confidential at the time, they were no longer confidential when Dr. Gates was asked to provide evidence on behalf of MEG in this litigation.

[49] Dr. Gates testified that he did not review the documents provided to him by Mr. Swist in the course of their interaction. He provided words of encouragement only because he is generally supportive of people achieving things, and this should not be interpreted as any sort of

endorsement. He declined to testify in support of Mr. Swist in this litigation because he was busy at the time.

[50] The failure to disclose any aspect of an expert's prior relationship with a party to a proceeding, as required by the Code of Conduct, may affect the weight to be given to an expert's evidence (*Kwicksutaineuk Ah-Kwa-Mish First Nation v Canada (Attorney General),* 2012 FC 517 at paras 69-70). However, the Court may choose to accept an expert's explanation of forgetfulness (*Amgen Inc v Pfizer Canada ULC*, 2020 FC 522 at para 152).

[51] I am satisfied that Dr. Gates did not make improper use of confidential information provided to him by Mr. Swist before these proceedings were commenced. Nor is there any reason to think that Dr. Gates harbours an animus against Mr. Swist. Dr. Gates' failure to recall his prior interaction with Mr. Swist at the time of his retainer by MEG, despite exchanging e-mail messages, discussing matters by telephone and in-person, and preparing a research proposal, is surprising. However, it is not wholly implausible. Dr. Gates explained that he is often approached by aspiring inventors seeking his input, advice and assistance with research.

[52] A more troubling aspect of Dr. Gates' testimony is his account of the manner in which he conducted his search for prior art related to the 746 Patent. Dr. Carey and Dr. Gates, both of whom testified in support of MEG, each claimed that they had conducted their own literature search, including personally performing the searches of the USPTO databases. Both experts also testified that they had not reviewed the other's report. However, their search terms and results were identical, including the day on which they were performed.

[53] In closing argument, counsel for MEG admitted that the literature search had been developed by Dr. Carey and then provided to Dr. Gates by counsel. Dr. Gates apparently agreed with the search string, and adopted the results as his own.

[54] Counsel's explanation for the identical prior art searches performed by Dr. Carey and Dr. Gates is not evidence. Nor can it be reconciled with Dr. Gates' clear statement under cross-examination that he personally formulated the search terms that produced the results appended to his expert report:

> Q. What I am trying to get is who came up with the specific search string, was that you?
>
> A. I, I came up with this set of search strings.

[55] Swist also complains that Dr. Gates demonstrated a willingness to act as an advocate for MEG rather than as an impartial witness to assist the Court. He refused to agree to simple propositions, preferring instead to engage in irrelevant speeches.

[56] There is an unfortunate tendency in some expert witnesses to provide short, direct answers in examination in chief, and considerably longer, less direct answers in cross-examination. While this may not detract from their credibility, it may nevertheless raise questions regarding their impartiality. Swist's criticisms of Dr. Gates are well-founded, but they apply equally to Dr. Rao, who often gave long, unwieldy answers in cross-examination.

[57] Despite these reservations, I am not prepared to wholly reject or discount the evidence of any witness who was called to testify in these proceedings. My reasons for preferring some witnesses' evidence over that of others are explained in the analysis that follows.

VIII. Claim Construction

A. *Legal Principles and Relevant Dates*

[58] The first step in a patent suit is to construe the claims to ascertain their meaning and determine their scope (*Whirlpool Corp v Camco Inc*, 2000 SCC 67 [*Whirlpool*] at para 43). In claim construction, the Court examines a patent's claims to identify what the inventor considered to be their "essential elements". This process may be aided by expert evidence regarding the meaning of specific terms (*Whirlpool* at paras 45, 57). The relevant date for claim construction is the date of publication of the patent application: November 22, 2012 (*Whirlpool* at paras 54-55).

[59] Where patent language can bear more than one equally plausible meaning, the Court must adopt a reasonable view of patent language to afford the inventor protection for that which he or she has in good faith actually invented; however, this does not mean that in all cases the Court must adopt any arguable interpretation that would uphold the patent (*ABB Technology AG v Hyundai Heavy Industries Co, Ltd*, 2015 FCA 181 at para 45). There is no general presumption of interpretation in favour of the inventor, but a patent should not be invalidated on a technicality (*Seedlings Life Sciences Ventures, LLC v Pfizer Canada ULC*, 2020 FC 1 at para 59).

[60] The canons of claim construction are found in the Supreme Court of Canada's decisions in *Whirlpool* at paragraphs 49 to 55 and *Free World Trust v Électro Santé Inc*, 2000 SCC 66 [*Free World Trust*] at paragraphs 44 to 54. They are the following:

(a) The words of the claims must be read in an informed and purposive way with a mind willing to understand, viewed through the eyes of the person of ordinary skill in the art [PSA] as of the date of publication having regard to the PSA's common general knowledge.

(b) The *Patent Act* promotes adherence to the language of the claims. This allows the claims to be read in the manner the inventor is presumed to have intended, and in a way that is sympathetic to accomplishing the inventor's purpose, which promotes both fairness and predictability.

(c) The whole of the patent's specification should be considered to ascertain the nature of the invention, and the claim construction must be neither benevolent nor harsh, but should instead be reasonable and fair to both the patentee and the public. The focus of the validity analysis is on the claims; specifications will be relevant only where there is ambiguity in the claims (*AstraZeneca Canada Inc v Apotex Inc*, 2017 SCC 36 [*AstraZeneca* SCC] at para 31).

(d) Claim construction must be the same for the purpose of validity and for the purpose of infringement.

B. *Person of Ordinary Skill in the Art [PSA]*

[61] In order to construe the claims in issue, the Court must define the PSA. The PSA is unimaginative and uninventive, but reasonably diligent in keeping up with advances (*Pfizer Canada Inc v Teva Canada Limited*, 2017 FC 777 at para 185). The PSA is not incompetent, and brings background knowledge and experience to the workbench (*AstraZeneca Canada Inc v Apotex Inc*, 2015 FC 322 [*AstraZeneca* FC] at para 276). The PSA is not stripped of the ability to pursue reasonable and logical enquiries, and can make deductions based on the information available (*Jay-Lor International Inc v Penta Farm Systems Ltd*, 2007 FC 358 at para 75, citing *Beloit Canada Ltd v Valmet Oy* (1986), 8 CPR (3d) 289 at 294 (FCA)).

[62] Swist says that the PSA is a person with a bachelor's degree in petroleum engineering or similar technical discipline, with three to five years of practical experience of production from hydrocarbon reservoirs. Dr. Carey would extend the practical experience of the PSA to five years, and would insist on experience of thermal recovery processes. Dr. Gates similarly described the PSA as someone with an undergraduate degree in chemical or petroleum engineering with five years of work experience relating to the extraction of bitumen from oil sands, with personal experience of the operation of SAGD well pairs and/or CSS wells and an understanding of both.

[63] I agree with MEG that the PSA has practical experience of SAGD and CSS, although I see no reason why this could not be acquired in three years rather than five. I therefore conclude that the PSA is someone with an undergraduate degree in chemical or petroleum engineering and

three to five years of practical experience relating to the extraction of bitumen from oil sands, including the operation of SAGD and CSS.

C. *Common General Knowledge of the PSA*

[64] The patent must be construed taking into account the "common general knowledge" shared by persons skilled in the art (*Free World Trust* at para 44; *Whirlpool* at para 53). This is the knowledge possessed by the PSA at the relevant time, and includes what the PSA would reasonably have been expected to know (*Whirlpool* at para 74). The common general knowledge of the PSA must be established with evidence on a balance of probabilities, and cannot be assumed (*Uponor AB v Heatlink Group Inc*, 2016 FC 320 at para 47). Common general knowledge may include the information presented as background knowledge in the patent itself (*Newco Tank Corp v Canada (Attorney General)*, 2015 FCA 47 at para 10).

[65] The assessment of common general knowledge is governed by the principles found in *Eli Lilly & Company v Apotex Inc*, 2009 FC 991 at paragraph 97 (aff'd, 2010 FCA 240), citing *General Tire & Rubber Co v Firestone Tyre & Rubber Co*, [1972] RPC 457 (UKHL) at pages 482 to 483:

(a) the common general knowledge imputed to the PSA must be carefully distinguished from what in patent law is regarded as public knowledge;

(b) common general knowledge is a different concept derived from a common sense approach to the practical question of what would in fact be known to an appropriately skilled addressee—the sort of person, good at his or her job, who could be found in real life;

(c) individual patent specifications and their contents do not normally form part of the relevant common general knowledge, although there may be specifications which are so well known that they do form part of the common general knowledge, particularly in certain industries; and

(d) scientific papers only become general knowledge when they are generally known and accepted without question by the bulk of those who are engaged in the particular art; in other words, when they become part of their common stock of knowledge relating to the art.

[66] Swist acknowledges that the common general knowledge encompasses known heavy oil recovery techniques, such as SAGD and CSS. However, Swist cautions that not every patent specification relied upon by MEG is necessarily part of the common general knowledge. There is no dispute that United States Patent No US 7,556,099 [Arthur Patent], which is discussed in the 746 Patent, forms a part of the PSA's common general knowledge.

[67] According to MEG:

> The common general knowledge of the Skilled Person is largely undisputed – Dr. Rao agreed with MEG's experts' opinions, with

> minor, immaterial additions. The common general knowledge include[s] adjacent SAGD well pairs, wells between those well pairs, the operation of CSS, and injecting fluid into production wells prior to their operation as production wells. Dr. Rao further admitted that: (i) determining well locations based on reservoir properties is "driven by the well properties and informed by simulations. This is in the common general knowledge."; (ii) "[a]ny well intended to become a production well will get warmed up, including the SAGD well pairs before SAGD operation. … That's common general knowledge"; and (iii) heating up an offset well for some period of time, including days, weeks, a month or a few months, prior to operating it as a production well is common general knowledge [citations omitted].

[68] I therefore conclude that the common general knowledge of the PSA encompasses the operation of SAGD and CSS methods to recover oil, including the theoretical and practical considerations described by MEG in the preceding paragraph, and disclosed in the Arthur Patent.

D. *Claim Terms Needing Construction*

[69] Claim construction is a matter of law for the judge. Expert evidence is necessary only where the meaning of a term is not apparent based on a reading of the patent specification (*Johnson & Johnson Inc v Boston Scientific Ltd*, 2008 FC 552 at para 92).

[70] Claim 1 is the only independent claim alleged to be infringed. Claims 2 to 8 depend from claim 1. A dependent claim incorporates the elements of the independent claim by reference.

[71] I have found expert evidence to be useful in construing the following terms in claims 1 and 2:

- "well pairs"

- "third well"

- "zone of increased mobility"

- "communication"

- "generating"

- "depletion zone"

[72] My construction of these terms is below.

(1) *"well pairs"*

[73] Claim 1 describes:

> 1. A method comprising:
>
> providing first and second **well pairs** separated by a first predetermined separation, each **well pair** comprising:
>
> > a first well within an oil bearing structure; and
> >
> > a second well within the oil bearing structure at a first predetermined vertical offset to the first well, substantially parallel to the first well and a first predetermined lateral offset to the first well.

[74] Swist says that the first element of claim 1 describes traditional SAGD, and the PSA reading claim 1, without an eye to infringement or validity, would readily recognize the configuration of the well pairs as SAGD. As of the relevant date, SAGD was a well known and proven method that specifically used a "well pair" comprising an injector and a producer. Furthermore, the 746 Patent explicitly describes its invention as a modification of SAGD:

> […] the inventor has established that beneficially pressure differentials may be exploited to advance production from SAGD wells by increasing the velocity of heavy oils, that pressure differentials may be exploited to adjust the evolution of the steam chambers formed laterally between laterally spaced wells to increase the oil recovery percentage, and provide SAGD operating over deeper oil sand formations.

[75] In his expert report, Dr. Gates wrote that the PSA "would understand that the 746 Patent generally relates to a method of practicing SAGD with an additional well positioned between two SAGD well pairs". He also observed that the PSA "would understand that a fluid is injected into each injection well and that the fluid injection heats the bitumen surrounding the injection well, as was commonly understood to be done in SAGD operations". Dr. Carey expressed the view in his expert report that the PSA "would understand that this operation of the second wells is consistent with the operation of a SAGD well pair, described in the 746 Patent, which has an upper injection well (first well) and a lower production well (second well)".

[76] In his oral testimony, Dr. Carey refined his opinion to assert that the PSA would understand that the well orientation described in claim 1 encompasses SAGD, but is not limited to SAGD:

> […] there are other gravity operations and processes that go on that use the same well pairs, the same well pair configuration, but they do not use steam. And, therefore, they would not be classified as SAGD.

[77] However, according to Dr. Carey's expert report, "injection of steam, water, carbon dioxide, nitrogen, propane, or methane, or a mixture of those fluids via the injector well is a known component of traditional SAGD". The Arthur Patent refers to the use of steam and natural gas as mobilizing fluids in SAGD.

[78] MEG notes that claim 1 provides for a "vertical" and "lateral" offset between the first and second wells, and this permits a "zero" offset in both instances. The disclosure of the 746 Patent describes well pairs with zero vertical offset (Figure 2268 and 2369), and zero or no horizontal offset (Figures 7A, 8, 9, 16, 19-21 and 2470), as embodiments of the invention.

[79] In oral testimony, Dr. Carey admitted that SAGD may be operated in a wide range of different configurations, including with the producer well above the injector well: "[…] in the normal understanding of it, yes, the bottom well would be the producer, but I have seen patents […] that [have] the injector at the bottom and the producer at the top." Asked to comment on Invention-4 of the Kuru Report, Dr. Gates said: "Now, the thing is, in this case, the well pairs are – they have zero vertical offset, and they have a horizontal offset. So, you know, it is still a SAGD well pair, but this time with a horizontal zero offset and a zero vertical offset in the configuration."

[80] The 746 Patent describes Figures 23A and 23B as follows:

> Figures 23A and 23B depict simulation results for a pressure assisted oil recovery process according to an embodiment of the invention with horizontally disposed SAGD well pairs operating with injectors at lower pressure than laterally disposed intermediate wells such as depicted in Figure 2.

[81] I therefore prefer the construction of "well pairs" proposed by Swist. Read as a whole, the 746 Patent relates to a modification of traditional SAGD that is intended to increase oil recovery percentage and reduce the time required for extraction. The well pairs described in claim 1 are traditional SAGD well pairs.

(2) *"third well"*

[82] Claim 1 envisages:

> providing a **third well** within the oil bearing structure at a predetermined location between the first and second well pairs;

[83] Another reference to the "third well" appears later in claim 1:

> generating a large singular zone of increased mobility by selectively injecting a second fluid into the **third well** […]

[84] In his expert report, Dr. Rao expressed the view that the "third well" in claim 1 "is not defined to have any other necessary characteristics other than being capable of being used to inject a fluid into the oil bearing structure, as described further in the claim language." However,

in his oral testimony Dr. Rao rejected the proposition that the "third well" could potentially be a CSS well.

[85] Dr. Gates and Dr. Carey both maintained that the "third well" could indeed be a CSS well, because in the initial stage of its operation cycle, a CSS well meets the claim's requirement of fluid injection.

[86] I prefer the construction of "third well" advocated by MEG. There is nothing in the language of claim 1 that requires the third well to function only as an injector well. Nor is this limitation necessary to render the claim language meaningful. It is noteworthy that claim 5 of the 746 Patent, which is a dependent claim, explicitly refers to "operating the third well to extract oil from the oil bearing structure", meaning that it may potentially be used as both an injector and a producer well.

(3) *"zone of increased mobility"*

[87] Claim 1 describes:

> selectively injecting a first fluid into the first well of each well pair according to a first predetermined schedule under first predetermined conditions to create a **zone of increased mobility** within the oil bearing structure; and
>
> generating a large singular **zone of increased mobility** by selectively injecting a second fluid into the third well according to a second predetermined schedule under second predetermined conditions at least one of absent and prior to any communication between the **zones of increased mobility.**

[88] According to Swist, a "zone of increased mobility" is a steam chamber. Swist acknowledges that there is a small area beyond the steam chamber where oil is more mobile, which Swist characterizes as "only a thin 'shell' or 'rind' along the edge of the steam chamber at the steam-oil interface". Swist argues that this construction is sympathetic to the inventor's purpose of putting the invention into practice and producing oil. Conversely, adopting a construction that provides for an undefined mobile zone beyond the steam chamber imparts no useable instruction to a PSA attempting to put the invention into practice.

[89] MEG points out that claim 1 does not use the term "steam chamber". Dr. Gates and Dr. Carey expressed the view that "zone of increased mobility" refers to the area around the first and third wells where bitumen has been heated and mobilized by fluid injection. Dr. Rao equated the "zone of increased mobility" to a steam chamber in his report, but in oral testimony he explained that the "zone of increased mobility is a zone where heavy oil is rendered more mobile".

[90] There appears to be little divergence between the positions advocated by the parties. I conclude that the "zone of increased mobility" encompasses a steam chamber and the "shell" or "rind" along its outer edge where bitumen has become mobile and flows towards a producer well.

(4) *"communication"*

[91] Claim 1 describes:

> generating a large singular zone of increased mobility by selectively injecting a second fluid into the third well according to a second predetermined schedule under second predetermined conditions at least one of absent and prior to any **communication** between the zones of increased mobility.

[92] Swist says that "communication" in claim 1 refers to steam chamber merger. According to Swist, the PSA, familiar with SAGD and reading the patent as a whole, would consider "fluid communication" to be the only kind of communication contemplated by claim 1. Swist notes that the disclosure of the 746 Patent never refers to "pressure communication" or "thermal communication", but does use the term "fluid communication".

[93] There is no dispute that three separate forms of communication within an oil reservoir would be known to the PSA: fluid communication, thermal communication and pressure communication. Because claim 1 refers to "any communication", MEG argues that all three forms of communication are contemplated.

[94] Swist responds that MEG's proposed construction of "any communication" is not purposive and leads to absurdity. If Dr. Boone's and Dr. Gates' construction is accepted, then in virtually all practical applications of the invention claimed in the 746 Patent, communication occurs almost immediately, within days of any injection. Adopting MEG's construction would effectively limit the claims to commencing third well injection contemporaneously with the SAGD wells, but this is not what the claims describe.

[95] I agree with Swist, and conclude that "communication" in claim 1 refers to steam chamber merger. In his expert report, Dr. Carey used "merger" and "communication"

interchangeably. Dr. Gates similarly observed that "the third well acts as an injector that is there to generate a large singular mobilized zone, and injection into it has to be prior to the merger of the mobilized zones" (*i.e.*, merger of the steam chambers and the mobilized bitumen at their outer edges).

(5) *"generating"*

[96] Claim 1 refers to:

> **generating** a large singular zone of increased mobility by selectively injecting a second fluid into the third well according to a second predetermined schedule under second predetermined conditions at least one of absent and prior to any communication between the zones of increased mobility.

[97] Swist asserts that the PSA would understand the third well and the two well pairs to be working together in generating the large singular zone of increased mobility. Zones of increased mobility will eventually merge regardless of the third well. Swist therefore argues that "generating" cannot mean that the third well causes the merger, because this would be redundant: "[t]hird well operation must necessarily do something besides cause something that will occur regardless". According to Swist, a reasonable construction of "generating" is that the third well must "positively influence" the generation of a large singular zone of increased mobility.

[98] Dr. Carey and Dr. Gates expressed the view that the PSA would understand that injection of fluid into the third well must cause the merger of the zones of increased mobility. MEG says

that, if Swist's construction of the term "generating" is accepted, then any minimal amount of injection would be sufficient to infringe the asserted claims, because it might "positively influence" the merger of the steam chambers. In contrast, Dr. Carey asserted in his expert report that:

> […] in the figures, the third well is always operated continuously in the 746 Patent and for a long period of time (10 years for all of the simulations except Figure 18 which delayed injection by 5 years). There is no example of short term injection into the third well. The Skilled Person would understand that injection must be continuous into the third well to cause the merger of the zones of increased mobility.

[99] I agree with MEG that the threshold of "positively influence" is too low, and "generating" implies a causal relationship. While Swist is right to say that, in most applications, the steam chambers generated by SAGD well pairs will eventually merge, the purpose of the invention claimed in the 746 Patent is to accelerate the process and improve the percentage of the oil recovered.

[100] I therefore conclude that injection of the third well must have a material and substantial effect on the speed with which the steam chambers merge and their ultimate dimensions. It is not enough for injection of the third well to merely have a "positive influence" on the process. Injection of the third well must cause the merger of the steam chambers to occur sooner than would otherwise be the case, and ultimately permit the operation of SAGD over deeper oil sand formations.

(6) *"depletion zone"*

[101] Claim 2 describes:

> the second predetermined schedule begins injection of the second fluid into the third well before a **depletion zone** resulting from injection of the first fluid into the first well of the first well pair merges with another **depletion zone** resulting from concurrent operation of the second well pair disposed in mirror relationship with respect of the third well with the first well pair.

[102] All expert witnesses generally agreed that a "depletion zone" refers to the area where bitumen has been drained and therefore depleted. In the words of Dr. Boone (in the context of claim 1): "one simplification that I tend to use in the report, and it's commonly used in industry, and it originates with Dr. Butler, is the assumption that, for simplicity, you can assume the steam chamber is coincident with the depleted chamber".

[103] Dr. Carey explained the minor difference between a "steam chamber" and a "depletion zone" as follows:

> They are close. One would be where the actual presence of steam is. The other one would be where there has been sufficient steam that a substantial volume of bitumen has been drained and thus depleted.

[104] To the extent that anything turns on the construction of "depletion zone" in claim 2, I adopt Dr. Carey's definition. A depletion zone is one where there has been sufficient steam that a substantial volume of bitumen has been drained and thus depleted.

IX. Infringement

A. *Legal Principles*

[105] Section 42 of the *Patent Act* grants the patent holder the exclusive right, privilege and liberty of making, constructing and using the invention and selling it to others to be used. A patent is infringed by any act that interferes with the patentee's full enjoyment of the monopoly granted (*Monsanto Canada Inc v Schmeiser*, 2004 SCC 34 [*Monsanto*] at para 34).

[106] Pursuant to s 55(1) of the *Patent Act*, any person who infringes a patent is liable for all damages sustained by the patentee after the grant of the patent by reason of infringement. The burden of proving infringement rests with the party that alleges it (*Monsanto* at para 29). The burden therefore falls upon Swist.

B. *Analysis*

[107] Swist seeks to prove infringement with reference to the following:

(a) the eMSAGP and eMVAPEX methods described by MEG in its patents and approved for use by the Alberta Energy Regulator [AER];

(b) activation of third wells before 30% to 35% recovery at all pads at MEG's Christina Lake reservoir;

(c) activation of third wells within three to four years of SAGD operation at all pads; and

(d) computer simulations performed by Mr. Walters.

[108] There is no question that MEG uses an array of SAGD well pairs, each comprising an injector and a producer well, with third wells in between. MEG calls its third wells "infill wells".

[109] MEG injects steam, or a combination of steam and methane, into the SAGD injector wells at a predetermined schedule under predetermined conditions. It is common ground that injection into the SAGD injector wells creates a steam chamber and a zone of increased mobility within the oil bearing structure.

[110] MEG's submissions to the AER and its operational data disclose the dates of the first activation of its infill wells, subsequent injection dates, production dates, volumes, pressures, and rates at each of its wells at Christina Lake. MEG's methods are also described in the 704 Patent and 159 Patent.

[111] Claim 1 of the 746 Patent requires injection into the third well prior to communication between adjacent steam chambers. Claim 2 requires injection into the third well before merger of adjacent depletion zones. In practice, steam chambers and depletion zones are almost interchangeable. If steam chambers have not merged, then depletion zones have not merged.

[112] The Christina Lake reservoir consists of several sets, or arrays, of SAGD well pairs that MEG refers to as "well pads". Swist asserts that MEG injects steam into its infill wells at an early stage. With rare exceptions, MEG activates each of its infill wells at the V-Pad before the merger of adjacent steam chambers or depletion zones.

[113] Swist relies on MEG's submissions to the AER in November 2012, which include the following statement:

> […] For a typical reservoir thickness of 20m at MEG's Christina Lake area, the chamber would have substantially reached the top of the SAGDable zones at 30-35% recovery (which corresponds to 3 to 4 years of SAGD operation) and be on the verge of contacting neighbouring steam chambers.

[114] According to Swist, MEG's operational data confirm that 76 of its infill wells were activated before 30% recovery, and 92 of its infill wells were activated before 35% recovery. Furthermore, Dr. Gates conceded that third well injection at 0% oil recovery would necessarily constitute injection prior to steam chamber merger. At the very least, infill well activation occurred at one well on the V-Pad (V3P) prior to merger, because the adjacent infill well injection commenced at 0% oil recovery.

[115] Based on MEG's submission to the AER that SAGD steam chambers are typically on the "verge" of merger at "3 to 4 years of SAGD operation", Swist says that 48 months is a reasonable time estimate for steam chambers to merge. MEG's operational data confirm that the vast majority (95 of 111) of its infill wells were activated within 48 months of commencement of SAGD operations, i.e., prior to steam chamber merger.

[116] The 704 Patent (eMSAGP) and 159 Patent (eMVAPEX) also suggest that MEG activates its infill wells before merger of adjacent SAGD steam chambers. This is one way in which MEG distinguished its inventions from the prior art. The 704 Patent states at page 6:

> It is not necessary for the steam chambers 55, 65 or the "mobilized zones" in the terminology of [the Arthur Patent] to merge, before commencing additional producer 70 operations, as per the criterion on stored heat used here. In this respect, the present process differs from the one described in [the Arthur Patent].

[117] Similar language appears in the 159 Patent at page 5.

[118] Mr. Walters' computer simulations of MEG's V-Pad demonstrate that MEG commences injection of its infill wells before the adjacent SAGD steam chambers have merged. Swist says that Mr. Walters used conservative assumptions for reservoir properties such as permeability and porosity that would tend to favour MEG.

[119] MEG objects that Dr. Rao and Mr. Walters only considered the operation of MEG's infill wells at the V-Pad. Although both experts had access to other data, neither modelled any other well pad or examined the volume or duration of steam injection at all of MEG's infill wells.

[120] MEG also objects to Swist's reliance on the 704 Patent and 159 Patent, and says that infringement cannot be based on the language of patents but must be established using data from real-world operations. MEG asserts that its operations, including injection timing, differ well-by-well and must be analyzed on that basis.

[121] In addition, MEG challenges the accuracy of Mr. Walters' modelling on numerous technical grounds, summarized by Dr. Boone in his expert report as follows:

(a) the assumptions in the model are not "conservative";

(b) the model is not unique to the reservoir and is too simple to represent real-world heterogeneity and outcomes;

(c) the input variables of the model are not the same as the input variables of MEG's reservoir;

(d) the data outputs from the model differ significantly from the observation data from MEG's wells; and

(e) the data relied on to identify the steam chambers are incorrect, and the figures are not properly interpreted to identify mobilized zones.

[122] Swist notes that Mr. Walters' simulations are the only ones before the Court, and criticizes MEG for taking "pot-shots from the sidelines" rather than challenging its experimental data head-on (citing *Astrazeneca* FC at para 298). Swist maintains that MEG could have provided the Court with its own modelling, but chose not to.

[123] Swist asks the Court to draw an adverse inference from MEG's failure to provide any modelling to contradict the computer simulations performed by Mr. Walters. Swist says that an

adverse inference is available as a matter of law (citing *Dow Chemical Company v Nova Chemicals Corporation*, 2014 FC 844 at paras 116 & 218), and also because of MEG's late disclosure of data relating to some computer modelling that MEG performed in-house to support its patent applications and submissions to the AER.

[124] This trial commenced on July 19, 2020, but was unexpectedly adjourned on July 29, 2020 following the revelation by MEG that certain data files relating to its in-house modelling had been discovered only recently. On August 28, 2020, Swist informed the Court that it was ready to proceed. The trial resumed on September 15, 2020. None of the late-disclosed data were entered into evidence, and it is unclear what relevance (if any) they may have had to these proceedings.

[125] Mr. Yee explained the circumstances that led to the late disclosure, which resulted from the departure of one of MEG's employees for health reasons and a failure by MEG to search his personal computer for relevant documents. Mr. Yee also explained that MEG conducted in-house modelling for a period of approximately one month in support of its patent applications and submissions to the AER, but found the modelling to be unreliable in practice and did not use it to develop the Christina Lake reservoir.

[126] In response to Swist's contentions regarding the timing of injection of specific infill wells at the V-Pad, MEG argues that injection occurs only after communication between the adjacent zones of increased mobility. However, this argument is premised on MEG's proposed construction of "any communication" in claim 1 of the 746 Patent to encompass all three types of

communication that would be known to the PSA: pressure, thermal and fluid communication. I have rejected this construction above, and this defence of Swist's infringement allegations must therefore fail.

[127] Considering the eMSAGP and eMVAPEX methods described by MEG in its patents and submissions to the AER, the activation of certain infill wells before 30% to 35% recovery, and the activation of certain infill wells within three to four years of SAGD operation, I am satisfied, on a balance of probabilities, that injection into these infill wells occurs prior to communication between adjacent zones of increased mobility, and before merger of adjacent depletion zones. This conclusion is supported by Mr. Walters' computer simulations, although it is not dependent on them.

[128] I have not found it necessary, or appropriate, to draw an adverse inference against MEG as a matter of law, or due to its late disclosure of certain data files. My conclusion that injection into MEG's infill wells occurs prior to the merger of adjacent steam chambers is sufficiently supported by MEG's operational data.

[129] However, I am not satisfied that Swist has established, on a balance of probabilities, that early injection of the specified infill wells has the effect of "generating a large singular zone of increased mobility".

[130] Relying on Mr. Walters' modelling, Dr. Rao expressed the view that MEG's injection into the infill wells "influences the speed and shape of steam chamber development", and "the

lag time for steam chamber merger in the base case [*i.e.*, conventional SAGD] was about 1 to 8 months longer than in the simulation with intermediate well injection" (with the exception of the V3N and V4N wells, which Dr. Rao considered to be anomalous). Dr. Rao also observed that Mr. Walters' modelling was consistent with MEG's statements to the AER regarding steam chamber development.

[131] Swist says it is a matter of basic science that injecting steam into a reservoir will heat bitumen to increase its mobility. When fluid is added to or removed from the reservoir, it will affect the pressure gradients in the reservoir, causing influence. Ultimately, the purpose of injection is to warm up oil so that it becomes more mobile. Rendering oil more mobile will have a positive influence on the development of the adjacent SAGD well pairs in the same reservoir.

[132] I have concluded in my analysis of claim construction that the threshold of "positively influence" is too low. "Generating" requires a causal connection between injection of the third well and merger of the adjacent steam chambers sooner than would otherwise be the case, ultimately permitting the operation of SAGD over deeper oil sand formations.

[133] Dr. Boone testified that MEG does not inject enough fluid, or for a sufficient length of time, to "generate" a large singular zone of increased mobility. Dr. Boone calculated the number of days and the amount of injection at each of MEG's infill wells, as well as the heated radius that would be formed around each of those wells by injection. He concluded that the average heated zone that would form around MEG's infill wells would have a radius of approximately

three metres, demonstrating that a large singular zone was not generated by injection into the infill well. This conclusion was not effectively challenged in cross-examination.

[134] Dr. Boone also observed that the simulations referred to in the 746 Patent show continuous injection for up to 10 years in volumes of "something like 290,000 cubic metres", which is "several orders of magnitude larger" than what occurs during MEG's operation of its infill wells at Christina Lake. Dr. Gates agreed that MEG's injection of the infill wells would not be sufficient to generate a large singular zone of increased mobility, in part because fluid injection is interspersed with periods of production that prevent a steam chamber from forming around the infill well. Dr. Gates confirmed that MEG's injection volumes are "five to ten percent" of those contained in the simulations referenced in the 746 Patent, and are therefore small amounts.

[135] The evidence in this case demonstrates that MEG injects steam at its infill wells in a limited, often cyclic, manner lasting only a few days, weeks or months, in order to heat the well and near wellbore region. The infill well is then used for many years for production. Indeed, Mr. Walters' simulation data show that MEG's V-Pad infill wells are used mainly for production, interspersed with much shorter injection cycles. According to Dr. Gates, early injection of the infill well is only to stimulate the well, or heat it up:

> The amount of steam that is injected is very small, a small time duration, and you know, it's really to warm the well from surface down to the reservoir and to warm the near-well region. The purpose is not to inject steam into the reservoir, it's to simply stimulate the well to warm it up so that it can go on production. And it may take a few of those stimulations to do that, but that is what the purpose is, is to get the well on production.

[136] Referring to claim 5, which describes the third well functioning as a producer, Swist says that this would not have a negative effect on the generation of a large singular zone of increased mobility. Dr. Gates agreed with this proposition. However, Swist makes the further assertion that drawing fluid towards the infill well from the adjacent SAGD well pairs must cause earlier steam chamber merger than without the infill well. The latter assertion is not supported by the evidence.

[137] I therefore conclude that MEG's use of eMSAGP and eMVAPEX at Christina Lake does not infringe the specified claims of the 746 Patent.

X. Validity

[138] Subsection 43(2) of the *Patent Act* states that a patent is presumed to be valid in the absence of evidence to the contrary. A party alleging invalidity bears the burden of establishing this on a balance of probabilities. The burden therefore falls upon MEG.

[139] MEG challenges the validity of claims 1 to 8 of the 746 Patent on four separate grounds: anticipation, obviousness, inutility, and overbreadth.

A. *Anticipation*

(1) Legal Principles

[140] Pursuant to s 28.2 of the *Patent Act*, a patent claim is invalid for anticipation if the subject matter defined by the claim was disclosed in such a manner that it became available to the public more than one year before the filing date of the application, if disclosed directly or indirectly by the patentee (s 28.2(1)(a)), or at any time before the claim date, if disclosed by any other person (s 28.2(1)(b)), and was enabled to a skilled person (*Eli Lilly Canada Inc v Mylan Pharmaceuticals ULC*, 2015 FC 125 at para 145). Disclosure need not reveal an exact description of the subject matter of a claim, but must be sufficient so that, when read by a PSA who is willing to understand the invention, it can be understood without undue burden (*Apotex Inc v Sanofi-Synthelabo Canada Inc*, 2008 SCC 61 [*Sanofi*] at para 25).

[141] If the disclosure requirement is satisfied, the second requirement to prove anticipation is enablement, *i.e.*, whether the PSA would have been able to perform the invention. Trial and error experimentation is not permitted at the disclosure stage, but is permitted at the enablement stage. For the purposes of enablement, the question is no longer what the PSA would think the disclosure of the prior patent meant, but whether he or she would be able to work the invention (*Sanofi* at para 27).

[142] MEG says that claims 1 to 8 of the 746 Patent are anticipated by one or more of the following:

(a) Arthur Patent;

(b) United States Patent US 5,283,111 [Brannan Patent];

(c) United States Patent US 6,257,334 [Cyr Patent];

(d) United States Patent Application US 2009/0288872) [Coskuner Patent]; and

(e) United States Patent US 5,318,124 [Ong Patent].

[143] For the reasons that follow, I conclude that claims 1 to 8 of the 746 Patent are anticipated, separately and individually, by the Arthur Patent, the Brannan Patent and the Cyr Patent.

(2) Arthur Patent

[144] The Arthur Patent is dated July 7, 2009 and owned by Encana Corporation (now Ovintiv Inc). The 746 Patent acknowledges that the Arthur Patent is prior art.

[145] MEG says that the claimed well orientation and claimed functions of the wells (i.e., fluid injection into the “first” and “third” wells) are disclosed by the Arthur Patent. Dr. Rao conceded that the Arthur Patent discloses adjacent SAGD well pairs with an injection well between them, and that injection at the upper injection wells of each adjacent SAGD well pair creates a first and a second mobilized zone.

[146] This is Figure 3 of the Arthur Patent:

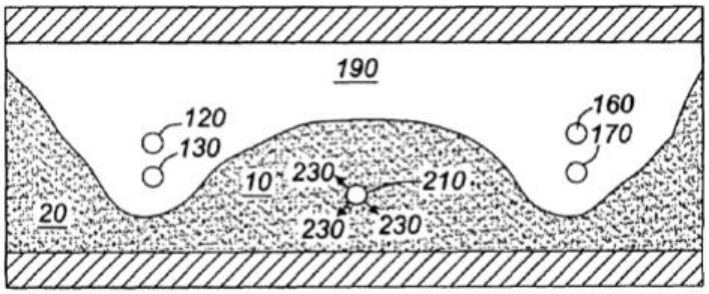


FIG. 3

[147] This is Figure 7A of the 746 Patent:

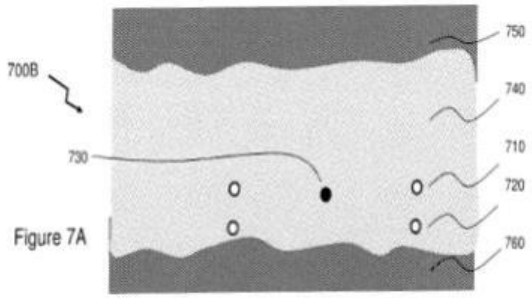


Figure 7A

[148] Swist seeks to distinguish the Arthur Patent from the 746 Patent based on the timing of injection of steam into the third well. The 746 Patent specifies that this must occur prior to any communication between the adjacent mobilized zones, while the Arthur Patent teaches the opposite. The Arthur Patent states that injection of the third well should occur only after the mobilized zones generated by the adjacent SAGD well pairs have merged.

[149] Swist says that the Arthur Patent is directed to recovering hydrocarbons that have been "bypassed" by a gravity-controlled recovery process (*i.e.*, SAGD). According to Swist, there can be no "bypassed" region until adjacent steam chambers have merged.

[150] Swist therefore maintains that the invention claimed by the Arthur Patent is different from that of the 746 Patent, and therefore not anticipatory. Swist notes that the test for anticipation is high, and cites *Sanofi* at paragraph 21 for the proposition that "[a] signpost, however clear, upon the road to the patentee's invention will not suffice. The prior inventor must be clearly shown to have planted his flag at the precise destination before the patentee." However, as the Supreme Court of Canada observed at paragraph 23 of the same decision, this overstates the stringency of the test of anticipation. It is not necessary for the "exact invention" to have been made and publicly disclosed. The requirement of prior disclosure means only that the prior patent must disclose subject matter which, if performed, would necessarily result in infringement of that patent (*Sanofi* at para 25).

[151] The fact that prior art "teaches away" from an impugned patent, while potentially relevant to an obviousness allegation, is irrelevant to the anticipation analysis. The fact that a piece of prior art discloses formulations that would not infringe a patent, as well as formulations that do infringe, is irrelevant to assessing anticipation (*Aux Sable Liquid Products LP v JL Energy Transportation Inc*, 2019 FC 581 [*Aux Sable*] at paras 97-98, citing *Schering-Plough Canada Inc v Pharmascience Inc*, 2009 FC 1128; see also *Valence Technology, Inc v Phostech Lithium Inc*, 2011 FC 174 at para 228).

[152] A similar distinction may be found in United States jurisprudence. For example, in *Allergan, Inc v Apotex Inc*, 754 F (3d) 952 at 959 (Fed Cir 2014), the United States Court of Appeals for the Federal Circuit held that "[…] even if the reference discloses the option within the context of a reference that 'disparages' or 'teaches away,' we do not consider those issues in the context of an anticipation analysis".

[153] The Arthur Patent describes its invention as follows (at column 3):

> At least one well, referred to in its singular embodiment as the infill well, is completed in a completion interval in the bypassed region where hydrocarbons have been bypassed by a gravity-controlled recovery process, and thereafter mobilizing the hydrocarbon in those otherwise-bypassed regions in such a way that the infill well achieves and remains in hydraulic communication with adjacent gravity-controlled patterns. The **timing of activation** of the infill well is such that **the adjacent well pairs have first operated for a sufficient period of time to ensure that their surrounding mobilized zones have merged** to form a single hydraulic entity, after which time the infill well can be operated so as to access that entity. [Emphasis added.]

[154] Nevertheless, the Arthur Patent acknowledges that activation of the third well may occur at a "distinctly earlier stage" (at column 5):

> Timing of the inception of operations at the infill well 210 may be dictated by economic considerations or operational preferences. Thus, in some circumstances it may be appropriate to initiate the operation of the infill well 210 after the adjacent well pairs 100 are at or near the end of what would be their economic lives if no further action were taken. In other circumstances, however, it may be advisable to initiate the operation of the infill well 210 at a distinctly earlier stage in the life of the adjacent well pairs 100.

[155] Swist emphasizes the following language in the Arthur Patent's description of its invention (at column 5):

> However, a key feature of the present invention is that the linking or fluid communication between the infill well 210 and the common mobilized zone 190 must await the merger of the first mobilized zone 110 the second mobilized zone 150 (which forms the common mobilized zone 190).

[156] But this is qualified by the following statements (at column 6):

> If the infill well 210 is activated **too early relative to the depletion stage of the adjacent well pairs** operating under a gravity-controlled process, the infill well 210, though possibly capable of some production, will not necessarily share in the benefits of being a producer in a gravity-controlled process. That is, **premature activation of an infill well may prevent or inhibit hydraulic communication**, or may result in communication in which the flow from the adjacent well pairs to the infill well is due to a displacement mechanism rather than to a gravity-control mechanism. To the extent that a displacement mechanism is operative at the expense of a gravity-control mechanism, recovery efficiency will be correspondingly compromised if the infill well 210 is converted from an injection well to a production well **before the common mobilized zone 190 is established**. [Emphasis added.]

[157] The Arthur Patent describes late injection of the infill well as "preferable", but it also envisages that activation of the third well may occur "before the common mobilized zone […] is established". The Arthur Patent cautions that "premature activation of an infill well may prevent or inhibit hydraulic communication". Preventing or inhibiting hydraulic communication necessarily implies activation of the third well prior to communication.

[158] The Arthur Patent explains how early injection may have an adverse effect on recovery. MEG says this is consistent with the results of the Kuru Report, some of which are included in the 746 Patent. Invention-1 of the Kuru Report showed no improvement in bitumen recovery unless there was a pressure difference between the injector well and the infill well. Invention-4 of the Kuru Report simulated an embodiment of the invention with zero vertical offset. Dr. Rao described the results of Invention-4 as “awful”.

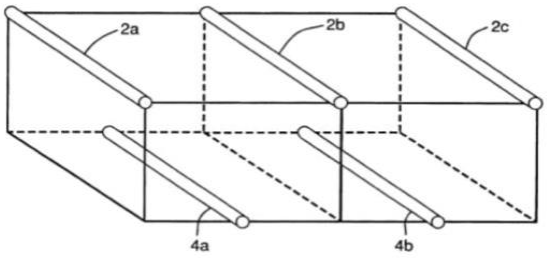
[159] The Arthur Patent discloses all of the essential elements of claim 1: two SAGD well pairs, coupled with a third well to assist in generating a large singular zone of increased mobility. Activation of the third well preferably occurs after the merger of the adjacent steam chambers, but it may occur at a distinctly earlier stage, including “before the common mobilized zone […] is established”. Practising the method disclosed by the Arthur Patent before the common mobilized zone is established would infringe the 746 Patent, and is therefore anticipatory.

[160] Dr. Carey and Dr. Gates each stated in their expert reports that the Arthur Patent discloses the essential elements of the claims that depend from claim 1, including the fluid of claim 3, the pressure difference of claim 4, and the alternatives of claim 5. Specifically, claim 4 requires that “injection into the third well is made at a higher pressure than injection into the first wells of each well pair”, which is disclosed as a preferable method of operating the third well in the Arthur Patent. MEG’s experts were not cross-examined on these opinions.

[161] There is no dispute that the disclosure of the Arthur Patent is enabling. The Arthur Patent therefore anticipates claim 1 of the 746 Patent and its dependent claims.

(3) Brannan Patent

[162] The Brannan Patent is dated December 28, 1993 and owned by Amoco Corporation (now British Petroleum). MEG says that the Brannan Patent discloses the well orientation described in claim 1 of the 746 Patent: adjacent well pairs (2a-4a and 2c-4b) with an injection well between them (2b). This is Figure 1 of the Brannan Patent:



[163] Figure 1 of the Brannan Patent is the same as Figure 6 of the 746 Patent, but with different labels. This is Figure 6 of the 746 Patent:

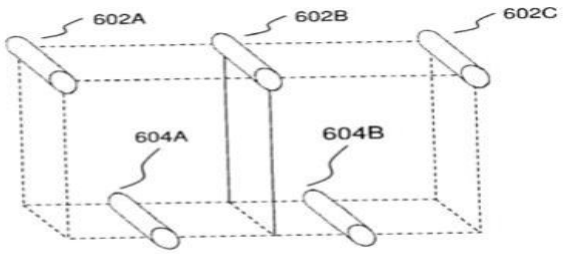


Figure 6

[164] MEG says that the Brannan Patent also discloses the claimed functions of the wells: steam injection into the first wells (2a and 2c) and third well (2b). Injection into the third well

(2b) is necessarily prior to "any communication" between the adjacent zones of increased mobility, because fluid injection starts at the same time as at wells 2a and 2c. That injection is continuous and helps to generate a large singular zone of increased mobility.

[165] Swist responds that the well configuration described in the Brannan Patent differs from that claimed by the 746 Patent, primarily due to its spacing. The Brannan Patent refers to a widely-spaced "functional set" with two injectors near the top of a reservoir that are used to push fluid toward a single producer well at the bottom of a reservoir. The Brannan Patent distinguishes SAGD ("a pair of closely spaced horizontal wells, one aligned vertically over another") from its "present invention" (a pattern of "lower production horizontal well laterally and vertically spaced from upper injection horizontal well"). The sole preferred embodiment of the Brannan Patent teaches large separations between injector and producer wells (18 metres vertical, 162 metres horizontal), which may be contrasted with typical SAGD injector/producer well pairs (5 to 10 metres vertical, horizontally aligned).

[166] Swist therefore maintains that the Brannan Patent does not teach the use of SAGD well pairs, nor a third well, nor any "second predetermined conditions" for operating any of its injector wells. Swist notes that Dr. Carey did not cite the Brannan Patent as an allegedly anticipatory reference.

[167] I agree with Swist that the Brannan Patent distinguishes its claimed invention from SAGD, principally due to the wide spacing between the injector wells and producer well (at column 6):

> Each lower horizontal well 4 is spaced a distance from each of its respectively associated upper horizontal wells 2 (e.g., lower well 4a relative to each of upper wells 2a, 2b) for allowing fluid communication, and thus fluid drive to occur, between the two respective upper and lower wells. Preferably this spacing is the maximum such distance, thereby minimizing the number of horizontal wells needed to deplete the formation where they are located and thereby minimizing the horizontal well formation and operation costs. The spacing among the wells within a set is made to enhance the sweep efficiency and the width of a chamber formed by fluid injected through the implementation of the method of the present invention.

[168] However, the Brannan Patent continues:

> The present invention is not limited to any specific dimensions because absolute spacing distances depend upon the nature of the formation in which the wells are formed; however, by way of example only, in a formation containing oil having an API gravity within the range of about 8-12, it is contemplated that a suitable vertical spacing between wells 24 and well 4a, for example, could be 18 meters and a suitable horizontal spacing could be 162 meters.

[169] As discussed above, SAGD may be operated in a variety of configurations, including with well pairs that have a horizontal rather than a vertical offset. The Brannan Patent specifies that its invention is not limited to any specific dimensions, and describes Figure 1, which is the same as Figure 6 of the 746 Patent, as "a schematic perspective view of an array of horizontal wells defined for use in the method of the present invention."

[170] The well identified as 2b in Figure 1 of the Brannan Patent is positioned and is capable of functioning as the "third well" described in claim 1 of the 746 Patent. None of the experts,

including Dr. Rao, construed the injection conditions to require a difference between the conditions (e.g. steam, timing) used at the first wells or the third wells.

[171] The essential elements of claim 1 of the 746 Patent are all disclosed by the Brannan Patent. Figure 1 of the Brannan Patent is the same as the embodiment described in Figure 6 of the 746 Patent. Both figures may be read as depicting SAGD well pairs, coupled with an additional injector well that is used to produce oil more quickly and efficiently.

[172] Disclosure of a single embodiment that falls within the claim destroys the novelty of that claim (*Baker Petrolite Corp v Canwell Enviro-Industries Ltd*, 2002 FCA 158 at para 42). The prior disclosure of a point within a range prescribed by a patent is anticipatory (*Aux Sable* at para 90).

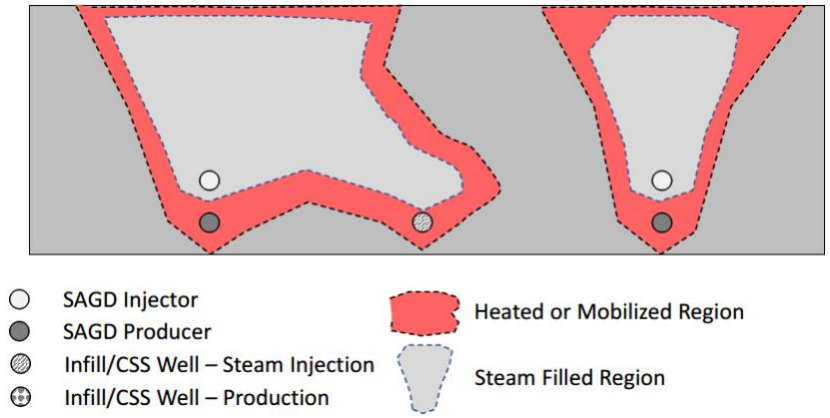
[173] There is no dispute that the disclosure of the Brannan Patent is enabling. Dr. Gates stated in his expert report that the Brannan Patent anticipates claims 1 to 3, 5 to 6, and 8. He was not cross-examined on these opinions. I therefore conclude that the Brannan Patent anticipates these claims of the 746 Patent.

(4) Cyr Patent

[174] The Cyr Patent is dated July 10, 2001 and owned by the Alberta Oil Sands Technology and Research Authority. It discloses a single SAGD well pair with an offset CSS well. The Cyr

Patent describes a “staged procedure” with the addition of an additional SAGD well pair and offset CSS, with the configuration repeated throughout a reservoir.

[175] Dr. Gates provided the following illustration of the configuration of the wells in the staged procedure:



[176] MEG argues that the staged procedure envisaged by the Cyr Patent discloses the same well orientation described in the asserted claims of the 746 Patent, *i.e.*, adjacent SAGD well pairs with a third well in between. The operation of the wells described in claim 1 of the 746 Patent is also disclosed: steam is injected into the first wells and third well; steam injection into the third well occurs before “any communication” between the adjacent mobilized zones (because the second SAGD well pair is added later); and steam injection into the third well generates a large singular zone of increased mobility.

[177] According to MEG, the essential elements of the dependent claims are also disclosed. The Cyr Patent discloses the fluid of claim 3 (steam), the pressure difference of claim 4, and the "substantial" pressure difference of claim 5.

[178] Swist distinguishes the Cyr Patent from the 746 Patent on the ground that the former does not teach the use of a second adjacent well pair, or early injection at the offset well to "positively influence" the merger of adjacent zones of increased mobility. However, Dr. Rao conceded in cross-examination that the staged procedure described by the Cyr Patent does result in a CSS well between adjacent SAGD well pairs "in an architectural sense". Based on my claim construction above, a CSS well meets the criterion of the third well described in the 746 Patent, because it is capable of injection.

[179] The addition of another SAGD well pair in the Cyr Patent is necessarily prior to any communication between the adjacent SAGD well pairs, since it is added only once the initial SAGD well pairs and offset CSS wells are operational. Dr. Rao acknowledged that the steam chambers generated by the initial SAGD well pair and the offset CSS well would already have merged when the additional SAGD well pair is added.

[180] It is true that adjacent SAGD well pairs are not present at the commencement of operations. However, there is nothing in the 746 Patent that requires all wells to be present at the outset. In the staged procedure, fluid is injected into the CSS well before any communication between the adjacent zones of increased mobility. MEG asserts that the merger of one side

before the other is irrelevant, and indeed would be expected in a heterogeneous reservoir using the method described in the 746 Patent.

[181] Swist maintains that, without a second SAGD well pair, there is no matching second mobilized zone. Thus, the operation of the offset well described in the Cyr Patent cannot "generate" a large singular zone from two zones of increased mobility.

[182] Although perhaps not as clear an anticipatory reference as the Arthur Patent or the Brannan Patent, I am persuaded that the operation of the "staged procedure" envisaged by the Cyr Patent would infringe the asserted claims of the 746 Patent. The operation of the initial SAGD well pair in tandem with the offset CSS well would create one large singular zone of increased mobility. The later addition of an adjacent SAGD well pair would create a still larger zone of increased mobility, aided by the operation of the CSS well. There is nothing in the 746 Patent that requires the development of the large singular zone of increased mobility to be symmetrical.

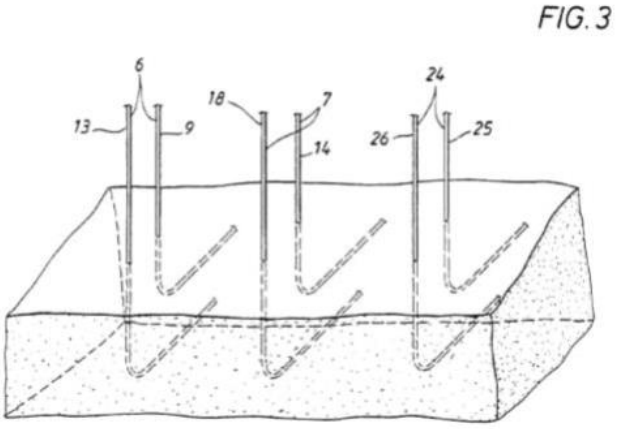
[183] There is no dispute that the disclosure of the Cyr Patent is enabling. The Cyr Patent, specifically its "staged procedure", therefore anticipates claims 1 to 8 of the 746 Patent.

(5) Ong Patent

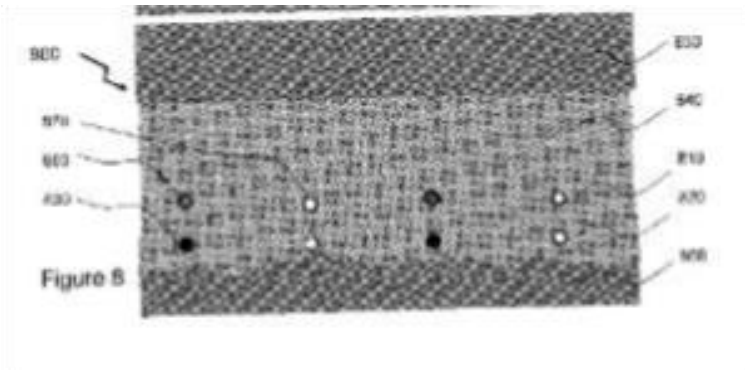
[184] The Ong Patent is dated June 7, 1994 and owned by Shell Canada Ltd. Figure 3 of the Ong Patent shows adjacent well pairs with two additional wells capable of injection and

production drilled in between. MEG says this is an embodiment of claims 1 to 8 of the 746 Patent.

[185] This is Figure 3 of the Ong Patent:



[186] This is Figure 8 of the 746 Patent:



[187] According to MEG, the Ong Patent discloses injection at the intermediate wells prior to merger of the zones of increased mobility formed around the adjacent well pairs. It also discloses the use of pressure differentials at the injection wells to aid in bitumen production. The well

orientation in Figure 3 of the Ong Patent is replicated in Figure 8 of the 746 Patent, in that the top three wells in Figure 8 can be injection wells, and the bottom three wells can be production wells. MEG therefore maintains that the Ong Patent discloses the "third well" described in claim 1 of the 746 Patent.

[188] Swist disagrees that the Ong Patent discloses the "third well" described in claim 1 of the 746 Patent. Swist also argues that the use of pressure differences in the Ong Patent differs markedly from the 746 Patent.

[189] Claim 1 of the Ong Patent reads as follows:

> 1. A method of recovering fluids from an underground tar sand reservoir or heavy oil reservoir comprising the steps of: (a) drilling and completing a first pair and a second pair of wells, wherein each pair of wells comprises an injection well terminating in the reservoir and a production well terminating in the reservoir below the injection well; (b) creating for each pair of wells a permeable zone between the injection well and the production well; and (c) injecting steam through the injection wells while producing fluid through the production wells, wherein the injection pressure of the injection well of the first pair of wells is greater than the injection pressure of the injection well of the second pair of wells.

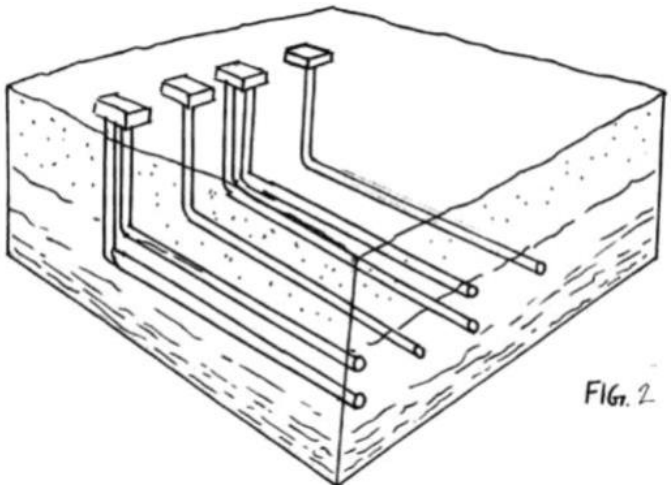
[190] I agree with Swist that the Ong Patent discloses an array of SAGD well pairs with alternating pressure differences. The pressure differences occur only at the start of adjacent well pair operations. The Ong Patent is silent about the merger of adjacent steam chambers or the generation of a large singular zone of increased mobility. Dr. Gates did not cite the Ong Patent as an allegedly anticipatory reference, despite recognizing it as part of the state of the art.

[191] MEG has not met its burden of demonstrating that the Ong Patent anticipates claims 1 to 8 of the 746 Patent.

(6) Coskuner Patent

[192] The Coskuner Patent is dated June 16, 2009 and owned by Husky Energy. MEG asserts that the Coskuner Patent discloses adjacent well pairs with a single well in between. Fluid is injected at the upper well of each well pair and at the intermediate CSS well at the same time, i.e. prior to any communication between the adjacent zones of increased mobility.

[193] This is Figure 2 of the Coskuner Patent:



[194] The process described in the Coskuner Patent involves three stages, the first of which entails the operation of only CSS wells operating independently. While these individual CSS wells may eventually belong to a “well pair”, the initial CSS stage involves the operation of

individual wells. The initial CSS stage encompasses either three or five wells, but if there are five, then one well from each eventual pair is “shut in” (i.e., it neither injects nor produces). Only three wells are used.

[195] The initial CSS stage comprises multiple cycles of injection, soak, and production. These cycles are performed until the steam chambers merge. When the steam chambers merge, no SAGD has yet been performed. This occurs only after the initial CSS stage has generated the merger. During the SAGD operational stage, the single offset wells are no longer used for injection, but are dedicated solely to production.

[196] I agree with Swist that the Coskuner Patent does not contemplate third well injection between operating SAGD well pairs as claimed in the 746 Patent. Nor does it envisage the use of a “second predetermined schedule” under “second predetermined conditions” for the third well, as required by claim 1.

[197] MEG has not met its burden of demonstrating that the Coskuner Patent anticipates claims 1 to 8 of the 746 Patent.

B. *Obviousness*

(1) Legal Principles

[198] Pursuant to s 28.3 of the *Patent Act*, a patent cannot be issued for an invention that was obvious on the claim date to a person skilled in the art or science to which the patent pertains. Obviousness is to be assessed as of the priority date: May 19, 2011.

[199] Obviousness is generally considered to be a factual determination, or a question of mixed fact and law (*Wenzel Downhole Tools Ltd v National-Oilwell Canada Ltd*, 2012 FCA 333 at para 44). It must be assessed on a claim-by-claim basis (*Zero Spill Systems (Int'l) Inc v Heide*, 2015 FCA 115 at paras 85, 87-88).

[200] When considering obviousness, hindsight is prohibited. To determine whether a claim is obvious, courts generally follow the four-part test found in *Sanofi* at paragraph 67:

(a) identify the notional "person skilled in the art" and the relevant common general knowledge of that person;

(b) identify the inventive concept of the claim in question or, if that cannot readily be done, construe it;

(c) identify what, if any, differences exist between the matter cited as forming part of the "state of the art" and the inventive concept of the claim or the claim as construed; and

(d) viewed without any knowledge of the alleged invention as claimed, do those differences constitute steps which would have been obvious to the person skilled in the art or do they require any degree of invention?

[201] The fourth step of the inquiry may require consideration of whether the claimed invention was "obvious to try". This aspect of the test tends to arise in areas of endeavour where advances are often made through experimentation, and where numerous interrelated variables may affect the desired result (*Sanofi* at paras 68-71). This involves a consideration of the following non-exhaustive factors:

(a) is it more or less self-evident that what is being tried ought to work? Are there a finite number of identified predictable solutions known to persons skilled in the art?

(b) what is the extent, nature and amount of effort required to achieve the invention? Are routine trials carried out or is the experimentation prolonged and arduous, such that the trials would not be considered routine?

(c) is there a motive provided in the prior art to find the solution that the patent addresses?

[202] For the reasons that follow, I conclude that claims 1 to 8 of the 746 Patent are not invalid on the ground of obviousness.

(2) PSA and Common General Knowledge

[203] The PSA and common general knowledge are discussed under the heading Claim Construction, above. While the relevant dates for claim construction and assessing obviousness differ, neither party suggested that anything turns on this.

(3) Inventive Concept

[204] MEG proposes that the Court dispense with articulating the inventive concept, and adopt the elements of the claims as construed by the Court as the inventive concept (citing *Ciba Specialty Chemicals Water Treatments Limited's v SNF Inc*, 2017 FCA 225 at para 77, leave to appeal to SCC ref'd, 37915 (June 14, 2018)). Swist is amenable to this approach.

(4) Differences between the State of the Art and the Invention

[205] The Federal Court of Appeal has instructed that prior art available to the public at the relevant date should not be excluded when considering the differences between the state of the art and the claimed invention (*Hospira Healthcare Corporation v Kennedy Trust for Rheumatology Research*, 2020 FCA 30 at paras 81-87). It is not necessary to demonstrate that the prior art would have been discovered by the PSA following a reasonably diligent search.

Accordingly, all of the prior art cited by MEG in support of its allegation of anticipation may be considered at this stage of the obviousness analysis.

[206] I have found that claims 1 to 8 of the 746 Patent are anticipated by the Arthur Patent, the Brannan Patent and the Cyr Patent. Because the inventive concept of the claims is the same as the claims as construed, it follows that there is no difference between the inventive concept and the prior art.

[207] Swist nevertheless asserts that none of the prior art references describe the early activation of a third well situated between two SAGD well pairs in order to promote the merger of the two adjacent zones of increased mobility into a single zone. Swist also maintains that none of the prior art references describe other aspects of the inventive concept of the claims, such as the use of pressure differentials to affect the zones of increased mobility in the manner recited in claims 4 and 5, both of which specify a pressure element as well as the timing element.

(5) Are the Differences Obvious?

[208] At this stage of the obviousness analysis, any information or prior art reference that was available to the public may be considered. A combination or "mosaic" of prior art references may also be relied upon, if it is reasonable to expect that the PSA would have located those documents in a diligent search (*MIPS AB v Bauer Hockey Ltd*, 2018 FC 485 at paras 234-238).

[209] Swist objects that MEG's experts were driven by hindsight. While Dr. Carey's literature search identified 387 prior art references, his obviousness analysis focused solely on the four references he was directed to consider by MEG's counsel. As previously discussed, Dr. Carey and Dr. Gates each testified that they personally conducted their own literature searches to identify relevant prior art, but in closing argument counsel for MEG admitted that this was not true. According to counsel, the search was performed only by Dr. Carey, and the results were then shared with Dr. Gates who adopted them as his own.

[210] There is little to demonstrate that a PSA conducting a reasonably diligent search would have found, and thereafter selected, only the prior art references relied upon by MEG in support of its allegation of anticipation. The evidence surrounding the prior art searches conducted by Dr. Carey and Dr. Gates is unsatisfactory. Only Dr. Carey conducted an independent search, and he inexplicably selected as relevant solely the prior art references previously provided to him by counsel.

[211] Swist argues that the PSA would have no motivation to combine the prior art, and no reason to depart from the state of the art as exemplified by the Arthur Patent, in a manner that violates the key feature of its method (*i.e.*, injection of the third well only after the steam chambers generated by adjacent SAGD well pairs have merged). The invention claimed by the 746 Patent, together with its shortcomings, is fully explained in the Arthur Patent. It is common ground that the Arthur Patent "teaches away" from the 746 Patent.

[212] It is unclear whether extraction methods in the Canadian oil sands is an area of endeavour where advances are often won by experimentation, and whether an "obvious to try" test is appropriate in this case. MEG asserts that simulations are commonly used to determine if operational methods should be implemented or not. The process is not cost-prohibitive, and would be available to the PSA. MEG notes that the prior art is replete with simulation results, and Mr. Swist himself used simulations in order to achieve the invention claimed in the 746 Patent.

[213] Swist says that the claims of the 746 Patent were neither obvious nor "obvious to try". There were many options available to the PSA to further develop methods of heavy oil recovery. In addition to combining elements of SAGD and CSS, and prior art methods that built on those techniques, the PSA could have explored numerous other approaches, such as *in situ* steam generation, VAPEX, microwave stimulation, and molecular manipulation. Swist asserts that the failure of MEG's expert witnesses to consider alternative methods is further proof that their obviousness analyses were tainted by hindsight.

[214] I agree with Swist that the absence of any motivation to find the solution of the 746 Patent renders the obviousness analysis futile. The prior art references closest to the May 2011 priority date are the Arthur Patent and the Coskuner Patent, both of which taught away from the 746 Patent. There was no reason to depart from the method described in the Arthur Patent in a manner that contradicted one of its key teachings. Claims 1 to 8 of the 746 Patent are not invalid on the ground of obviousness.

C. *Inutility*

(1) Legal Principles

[215] To determine whether a patent discloses an invention with sufficient utility under s 2 of the *Patent Act*, it is first necessary to identify the subject-matter of the invention as claimed in the patent. The Court must then ask whether that subject-matter is useful – is it capable of a practical purpose, *i.e.*, an actual result? The *Patent Act* does not prescribe the degree or quantum of usefulness required, or require that every potential use be realized. A scintilla of utility will do. A single use related to the nature of the subject-matter is sufficient, and the utility must be established by either demonstration or sound prediction as of the filing date (*AstraZeneca* SCC at paras 54-56).

(2) Analysis

[216] Dr. Gates and Dr. Carey both expressed the view that the subject-matter of the invention claimed by the 746 Patent includes enhanced bitumen recovery compared to bitumen recovery methods disclosed in the prior art. The "Summary of the Invention" states that "[i]t is an object of the present invention to enhance second stage oil recovery".

[217] The Background of the Invention identifies "the need to more quickly achieve production from the SAGD wells." It then states that the inventor has established techniques "to increase the oil recovery percentage, and provide SAGD operating over deeper oil sand formations."

[218] MEG therefore maintains that the subject matter of the invention is an enhancement of SAGD. According to MEG, it would be nonsensical to devote money to drilling and operating a "third well" only to achieve no enhancement in bitumen recovery as compared with SAGD methods disclosed in the prior art. There cannot be "invention" in such a method, as it is useless.

[219] Swist responds that the subject-matter of the claims relates only to methods of extracting oil. None of the claims refer to enhancement. According to Swist, MEG's position is an attempt to revive the "promise doctrine", wherein the disclosure is mined for alleged promises to determine whether they were fulfilled. The Supreme Court of Canada rejected this doctrine as unsound in *AstraZeneca* SCC (at paras 31, 36).

[220] Swist acknowledges that utility must be demonstrated or "soundly predicted" before the filing date. Sound prediction has three aspects: a factual basis for the prediction; an articulable and sound line of reasoning; and proper disclosure. Sound prediction requires a *prima facie* reasonable inference of utility; it does not require certainty (citing *Mylan Pharmaceuticals ULC v Eli Lilly Canada Inc*, 2016 FCA 119 at para 12).

[221] Swist asserts that utility was demonstrated by the simulations reproduced in the 746 Patent from the Kuru Report. The AITF Report confirmed that the claimed methods were capable of extracting oil. Dr. Carey conceded that the simulations demonstrated that the invention claimed in the 746 Patent would produce at least some oil.

[222] Swist points to simulations of the 746 Patent that showed higher oil recovery than the base case in the initial four to six year period of operations. However, MEG notes that no operator would cease operations before a reservoir was fully exploited. Over the life of the simulation, the invention claimed in the 746 Patent performed worse than the base case, i.e., traditional SAGD.

[223] Swist nevertheless maintains that utility was soundly predicted. The simulations disclosed in the 746 Patent provided a factual basis for the claim that the process would produce at least some oil.

[224] The facts informing the inutility analysis in this case are comparable to *Aux Sable*. Claims 9 and 10 of the impugned patent in that case related to "[a] gas mixture, for use in a pipeline ...", and included within their scope gas mixtures that would result in inefficient transportation. The claims did not refer to efficiency, and the key question was whether the subject-matter of the invention as claimed required a more efficient transportation of the gas mixture.

[225] The patentee in *Aux Sable* asserted that the claims only required that the gas mixtures be "capable of being transported in a pipeline", even if that transportation was less efficient than the prior art. An expert called on behalf of the plaintiff expressed the view that the single subject matter of the invention related to the efficient transport of natural gas. Justice Richard Southcott concluded as follows (at paras 97-88):

> I agree with that conclusion and therefore do not accept JL Energy's argument that the mere fact that the gas mixtures contemplated by claims 9 and 10 are capable of being transported in a pipeline, at the pressures and temperatures contemplated by those claims, satisfies the utility requirement. Such an argument is not quite as extreme as submitting that an otherwise useless machine has utility as a paperweight (per paragraph 53 of *AstraZeneca*). However, in my view, it reaches in that direction.
>
> Finally, I note that I do not regard the assessment of the utility of claims 9-10, based on whether they include useless selections, to represent an application of the promise doctrine. These claims lack utility, not because the 670 Patent promises efficient transportation of natural gas, but because efficient transportation is the subject matter of the invention.

[226] Swist's argument that the invention claimed in the 746 Patent is useful because it is capable of producing oil must be rejected for similar reasons. MEG's position is not an attempt to revive the promise doctrine. It is simply the assertion that the claims lack utility because the subject mater of the invention is enhancement of traditional SAGD, and Swist's invention does not provide this. Claims 1 to 8 of the 746 Patent are therefore invalid on the ground of inutility.

D. *Overbreadth*

[227] In light of my conclusions that claims 1 to 8 of the 746 Patent are invalid on the grounds of anticipation and inutility, it is unnecessary to consider MEG's arguments respecting overbreadth.

XI. Disposition

[228] MEG's use of eMSAGP and eMVAPEX at Christina Lake does not infringe the specified claims of the 746 Patent.

[229] Claims 1 to 8 of the 746 Patent are anticipated by the Arthur Patent, the Brannan Patent, and the Cyr Patent, and are therefore invalid. These claims are also invalid on the ground of inutility.

JUDGMENT

THIS COURT'S JUDGMENT is that:

1. MEG's use of eMSAGP and eMVAPEX at Christina Lake does not infringe claims 1 to 6 or 8 of Canadian Patent 2,800,746 [746 Patent].

2. Claims 1 to 8 of the 746 Patent are anticipated by United States Patent US 7,556,099 [Arthur Patent], United States Patent US 5,283,111 [Brannan Patent], and United States Patent US 6,257,334 [Cyr Patent], and are therefore invalid. These claims are also invalid on the ground of inutility.

3. If the parties are unable to agree upon costs, they may make written submissions, not exceeding seven pages, within 21 days of the date of this Judgment. Responding submissions, not exceeding three pages, may be made within 10 days thereafter.

"Simon Fothergill"
Judge

FEDERAL COURT

SOLICITORS OF RECORD

DOCKET:	T-1069-14
STYLE OF CAUSE:	JASON SWIST AND CRUDE SOLUTIONS LTD. v MEG ENERGY CORP.
PLACE OF HEARING:	BY VIDEO CONFERENCE BETWEEN CALGARY, ALBERTA, TORONTO, ONTARIO, AND OTTAWA, ONTARIO
DATE OF HEARINGS:	JULY 20, 21, 22, 23, 24, 27, 28, 29, 2020 SEPTEMBER 15, 21, 24, 25, 2020 OCTOBER 13, 14, 2020
JUDGMENT AND REASONS:	FOTHERGILL J.
CONFIDENTIAL JUDGMENT AND REASONS ISSUED:	JANUARY 4, 2021
PUBLIC JUDGMENT AND REASONS ISSUED:	JANUARY 20, 2021

APPEARANCES:

Timothy Gilbert Andrew Moeser Kevin Siu Thomas Dumigan Jack MacDonald	FOR THE PLAINTIFFS (Defendants by Counterclaim)
Timothy St. J. Ellam, QC Steven Tanner James S.S. Holtom Kendra Levasseur Tracey Doyle Leah Strand	FOR THE DEFENDANT (Plaintiff by Counterclaim)

SOLICITORS OF RECORD:

Gilbert's LLP Toronto, Ontario	FOR THE PLAINTIFFS (Defendants by Counterclaim)
McCarthy Tétrault LLP Calgary, Alberta	FOR THE DEFENDANT (Plaintiff by Counterclaim)