Federal Court  Cour fédérale

Date: 20150824

Docket: T-1749-11

Citation: 2015 FC 997

BETWEEN:

SNF INC.

Plaintiff

and

CIBA SPECIALTY CHEMICALS WATER TREATMENTS LIMITED

Defendant

REASONS FOR JUDGMENT

PHELAN J.

I. Introduction

[1] This is an action for a declaration that Canadian Patent CA 2 515 581 [581 or the 581 Patent] – a process of "rigidifying" a material using polymers – is invalid. This case does not follow the usual pattern of an infringement action for which there is a defence and counterclaim of invalidity. This is a direct challenge to validity.

[2] The issues about a similar patent have been litigated in Australia, about which this Court comments later.

[3] There was a counterclaim by the Defendant (Plaintiff by Counterclaim) for infringement of the 581 Patent, but that was settled during the course of the trial.

Therefore, the central issue before this Court is the validity of the 581 Patent. The commercial product incorporating the patented process has been used in the oil fields in and around Fort McMurray.

[4] The Plaintiff, SNF Inc [SNF], is a company incorporated under the laws of the State of Delaware, USA, and has its principal place of business in Riceboro, Georgia, USA. SNF is a manufacturer and distributor of water soluble polymers and polymer feed equipment.

[5] Ciba Specialty Chemicals Water Treatment Limited [Ciba] is a company incorporated in the United Kingdom with a principal place of business in Bradford, West Yorkshire, United Kingdom.

[6] The patent at issue, the 581 Patent, stems from an international patent application filed on January 7, 2004, as international application no PCT/EP2004/000042.

The international patent application was published on July 22, 2004, as international publication no WO 2004/060819 [the 581 PCT Patent Application].

[7] The 581 Patent claims priority from GB 0310419.7, which is an application filed on May 7, 2003, in Great Britain [Priority Document].

The 581 Patent was granted on July 5, 2011.

[8] Philip McColl and Stephen Scammell are the individuals listed as inventors on the 581 Patent. Scammell gave evidence in this trial concerning his work in "inventing" the process at issue.

[9] Ciba is listed in the Canadian Intellectual Property Office [CIPO] as the owner of the 581 Patent.

II. 581 Patent

[10] The 581 Patent invention is described as:

> The present invention relates to the treatment of mineral material, especially waste mineral slurries. The invention is particularly suitable for the disposal of tailings and other waste material resulting from mineral processing and beneficiation processes, including the co-disposal of coarse and fine solids, as a homogenous mixture.

[11] Normally the process of mineral extraction results in waste material frequently called tailings. Often the waste consists of an aqueous slurry or sludge comprising different mineral materials such as clay, sand, grit, etc. Generally, the material consists of mineral particles of different sizes.

[12] Flocculation, in polymer science, is the formation of aggregates – sometimes also called coagulation. As the Patent discloses, it is common practice to use flocculants to assist this process by flocculating the fine material to increase the rate of sedimentation. However, the problem is that the coarse materials will sediment at a faster rate than the flocculated fines, resulting in a heterogeneous deposit of coarse and fine solids.

[13] In cases where it is not possible to dispose of the waste in an emptied mine, it is common practice to dispose of the waste material by pumping the aqueous slurry to lagoons, heaps or stacks and allowing it to dewater gradually through the actions of sedimentation, drainage and evaporation.

[14] The Patent pointed out environmental pressures to reduce the land area for waste. One method is to layer stacks of waste. The difficulty is to ensure that the new waste flows over the "rigidified" (a term discussed more fully under Claim Construction) prior waste, remains within the waste area boundaries, forms a stack and the waste, old and new, consolidated to support multiple layers without collapsing or overflowing.

The Patent identified that there was a requirement for providing a waste material with the right sort of characteristics for stacking that was altogether different from those required for other forms of disposal, such as back-filling within a relatively enclosed area (such as an emptied excavation site).

[15] The Patent outlined that past attempts to use a coagulant or a flocculant had been unsuccessful because the treatments were at conventional dosages, which brought little or no

benefit in either the rate of compaction of the fine waste material or clarity of the recovered water.

[16] The Patent further asserts that it is desirable to have a treatment, which provides a more rapid release of water from the suspension of solids, that the concentrated solids are held in a more convenient manner that prevents both segregation of any coarse and fine fractions and that prevents contamination of the released water, while minimizing the impact on the environment.

[17] The Patent then goes on to discuss some prior treatment processes using a flocculant, in particular a polymer, water absorbent or water soluble and their difficulties or failings.

[18] Most particularly for purposes of this litigation, the Patent refers to WO-A-0192167, known as the “Gallagher Patent”. The Gallagher Patent discloses a process where a material comprising a suspension of particulate solids is pumped as a fluid and then allowed to stand and rigidify. The rigidification is achieved by introducing particles of a water soluble polymer which has an intrinsic viscosity of at least 3 dl/g into the suspension.

[19] The advantage of the Gallagher treatment is that it enables the material to retain its fluidity while being pumped and upon standing causes the material to rigidify. The benefit is that the concentrated solids can be easily stacked and water is released rather than being retained in a water absorbent polymer. The disclosure of the 581 Patent contains the following phrase which became a major source of dispute:

> The importance of using particles of water soluble polymer is emphasised and it is stated that the use of aqueous solutions of the dissolved polymer would be ineffective.
>
> (Court's underlining)

[20] In addressing the invention in the 581 Patent, while acknowledging the improvements of the Gallagher Patent, it states there is a need to further improve the rigidification of suspensions of materials and further improve upon the clarity of water released (Court's underlining).

[21] The Patent describes its objective as finding a more suitable method of treating coarse and/or fine particulate waste material from mineral processing operations in order to provide a better release of fluids and a more effective means of disposing of the concentrated solids.

[22] The Patent contains 13 examples of how one tested to determine the proper amount of polymer to add to the slurry to create the desired "rigidification".

[23] The Patent does not contain a formula to achieve the benefits of rigidification nor did it specify what constituted rigidification. In many ways, the process consists of adding enough water soluble polymer until one achieved the desired result.

[24] With respect to the Claims at issue, those Claims are attached as Appendix I to these Reasons for ease of reference. The central claim is Claim 1.

> A process of rigidifying a material whilst retaining the fluidity of the material during transfer, in which the material comprises an aqueous liquid with dispersed particulate solids that is transferred as a fluid to a deposition area, then allowed to stand and rigidify, by combining with the material during transfer an effective

> rigidifying amount of an aqueous solution of a water-soluble polymer, said water-soluble polymer having an intrinsic viscosity of at least 5 dl/g (measured in 1 M NaCl at 25°C).

[25] The evidence in this trial was focused on Claim 1 and its dependent Claims 2 to 31. The only other independent claim is Claim 32 but it is, in reality, a composite of a set of six claims (1, 2, 4, 9, 21 and 28). The claims which depend on Claim 32, namely Claims 33 to 50, have the same dependencies, limitations and qualifications as certain corresponding claims from the set of Claims 2 to 31. Therefore, any finding of invalidity with respect to the set of Claims 1 to 31 will apply to Claims 32 to 50.

[26] As a result of the nature of the dependencies and the state of the art, if Claim 1 is invalid, then its dependent claims are likewise invalid. Dr Farrow, Ciba's principal expert, was correct in his view that there was only one inventive concept that applied to all claims in the 581 Patent. This case rises or falls on Claim 1.

[27] There are material dates for the various issues in this litigation including the construction of the Patent:

- for claim construction it is the publication date – July 22, 2004;
- for anticipation and obviousness, it is the claim date – May 7, 2003; and
- for false and misleading statements, the issuance date governs – July 5, 2011.

There is no dispute as to these material dates.

III. Grounds of Challenge

[28] In addition to the issues of claim construction, determining the person of ordinary skill in the art [Skilled Person] as of July 22, 2004, and the state of Common General Knowledge, the Plaintiff submits that:

a) the Patent was anticipated by the prior art including the Gallagher Patent, the Condolios Patent 4,347,140 published August 31, 1982 and an article by Stewart, Backer and Busch published in 1986;

b) the Patent was anticipated by prior use including: the work done at Fos-sur-Mer near Marseilles, France; the process used at the John Brown Harris Coal Company in Quinwood, West Virginia in 1977; and subsequently, the process used at Central Coal Company in New Haven, West Virginia also commencing in 1977;

c) the Patent was obvious in light of the Common General Knowledge, and in light of the Gallagher Patent, the Pearson Patent and/or a combination of both patents;

d) the Patent was insufficient in its disclosure of the invention;

e) the Patent claims are overbroad in that they made claims broader than the invention, particularly with respect to the use of the patented process in the oil sands tailings; and,

f) the Patent contained false and misleading statements.

IV. Witnesses' Summary

[29] While this action, similar to any patent action, was dominated by expert evidence and reports, there were a number of lay witnesses whose evidence was an important part of the mosaic of the case and have influenced the result.

A. *Plaintiff's Lay Witnesses*

[30] The key lay witnesses for the Plaintiff were Dr Poteur and Larry Hyatt.

(1) Dr Poteur

[31] Poteur gave evidence about a project, at the harbour at Fos-sur-Mer in France, which took place in the mid-1970s. His evidence was directed at the issue of Prior Use. The project was for the reclamation of land and the construction of the harbour. To achieve the objective of creating an area upon which buildings could be built, the slurry dredged from below water marshlands was treated with a polymer. Dr Poteur knew (as he suggested others knew as well) that using a polymer flocculant on the slurry would increase the sheer strength (the engineering term for strength required to tear material apart). The dredged material was transported by pipeline to a reclamation site and polymer was added to the material as it was transported. The polymer was a water soluble polymer and the dose of polymer was adjusted in order to obtain the desired effect. The observed results were: a slope of 3% indicating the solids had become more solid; the strength of the material was achieved quickly – in days rather than, for untreated materials, in

weeks; clear water flowed off meaning fine particles did not escape into the water; and, there was homogeneity of particle size.

[32] While Dr Poteur's evidence was attacked as faulty in memory and not sufficient to meet the legal test of Prior Use (which will be discussed later), his memory of key aspects – the use of polymer in a tube to increase solidification – was clear. His evidence was germane to the issue of Common General Knowledge as well as Prior Use.

[33] He was an honest witness who had no stake, financial or personal, in the litigation. His recollection of minute details such as the viscosity of the polymer use and related details may not be exact but his overall evidence was credible and worthy of considerable weight.

(2) Larry Hyatt

[34] Larry Hyatt gave evidence, both as a lay witness and as an expert; a rather difficult thing to do without calling into question the weight which should be given to the evidence as a whole. In the 1970s, he was a sales representative for Nalco Chemical Co [Nalco]. As such, he was involved with two examples of Prior Use in the US coal industry. One was at John Brown Harris Coal Company, where Hyatt added polymer into a slurry pipeline 20 feet from the exit point. The result was that at the disposition area, where the slurry was allowed to stand, water flowed away from the solids, the solids started to compact, the solids were homogeneously distributed and the solids developed enough strength in a few days to support the weight of a person.

[35] Hyatt metaphorically introduced the Court to Cigar Bill (Bill Myers of Leckie Smokeless Coal Company) to whom Hyatt showed the results. Unfortunately, Cigar Bill did not testify – it is believed he had passed away.

[36] The other example of Prior Art attributed to Hyatt was a process at Central Coal, where there was concern that its process water was murky and carrying suspended particles to the Ohio River. The slurry to be treated was the underflow from a thickener that was moved to the deposition area by a centrifugal pump located under the thickener. The polymer said to be used was Nalco 8863, a water soluble 30% anionic co-polymer. The polymer was injected into the underflow slurry, transported to the disposition area and allowed to stand. The result was separation of solids and liquids with clear water coming out. The solids compacted and shaped a beach, which sloped away allowing for the release of clear water. The beach became solid with sufficient yield strength to allow stacking.

[37] Hyatt testified that he shared the results with others and subsequently believed that he had achieved the inventive concept in the Patent.

[38] Hyatt was a colourful witness who attempted to be forthright in his evidence. However, I put less weight on this evidence than SNF would like because his recollection of specifics was shown to be faulty, he had no documents, no contemporaneous corroborative evidence and there is no way to confirm the veracity of his recollection. His recollection is likely substantially influenced by reading the Patent and a desire to assist SNF.

B. *Defendant's Lay Witnesses*

[39] The Defendant had two key lay witnesses – William Peatfield, a European Patent Agent and an employee of Ciba in the UK who was generally responsible for the Gallagher Patent application process and Stephen Scammell, one of the inventors of the Patent.

(1) William Peatfield

[40] The importance of Peatfield's evidence stems not only from the Plaintiff's reliance on it for its assertion of false and misleading statements, but also because it demonstrates, to some extent, how Ciba treated the Gallagher Patent and the 581 Patent in which Peatfield was personally involved. Combined with Scammell's evidence, the evidence demonstrates the marketing/financial interests being protected by Ciba.

[41] The impugned statement in the 581 Patent is the description referring to Gallagher that "the importance of using particles of water soluble polymer is emphasised and it is stated that the use of aqueous solutions of the dissolved polymer would be ineffective".

[42] The statement has been used by Ciba to show that Gallagher taught away from the inventive concept in the 581 Patent and thus, the 581 Patent was new and not covered by Prior Art.

[43] The words chosen for the Gallagher Patent were Peatfield's. Since the Gallagher Patent used powdered polymer – and that would be the product being pushed commercially by Ciba – the Gallagher Patent described the so called uniqueness of using powder:

> - It is surprising that the process according to the invention forms a product which rigidifies far better than alternative treatment.
>
> - One advantage of additions in powder form is that the viscosity does not increase or diminish as rapidly as solution based additions.

[44] It was Ciba's position that Gallagher and the 581 were conceptually different despite a substantial amount of evidence that internally Ciba considered the Gallagher Patent to cover five forms of polymers including aqueous solution. The fact is that the Gallagher application never stated that the aqueous polymer addition would be ineffective despite the statement to that effect found in the 581 Patent.

[45] Peatfield knew that the solution addition would work in the same way as powder and could achieve better or comparable results. Peatfield also recognized that an admission that aqueous solutions of the same polymers would carry out the same conditions as the 581 application would mean that the 581 process would not be novel.

[46] In trying to explain away some of the internal comments suggesting that at best 581 was merely a next step to Gallagher, Peatfield appeared distinctly uncomfortable in giving his evidence. In my view, Peatfield suffered from being an honest man caught in the internal and inconsistent story of his employer.

[47] Peatfield's initial absence of recollection of key events was refreshed after discussion with counsel to fall in line with Ciba's position in this litigation. I do not suggest anything improper in Ciba's Canadian counsel's conduct – they are people of the highest professional ethics. However, the Court cannot ignore this Pauline conversion of memory.

[48] I put greater weight on the documents, the internal memos and the commercial advantage to Ciba of protecting Gallagher and trying to assert or create a novel aspect in the 581 Patent. Such weight is reinforced by the Scammell evidence referred to below.

[49] In other words, I do not accept Peatfield's attempt to explain away the efforts to distinguish Gallagher Patent from the 581 Patent except the patents' obvious difference of powder versus aqueous solution.

(2) Stephen Scammell

[50] Stephen Scammell worked in Australia for Allied Colloids, which then became Ciba. He ran plant trials on the flocculant business in the thickener application at various sites.

[51] Scammell's evidence was the tale of the "discovery" of the inventive concept – adding an aqueous solution polymer to slurry and letting it stand. He was generally defensive throughout his evidence and cross-examination, often unresponsive to the questions posed. He was clearly there to protect "his" patent. His evidence must be taken in that light.

[52] The starting point for the work, which led to the Patent, involved the sand mining operations of Consolidated Rutile Limited [CRL] on Stradbrooke Island. CRL was moving their Gordon plant to Yarraman and going from dealing with low fines (low slimes) to high fines (high slimes). The process to treat low fines was not effective on high fines. Scammell was to look at the flocculant and equipment to be used to prepare the flocculant in the thickener CRL was using. Scammell secured CRL's business by pushing an emulsion polymer.

[53] The problem CRL eventually had, after sorting out some initial teething issues, was that the pumped tailings below the specific gravity of 1.6 would wash away to the nearest flat area or even back to the dredge pond from whence it came.

[54] The focus became to use "rheology aids" – the marketing term for flocculants – in the thickener underflow/slurry. This would presumably change the characteristics of the slurry.

[55] Rheology is basically the study of the flow and deformation of matters primarily in a liquid state but also as "soft solids" or solids under conditions in which they respond with elastic flow rather than deforming elastically in response to an applied force.

[56] At that time, a number of people in Ciba, including Michael Gallagher (inventor of the Gallagher Patent), were working on rheology aids. The evidence included several series of e-mails within Ciba dealing with how to test the effectiveness of the rheology aids. The advice or view exchanged included staying within the field of powder polymers because that was the product Ciba was working with and pushing for sales in the market.

[57] In August-September 2002, Scammell stated he decided to focus on the thickener underflow and treating the combined tailings. He started with a powder polymer and achieved good results. He then moved to a solution polymer which gave even better results.

[58] Of particular importance, and a matter Scammell attempted to deflect by questioning the date of communications from the field, is CRL's request to use a liquid polymer (emulsion) injected 50 meters back from the discharge. It seemed obvious to CRL that a liquid polymer was likely to give the type of solidification of the discharge they sought.

[59] What followed thereafter was a series of communications within Ciba expressing concern that Scammell and McColl should not stray outside the Gallagher Patent and should continue to use powder. Given the correspondence, the most likely reason for Ciba's concern was not Gallagher Patent integrity but the fact that emulsion polymer was 1/3 the cost of powder and thus, the sales revenue produced would be less. Gallagher expressed the view that Scammell would be better to have his test, which was to show CRL how well the solution worked, fail.

[60] I do not accept Scammell's protestation that pricing had little to do with the ultimate solution and that Ciba was simply driven by desire to solve a customer's problem.

[61] Scammell's evidence, taken together with Peatfield's, establishes that Ciba knew that the Gallagher Patent either included what Scammell was doing or that the polymer form switch (simply moving from powder polymer to liquid (aqueous) polymer) was not unforeseen.

V. Expert Evidence

[62] Like any other witness, the credibility of an expert witness cannot be determined by following a set of rules. Credibility is an issue of fact and deciding between or preferring one expert's evidence over another is not an easy matter. In *R v White*, [1947] SCR 268, the Supreme Court gave this overview:

> The general integrity and intelligence of the witness, his powers to observe, his capacity to remember and his accuracy in statement are important. It is also important to determine whether he is honestly endeavouring to tell the truth, whether he is sincere and frank or whether he is biassed, reticent and evasive. All these questions and others may be answered from the observation of the witness' general conduct and demeanour in determining the question of credibility.

[63] Courts have sought to structure the obligations of experts into a Code of Conduct under the *Federal Courts Rules*. The basic obligation is to be impartial and assist the Court; the basic prohibition is to not be an advocate.

1. An expert witness named to provide a report for use as evidence, or to testify in a proceeding, has an overriding duty to assist the Court impartially on matters relevant to his or her area of expertise.	**1.** Le témoin expert désigné pour produire un rapport qui sera présenté en preuve ou pour témoigner dans une instance a l'obligation primordiale d'aider la Cour avec impartialité quant aux questions qui relèvent de son domaine de compétence.

2. This duty overrides any duty to a party to the proceeding, including the person retaining the expert witness. An expert is to be independent and objective. An expert is not an advocate for a party.	**2.** Cette obligation l'emporte sur toute autre qu'il a envers une partie à l'instance notamment envers la personne qui retient ses services. Le témoin expert se doit d'être indépendant et objectif. Il ne doit pas plaider le point vue d'une partie.

Federal Courts Rules, SOR/98-106, Schedule, Code of Conduct for Expert Witnesses

[64] In addition to the above, some of the factors this Court has considered, and which are germane to this trial, in evaluating the credibility and weight of an expert's evidence, are whether the witness:

- was intransigent, particularly during cross-examination and evaded questions that could expose any frailties in his theory and was intent on reiterating his views, when he deemed it necessary, irrespective of whether those views were responsive to the questions at hand (including by providing answers that went much beyond the question put to the witness);
- emphasized those areas favourable to the expert's interpretation and reluctant to respond to other questions;
- frequently would not concede something which seemed to be obvious or logical and when the concession came, did so reluctantly and grudgingly;
- was forthright, fair, thoughtful and reasonable in answering all questions asked of him/her during both direct and cross-examination;

- in testifying as to the teachings of the Prior Art and the patent in issue, varied their interpretation in order to reach the desired result.

(See: *Johnson & Johnson Inc v Boston Scientific Ltd*, 2008 FC 552 at paras 202-205, 327 FTR 49; *Xerox of Canada Ltd v IBM Canada Ltd*, [1977] 33 CPR (2d) 24 at paras 37-41.)

[65] Rather than summarize each expert's evidence, the Court will summarize their evidence in respect of each of the major issues, which are addressed in these Reasons. However, below is a brief discussion of the Court's evaluation of each expert's credibility and weight given to their evidence.

A. *Dr Bernhard Klein*

[66] Klein has a PhD in Rheology. He has been a professor of Mineral Processing in the Department of Mining Engineering at UBC since 1998 and was head of the department for six years. His area of expertise – mineral processing – encompasses all the activities that take place following the excavation of rock from the ground to the creation of products that are saleable as well as the disposal of waste from the excavation.

[67] He taught courses in rheology and industrial applications in which mineral suspensions are being treated or processed.

[68] In addition to teaching, he had worked in private industry in the same field on about 300 projects but only one in which the addition of polymers to treat waste was involved.

[69] Klein testified on all the major issues in this case. His opinion evidence was countered by that of Dr Farrow on behalf of the Defendant, about whom more follows.

[70] I found Klein to be a straightforward witness, who recognized the limits of his knowledge. Perhaps too often he dismissed issues as theoretical where he did not know an answer and where some explanation of the engineering theory would have been helpful.

[71] Having said that, Klein brought an element of practicality to what was a practical patented process. Unlike Dr Farrow, he did not engage in answers that undermined his credibility. He was more objective, helpful and clear and I attach considerable weight to his evidence.

Generally, where there was a direct conflict between the Defendant's witnesses and Klein, I preferred his evidence unless stated otherwise.

B. *Larry Hyatt*

[72] Hyatt was accepted by the parties as both an expert witness and a fact witness. This hybrid type witness is an anomaly to the usual requirement of an expert witness. An expert need not be overloaded with PhDs and research papers, and expertise can be gained (and of considerable benefit to the Court) through practical and intellectual experience. The example of the master mariner resonates in this Court. Hyatt did not rise to that level of expertise.

[73] Specifically, he was qualified as an expert in the application and use of flocculants to treat mining waste with expertise in mineral processing unit operations such as thickeners,

pumps, pipelines and the various treatments and techniques used for disposal of mining waste including liquid solids separation techniques.

[74] Hyatt has a BSc in chemistry and natural sciences from Morris Harvey College in West Virginia and a Masters of Arts in Educational Administration from West Virginia College of Graduate Studies. From 1972 until 1977, he was a high school chemistry and science teacher.

[75] In 1977, Hyatt began working with Nalco in the mining and minerals processing group where his focus was marketing and selling process chemicals to the mining industry. He was a technical sales representative until early 1980 whereupon he became a district sales manager, most specifically in coal mining related sales and services in the Appalachian coal basin. It was through that sales representative position with Nalco that he became involved with John Brown Harris Coal and Central Coal.

[76] From 2001, Hyatt had his own company marketing binders to the synfuel industry. During 2002-2003, he consulted for Freedom Industries, which had bought the coal portion of Ciba's mining chemicals business. In 2005, he formed Appalachian Chemical Services LLC, which was focused on marketing process chemicals to the mining industry. That company was sold to SNF in 2011. Hyatt has no ongoing relationship with SNF other than the evidence here.

[77] Within the limitations of his education and background limited to the Appalachian coal industry, Hyatt gave straightforward practical evidence on how people "on the ground" would understand aspects of the industry and the Patent. I consider his evidence to be helpful and

generally clear (except for the accents – West Virginian, and in Farrow's case, Australian – the Court was reminded that we are "divided by a common language".)

C. *Dr John Benson Farrow*

[78] Farrow was the Defendant's principal expert on all the major relevant issues. The Defendant's case turned in large part on his evidence. Academically and experientially, he was, on paper, the most qualified major expert. He was relied upon heavily in the Australian Federal Court proceedings, although there are major differences between this case and the present one.

[79] Farrow has a BSc with first class honours in chemistry from the University of Western Australia. He completed his PhD in 1982 on the subject of hydrolysis.

[80] Since 2004, he has been employed with CSIRO and is the manager of the CSIRO Waterford site. CSIRO is an Australian government statutory authority in respect of mining heavily engaged in research projects related to mining. In addition to his Waterford site manager role, he has been the Project Manager of AMIRA P266 "Improving Thickener Technology" projects.

[81] He serves on several boards including the Chemistry Centre of Western Australia and has received awards for his work in thickener technology. He has in-depth knowledge of flocculants and their characteristics and applications. He has authored numerous articles and papers. He was qualified in this Court as an expert in the field of solid-liquid separation processes, flocculants,

flocculation, the application of flocculants to tailings, thickener technology and tailings disposal to the mining industry.

[82] Farrow, like Klein, Clasen, Poteur and Hyatt, testified as to the construction of the Patent, as well as issues of Prior Art, Common General Knowledge, Obviousness and other aspects of validity.

[83] Despite Farrow's strong background, I found his evidence to be less persuasive, consistent, objective and balanced than one would reasonably expect.

[84] It was particularly concerning that on a major construction of the Patent issue – the meaning of the term "rigidification", Farrow advanced different and shifting meanings and components thereof. He stretched and strained the meaning of the Patent and supplied a result oriented interpretation.

[85] Overall, Farrow approached questioning as if it was warfare. No one expects an expert to be a wallflower at a high school dance nor should one expect an expert to be a pit bull in a dog park. Farrow chose both to challenge and debate with counsel on questions and to deflect and quibble with them on answers. He had to be reminded by the Court that he was to answer the question posed and not the one he wished he had been asked. He persisted in his non-responsiveness.

[86] Farrow engaged in trying to slip into an answer gratuitous comments to bolster other points he made. From my perspective, he appeared to have lost his objectivity and became a greater advocate for the Patent's validity than was appropriate.

[87] With all due respect to a highly qualified expert, he was much less helpful to the Court than his duty called for. Therefore, despite his preeminent credentials, I approach his opinion with grave caution and tend to favour the Plaintiff's experts' opinion.

D. *Dr Clasen*

[88] Dr Clasen is a professor of Chemical Engineering. He has authored and published more than 200 presentations and papers related to flow characteristics and viscosity. In 2004, he co-authored a book with Dr Werner-Michael Kulicke entitled "Viscosity of Polymers and Polyelectrolytes". Two relevant chapters from that book, "Intrinsic Viscosity" and "Parameters affecting the Intrinsic Viscosity", were included in his evidence.

[89] He has been appointed by the European Research Counsel as an expert peer reviewer in his field - the general rheology of polymers. He was qualified as an expert in this trial in the field of intrinsic viscosity, including the determination of intrinsic viscosity and techniques for measuring intrinsic viscosity.

[90] His evidence focused on determining the identifying characteristics of polymers including their molecular weight and intrinsic viscosity - a property that can be used to describe

anything that can be added to a liquid. This evidence was important in identifying polymers used in Prior Art.

[91] There is a specific correlation between the mass of the polymer coil and the intrinsic viscosity. The same polymer with the same coil mass put into the same solvent at the same conditions will give the same intrinsic viscosity. As a result, in cases where the relationship between coil mass and intrinsic viscosity is known, a measurement of the intrinsic viscosity can be correlated to a mass for that polymer. This relationship is known as the Mark-Houwink equation and is used to identify a polymer.

[92] Dr Clasen's evidence also emphasized the vulnerability of any assumption made about polymers used in the Prior Art. Particularly, if the type of polymer along with its molecular weight turned out to be different, the intrinsic viscosity could vary immensely, distinguishing it from the polymers referenced in the 581 Patent.

[93] In Dr Clasen's opinion, the polymers referenced in the 581 Patent indicated the use of a moderate to high molecular weight polymer (as confirmed by an intrinsic viscosity greater than 5 dl/g in 1 M NaCl at 25°C) soluble in water and using a solution in which that polymer dissolved in water or at least partially dissolved in water.

VI. Claim Construction

A. *General Principles*

[94] There is no fundamental disagreement between the parties on the general principles; there is a difference of emphasis. The law creates a tension between the desire to reward and protect the truly innovative (*Apotex Inc v Wellcome Foundation Ltd*, 2002 SCC 77, [2002] 4 SCR 153) and a need to strictly confine and define the protection of a monopoly that society is prepared to give (*Free World Trust v Électro Santé Inc*, 2000 SCC 66, [2000] 2 SCR 1024 [*Free World Trust*]). The Plaintiff emphasizes the confinement – the fences; the Defendant emphasizes protection of which the presumption of validity is a part.

[95] The first step in the analysis of validity (and infringement) is to construe the claims of the Patent. Claim construction is not to be result oriented but it should be done knowing where the dispute between the parties lies (*Free World Trust*).

[96] Although claim construction is a matter of law, it is viewed through the perspective of a person of ordinary skill in the art, with a mind willing to understand having regard for the Common General Knowledge such a skilled person would have as of the material date.

[97] The guiding approach of a purposive construction is well established in such decisions as *Free World Trust* at para 43, and *Whirlpool Corp v Camco Inc*, 2000 SCC 67, [2000] 2 SCR 1067 [*Whirlpool*]. This is not, however, a search for the "spirit of the invention" or something akin to legislative intent.

> 43 The patent owner, competitors, potential infringers and the public generally are thus entitled to clear and definite rules as to the extent of the monopoly conferred. This in turn requires that the subjective or discretionary element of claims interpretation (e.g., the elusive quest for "the spirit of the invention") be kept to the minimum, consistent with giving "the inventor protection for that which he has actually in good faith invented" (*Western Electric Co. v. Baldwin International Radio of Canada*, [1934] S.C.R. 570, at p. 574). Predictability is achieved by tying the patentee to its claims; fairness is achieved by interpreting those claims in an informed and purposive way.

[98] Claim construction is objective in nature – it is concerned with what a Skilled Person would have understood the inventor to mean. It addresses the question: What did the Skilled Person understand; not what the inventor might have understood (*Pfizer Canada Inc v Canada (Minister of Health),* 2005 FC 1725 at para 28, 285 FTR 1).

[99] Against those principles, the Court must determine who is "the skilled person" for purposes of this Patent and what was their Common General Knowledge.

B. *Skilled Person*

[100] The experts generally agree on the description of the Skilled Person – the point of substantive disagreement is the Common General Knowledge that such person would have particularly as to in-line polymer addition.

[101] Dr Farrow laid out details of the Skilled Person, which included a pragmatic understanding of the options for mineral tailings. The Skilled Person would have:

- At least an undergraduate degree in such fields as chemistry, chemical engineering or metallurgy. That formal education would have to be combined

with at least two years' practical experience in the treatment of tailings. That experience would include:

- conducting and evaluating flocculation tests, settling tests, slump tests, turbidity tests, yield stress tests;
- working knowledge of polymers (class, physical properties such as molecular weight, intrinsic viscosity), polymer solution preparation, polymer solution aging, polymer dosing and mixing regimes;
- sampling of tailings materials to be treated;
- basic knowledge of flocculation of mineral tailings including the impact of solids contents, particle size distribution, mineralogy and morphology of solids;
- basic knowledge of how to prepare and apply polymer flocculants to treat mineral tailings in a thickener, filter or other application;
- mixing of flocculant with mineral tailings to be treated, including a range of laboratory mixing technologies;
- taking measurements during laboratory tests of treatment of tailings materials such as settling tests and rheology assessment of the treated tailings materials;
- ability to relate laboratory results to plant applications using an informed approach in recognition of the challenges (batch scale, mixing conditions and day-to-day conditions); and,
- measuring and evaluating plant data to assess thickener and filter performance, including the nature of the material discharged to the tailings area.

[102] In accordance with Dr Klein's evidence, I would add to the above:

- be familiar with practices in the field of treating mineral waste, including mineral processing unit operations such as thickeners, pumps, pipelines and the various treatments and techniques used for the disposal of tailings; and,
- in order to put the invention into practice from laboratory work to field work, this Skilled Person would have the relevant skill-set required to troubleshoot and vary routine parameters to attain the objectives of the waste management scheme in place.

[103] This last point is important as it shows the pragmatic approach as part of the Skilled Person's skill set. The Skilled Person is much more like Scammell and Hyatt than a white coat lab technician.

C. *Common General Knowledge*

(1) General

[104] Common General Knowledge is information generally known or that forms part of the stock of knowledge of people in the particular field (*Eli Lilly and Company v Apotex Inc*, 2009 FC 991, 351 FTR 1; aff'd 2010 FCA 240 – leave refused [*Eli Lilly*]).

[105] For purposes of this case, it is important to bear in mind that Common General Knowledge is not limited to information found in literature. Not all knowledge that the Skilled Person is expected to have is distilled into print form (*Janssen-Ortho Inc v Novopharm Ltd*, 2007 FCA 217 at para 25(3), 59 CPR (4^{th}) 116; aff'd 2006 FC 1234 at para 113(3)).

[106] Common General Knowledge arises in this case firstly with respect to claim construction and then later with respect to Obviousness. While there were different emphasises placed on Common General Knowledge by the respective experts (for example, the importance of wet and dry storage), the most significant area of dispute is whether in-line and secondary flocculation were part of the Common General Knowledge for both claim construction and Obviousness.

[107] Much time was spent at the detail level of flocculation but I agree that the cause of flocculation (such as the addition of polymers) and its effect (the aggregation of solids and the increase in yield stress (strength) of a slurry) are the important matters for deciding the issues in this litigation.

[108] In the mining industry tailings are the by-product of mining operations. Tailings are comprised of minerals and other solid particles dispersed in water forming a slurry. Generally, the slurry is deposited to a land area where the separation of the solid particles from the water occurs. The water drains off (the cleaner the water, the better environmentally), and the solids are disposed of, typically when rehabilitating or reclaiming land.

[109] By May 2003, there were a wide variety of different tailings being treated at different processing capacities in different mining processing operations. Coarse particle solids (larger than 0.5 mm or 500 microns) could be easily separated by screens or cyclones. Finer particle sizes were more difficult to separate from the water in which they were suspended.

[110] There were essentially three approaches to separating these fines of which a) and b) were predominant:

a) Flocculation followed by gravity settling in a tailing pond or dam;

b) Flocculation followed by gravity thickening (in a conventional thickener) followed by discharge within a tailings storage facility; and,

c) Mechanical means such as filtration and centrifugation.

[111] Flocculation generally involves the addition of water-soluble polymer that co-absorbs on two or three particles which creates a bridge to bind them into an aggregate or a “floc”. The binding of the surfaces of the particles through the medium of the polymer is known as bridging flocculation.

[112] A polymer is a long, thread like molecule (polymer chain) that consists of many small repeating units (monomers) that are chemically linked. Polymers may differ in electrical charge and in molecular weight.

[113] The polymers of concern in the 581 Patent are “water soluble” meaning that they can be dissolved in an aqueous liquid to form a solution. A polymer expands in solution and so it takes up a greater volume of space in solution than it would in its dry form.

[114] The experts appear to agree that it was Common General Knowledge that polymers could be either coagulants or flocculants. Coagulants tended to be catatonic (positively charged) polymers and of low molecular weight. Polymers that are higher molecular weight anionic (negatively charged) or non-ionic polymers were used as flocculants because they had longer chains and had the capability of bridging particles together.

[115] Flocculants are a commercial product and are marketed and supplied by a range of companies. Before 2003, there were about a half dozen companies manufacturing polymer flocculants.

[116] Polymer flocculants were known to have intrinsic viscosities higher than 5 dl/g. They were also known to be non-selective, in that a polymer flocculant added to a slurry attached to both coarse and fine particles in forming an aggregate.

[117] It was Common General Knowledge that polymer flocculants cause solids in a slurry to aggregate into flocs and that under certain conditions would start to stick together to form a structure that is permeable and allows for further dewatering. With dewatering, the yield stress of the material increases. The addition of the polymer flocculants would co-immobilize coarse and fine particles.

[118] Importantly, it was known that flocculation techniques could be used to produce a "stacking" effect of the thickener slurries. Stacking is a heap of material over which additional solids could be deposited. This stacking occurred because of increased viscosities and rapid deposition and compaction of waste solids leading to further dewatering.

(2) In-Line Polymer Addition – Key Point of Disagreement

[119] The use of thickeners was also part of the Common General Knowledge. The thickening process involves an aqueous slurry inside a cone shaped vessel and allowing the solids within it to settle under gravity to the bottom of the vessel. The material settled on the bottom where it was collected in a central area and pumped to a disposal area. Trial Exhibit P4 shows such a thickener process.

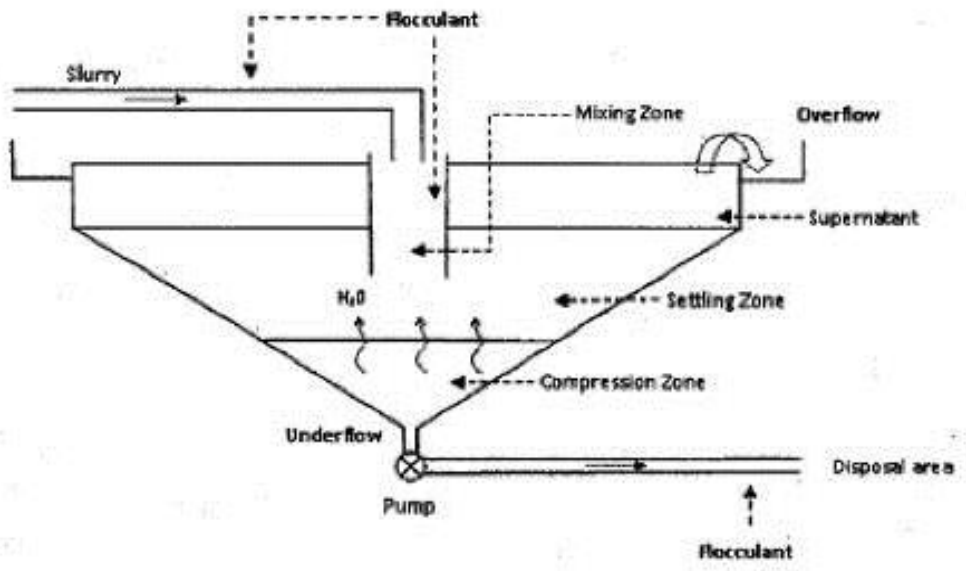

Figure 2: Thickener/clarifier vessel.

[120] It was also known that the flocculation of particles within a tailing slurry could be achieved in various ways including by adding the flocculant into the tailings pipe prior to the tailings being discharged into the deposition area.

[121] Both Klein and Hyatt opine that in-line polymer treatment of tailings was part of the Skilled Person's Common General Knowledge. Farrow disagreed, relying in part on "The 2002 Paste and Thickened Tailings – A Guide" (known here as the 2002 Paste Guide) and a text "Mineral Processing Plant Design, Practice and Control Proceedings (2002)". Farrow's point is that since neither publication referenced in-line flocculation, it was not part of the Common General Knowledge.

[122] The fact that a publication does not state something is not, *per se*, proof that the "something" did not exist. There was no publication cited in the case that attempted to

encapsulate the Common General Knowledge in this area as of 2002/2003. The 2002 Paste Guide itself was specific to improvements and developments in thickener technology, not other forms of slurry treatment.

[123] As I have concluded that Klein and Hyatt were closer to the Common General Knowledge given their greater field experience, I find that on balance it was more likely that in-line polymer addition was part of the 2003 Common General Knowledge. Common General Knowledge can comprise not only the written materials but the knowledge that a person skilled would come to know at the relevant time (*Eli Lilly* at paras 95-105).

[124] It is germane that Farrow in his Report, where he describes "flocculation followed by gravity settling in a tailings dam or pond" as part of the Common General Knowledge, states:

> Flocculation of the particles within the tailings slurry is achieved in various ways, sometimes by adding flocculant into the tailings pipe prior to discharge into the tailing pond or dam, or by adding flocculant into the tailings pond or dam in the vicinity of the discharge point.

[125] At trial, Farrow drew the process of in-line flocculation which became Exhibit P41. I find no difference between his description and this Exhibit.

[126] Exhibit P41, taken together with Exhibit P4 (Klein Report Fig 2) (as admitted by Farrow in cross-examination), show that they:

- embodied an aspect of a process;
- exemplified treatment of a tailings material;

- comprised treatment of the material while it remained fluid in the tailings pipe;
- the materials treated were a dispersion of solids in an aqueous or water medium;
- involved adding a water soluble polymer in-line, which would cause flocculation thereby increasing the yield stress of the material to a degree;
- the usual practice was to add a water-soluble polymer in aqueous solution; and,
- would involve discharge of flocculated material.

All of which supports the conclusion that the in-line addition of polymer to slurry was part of the Common General Knowledge as of May 2003.

[127] Further to the foregoing, I accept the Plaintiff's summary of the relevant Common General Knowledge accepted by those in the field as of May 2003 as follows:

> The following information was generally known and accepted by those in the field by May 7, 2003:
>
> (a) Slurries could be disposed of (with a view to land reclamation and water recycling) by pumping the slurry through a conduit to a disposal area where the material would be allowed to stand;
>
> (b) A water-soluble polymer could be added to a slurry as a powder, an emulsion, a dispersion or an aqueous solution, but was most typically added as a solution;
>
> (c) There were various techniques and protocols known for how to prepare solutions of high molecular weight, non-ionic, anionic and cationic water-soluble polymers, both at the lab scale and plant scale;
>
> (d) An effective amount of a water-soluble polymer could be in the range of 10 g to 10,000 g per tonne dry weight of solids;
>
> (e) Water-soluble polymers could be used in solution form to dewater slurries, in particular, mineral suspensions or tailings;

(f) Water-soluble polymers could be used to treat slurry such that clear water would separate from solids and would be easily removed;

(g) Water-soluble polymers could be added in solution form to slurries during transfer of the slurries (in pipes and other conduits) to a deposition area;

(h) Water-soluble polymers in solution form could be added to a slurry prior to, or during, pumping of the slurry to a deposition area;

(i) The addition of a water-soluble polymer to slurries prior to, or during, pumping of a slurry to a disposal site, including immediately prior to disposal, allowed the slurry to thicken, solidify, consolidate, and/or dewater more effectively upon standing;

(j) Slurries treated with a water-soluble polymer were capable of being transferred as a fluid through conduits and the like without the solids settling out during transfer;

(k) Slurries treated with a water-soluble polymer could be deposited in a deposition area where the dispersed particulate solids in the aqueous liquid would separate from the liquid and solidify;

(l) When allowed to stand, slurries treated with polymers formed compact, consolidated, solidified material which could support subsequent layers of material on top;

(m) The addition of water-soluble polymer to slurries during transfer to a deposition area resulted in rapid dewatering of the slurry and increased solidification, to the point where the treated material became solid enough to walk on;

(n) When a slurry treated with water-soluble polymer was deposited, dewatering could occur through: particle settling; drainage of water remaining between the interstices of the solids; and, compression dewatering due to the load of overlying material (such as in a pile) which would expel even more water from between interstices of the solids in the material;

(o) Deposited slurries formed sloped deposits upon which successive layers could be deposited to form a stack;

(p) Fine and coarse solids could be admixed with a slurry and a water-soluble polymer could be added during or after the admixing;

(q) The addition of a water-soluble polymer to slurries comprising fine and coarse solids would result in a homogeneous deposit with little or no stratification or segregation of coarse and fine solids in the deposit;

(r) Liquid solid separation techniques, such as treating a slurry with water-soluble polymer in a thickener or other vessel to form a supernatant layer comprising an aqueous liquor and an underflow layer comprising thickened solids, and pumping the underflow layer to a deposition area, were generally known; and,

(s) The underflow formed from a thickening process could be treated with a water-soluble polymer in solution form during transfer to a deposition area, and this was referred to as a "secondary flocculation" or "superflocculation".

VII. The Patent/Claim Construction

A. *Principles*

[128] Claim construction starts with the claims themselves. The essential point in dispute is the meaning of the term "rigidification" or "to rigidify".

> Claim 1 - A process of rigidifying a material whilst retaining the fluidity of the material during transfer, in which the material comprises an aqueous liquid with dispersed particulate solids that is transferred as a fluid to a deposition area, then allowed to stand and rigidify, by combining with the material during transfer an effective rigidifying amount of an aqueous solution of a water-soluble polymer, said water-soluble polymer having an intrinsic viscosity of at least 5 dl/g (measured in 1 M NaCl at 25°C). [underlined for emphasis]

[129] Further to the discussion of the law on claim construction, the Defendant has argued and I agree that there are five principles to keep in mind in claim construction:

1) A patent is to be construed purposively requiring the Court to read its claims in the context of the specification as a whole seen through the eyes of the Skilled Person. An inventor's intention must be construed according to the express or implied meaning of its claims (*Whirlpool* at paras 49-50);

2) The Skilled Person must take on this task with "a mind willing to understand a specification that is addressed to him." He/she is assumed to be "a person who is going to try to achieve success and not one who is looking for difficulties or seeking failure." (*Free World Trust* at para 44);

3) As a matter of construction, the Patent must be read in the sense the inventor is presumed to have intended and in a way that is sympathetic to the accomplishment of the inventor's purpose expressed or implicit in the text of the claims. In other words, the specification is the inventor's lexicon (*Free World Trust* at para 51; *Whirlpool* at para 52);

4) The Court should look at the specification to ascertain the nature of the invention, being neither benevolent nor harsh. The Court should construe the patent fairly for the patentee and public and not attempt to find ways to defeat an otherwise valid patent (*McKay v Weatherford Canada Ltd*, 2007 FC 1233 at para 6, 320 FTR 72, aff'd 2008 FCA 369; *Apotex Inc v Sanofi-Aventis*, 2013 FCA 186 at para 54, 114 CPR (4^{th}) 1); and,

5) The Court should attempt to construe the patent's claims to afford the patentee protection for that which he has in good faith invented (*Whirlpool* at para 49(g)).

[130] In more specific terms of these principles, the Supreme Court in *Whirlpool* at para 45 held:

> The key to purposive construction is therefore the identification by the court, with the assistance of the skilled reader, of the particular words or phrases in the claims that describe what the inventor considered to be the "essential" elements of his invention. …

[131] A purposive construction of patent claims requires that they be interpreted in light of the whole disclosure including the specifications (*Monsanto Canada Inc v Schmeiser*, 2004 SCC 34, [2004] 1 SCR 902). Justice Zinn suggests in *Janssen-Ortho Inc v Canada (Health)*, 2010 FC 42, 361 FTR 268 (endorsed by the Federal Court of Appeal in *Mylan Pharmaceuticals ULC v Pfizer Canada Inc*, 2012 FCA 103 at para 57, and more recently in *Apotex Inc v Pfizer Canada Inc*, 2014 FCA 250), that the disclosure is an aide to interpretation where the words of the claim may have two or more reasonable meanings but cannot be used to expand the monopoly by taking bits and pieces of the specifications to construct a meaning – as more colourfully put by counsel, the law does not permit "an unescorted and unchaperoned romp through the disclosure".

[132] These cautions are relevant because the meaning of "rigidification" or "to rigidify" is not immediately obvious. They are not words of science or technical – it is fabricated suggesting the opposite of flexible and akin to solidification or to solidify. This lack of precision is troubling, as is the lack of precision in the 581 Patent generally. In fact, many patents contain "infelicitous" statements (*Novartis Pharmaceuticals Canada Inc v Teva Canada Limited*, 2015 FC 770 at para 23). Here the meaning cannot be construed simply from the claims themselves, and thus, reference to the disclosure and specifications is required.

B. *Disclosure/Specifications*

[133] The Patent is entitled "Treatment of Aqueous Suspensions" and its specification begins with a brief statement of the invention's subject:

> The present invention relates to the treatment of mineral material, especially waste mineral slurries. The invention is particularly suitable for the disposal of tailings and other waste material resulting from mineral processing and beneficiation processes, including the co-disposal of coarse and fine solids, as a homogenous mixture.

[134] This specification describes the common practices of waste disposal. The environmental pressures include the need for waste material that has the "right sort of characteristics for stacking". The specification outlines the difficulties with tailing dams including size, cost, quality of recovered water, the faster settling of coarse materials compared to fines and the need to treat coarse and fines separately.

[135] The specification outlines the differences in settling and sedimentation and that the Patent is directed to overcoming problems with using existing methods which rely on slow rates of sedimentation/compaction and inadequate water release.

The matter of sedimentation/settling is referred to later.

[136] The disclosure/specification is replete with references to rigidification sometimes in relation to rapid solidification, sometimes on its own in terms of material being allowed to stand and rigidity. There is also reference to the formation of stacks and layers of rigidified material, heaped disposal geometry, and quick release of liquid.

[137] Nowhere is there a definition of what rigidification means; although, there is reference to the effect produced by the process in terms of rapid solidification of solids and rapid release of water without indicating any quantification of rapidity. The Defendant's position amounts to an argument that a Skilled Person would "know it when he sees it".

[138] The Patent does, however, refer to the need to improve rigidification:

> However, despite the improvements brought about by WO-A-0192167 [a reference to the Gallagher Patent], particularly in the treatment of red mud, there is still a need to further improve the rigidification of suspensions of materials and further improve upon the clarity of liquor released.

[139] The term "improving" does not appear in the claims. In this regard it is significantly different from the Australian patent and from the Gallagher Patent discussed later.

[140] The Patent disclosures go on to:

- describe that material takes on solid-like features behaving much less fluid-like;
- describe that the intent of the Patent is to produce a solid-like mass upon discharge;
- describe that the suitable dosage of polymer greatly ranges from 10 grams per tonne to 10,000 grams per tonne and that the suitable dosage is one that is "effective", without a description of what that may be;
- refer to the range of solids content as being from 10% to 80% by weight; and,
- suggest that there could be more than one point at which the polymer could be added.

[141] The Patent contained a number of examples. However, the evidence on the utility of those examples was sparse, inconclusive and of little assistance in this case.

C. *Claims 1 and 32*

[142] Claims 1 and 32 are the only independent claims in the Patent. They both raise the issue of the meaning of "rigidify".

[143] Claim 1 comprises the following steps:

- the material is being transferred to a deposition area;
- the material is combined with an aqueous solution of water-soluble polymer; and,
- the treated material is allowed to stand and rigidify.

[144] Claim 32 is different from Claim 1 in that it comprises the following:

- the process relates to rigidifying a mineral material;
- the material being treated is the underflow from a thickener;
- after transfer to a deposition area, the material is then allowed to stand and rigidify and release the aqueous liquid; and,
- certain anionic polymers are employed that are made up of certain monomers.

[145] Each claim in the Patent is directed at the process of "rigidifying" a slurry material while retaining the fluidity of the slurry material during transfer (Court's emphasis).

[146] The Defendant's position is that rigidification is separate and apart from "settling/sedimentation". From the Defendant's perspective, the Patent is directed at overcoming the problems encountered when using existing methods of tailing treatment which rely on slow rates of sedimentation/compaction and inadequate water release.

[147] To the extent that the Defendant attempts to make the case that rigidification is novel and different from settling and sedimentation, they have not made out that case. The Patent itself does not teach such distinction – it does not describe or rely on any scientific background to establish such a distinction. The Patent minimally mentions settling/sedimentation and does not directly compare it with rigidification.

[148] The experts disagree on the existence of such a distinction – each advancing their own theory of what occurs at the molecular level in these three processes. Farrow was particularly reliant on this distinction; however, he did not rely on any objective scientific materials and was inconsistent in his evidence on this issue. One would have expected that if there was a material distinction between settling/sedimentation and rigidification, there would have been scientific evidence to establish it.

[149] Farrow opined that "rigidification" involves a rapid and significant change in the rheological properties (the flow of materials) after the treated tailings material has been deposited in a deposition or impoundment facility. He relied on a quote from page 15 of the Patent [Page 15 Passage]:

> The rheological characteristics of the material as it rigidifies is important, since once the material is allowed to stand it is

> important that flow is minimised and that solidification of the material proceeds rapidly. If the material is too fluid then it will not form an effective stack and there is also a risk that it will contaminate water released from the material. It is also necessary that the rigidified material is sufficiently strong to remain intact and withstand the weight of subsequent layers of rigidified material being applied to it.

[150] However, as Klein correctly pointed out, heaped geometry, formation of a stack and dewatering were the preferable result of the process but not a requirement of Claim 1.

[151] Farrow, in Exhibit D54, provided a definition of "rigidified tailings" as including "one or more of the following" characteristics:

> (a) it is less likely to spread laterally after deposition in the impoundment area thus enabling the available land area to be used more efficiently …
>
> (b) it will rapidly form a solid structure in the form of a stack or heaped geometry …
>
> (c) there is a greater yield stress in the deposited material … , the slump test results in the Examples (…) which would be understood by the skilled person as a measure or indicator of yield stress and the yield stress results in …
>
> (d) it will have an increased uniformity or homogeneity of fine and coarse particles rather than tending to segregate or separate into fine and coarse fractions …
>
> (e) the formation of a stack or heaped geometry results in downward compression forces in the deposited material forcing water out of the stack by virtue of hydraulic gravity drainage …
>
> (f) a more rapid (…) and improved clarity of water release or dewatering: Example 1 (Table 3 which shows a significant increase in clarity of the released water, …), Example 2 (Table 5 which shows a significant increase in clarity of the released water) and Example 4 (Table 9 which shows a significant increase in clarity of the released water) from

> the deposited material without significantly disturbing the solids distribution in the deposited stack …

[152] Farrow's definition is undercut both by the fact that in the Australian Federal Court and before the Australian Patent Office, he swore that rigidified tailings would include all six characteristics (not just one or more) and that this is not a definition but a description of the preferred outcome. His definition is the very result oriented interpretation which the Supreme Court has said ought not to occur.

[153] Neither heaped geometry, nor co-immobilization of fine and coarse materials nor co-disposal of coarse and fine solids as homogenous mixture are necessary characteristics of rigidification. Also, forming a stack does not necessarily follow rigidification nor does water release. Farrow admitted that rigidification, as set out in the Patent, would in effect mean attaining greater yield stress.

[154] Farrow was not the only expert to give varying definitions of rigidification – he was just the worst offender. Interestingly neither party in final argument adopted the definition of their experts. The Defendant selected a succinct adoption of Farrow's report but specifically relying on the Page 15 Passage. The Plaintiff put forward an amalgam of concepts to suggest that rigidify means "to become solid-like with greater yield stress than would be the case without the addition of polymer".

[155] Dr Klein defined "rigidification" by defining the invention. The definition was the process of taking the slurry, transporting it, combining a water soluble polymer in the form of a

solution, allowing mixing forming aggregates, which is then transported to a deposition area where the material rests and forms a solid-like structured mass.

[156] This is not a definition and, in the absence of any scientific explanation in the Patent for the invention, the interpretation is beyond the specifications. His "definition" includes more than the term and is more like a definition or description of the invention.

[157] Hyatt defined "the process of rigidifying" as a process of converting a slurry from a liquid to a solid mass. In this regard Hyatt is closer to a definition especially where, in cross-examination, he accepted that rigidifying means solidification of the material in a slurry proceeding rapidly. He did not accept the Defendant's distinction between settling and rigidification; his point is accepted by the Court.

[158] A major difficulty with the word "rigidify" is that not only is it imprecise in itself, it has no parameter. It is a qualitative term generally referring to the strength and characteristics of tailing materials deposited in some form of facility.

[159] The Page 15 Passage is the most helpful part of the Patent on this issue. It speaks to the rapid solidification of a deposit where material flow is minimized and the material becomes strong enough to remain intact and withstand the weight of subsequent layers of similarly treated materials.

[160] The elements of heaped geometry, increased rate of dewatering and formation of a stack is the end, or at least the preferred, result.

[161] The difficulty with the Page 15 Passage basis of definition is that it lacks quantification or parameter. For example, there is nothing to indicate what the quality of "rapid" means – how rapid is rapid? The examples in the Patent do not establish the quality of rapidness – is it instant or over time; if over time, then what is that period?

[162] The Court does not need to reach a conclusion on these missing quantifications. That could be an issue for an infringement action. It leaves the 581 Patent like a recipe – if the cake turns out light and fluffy like grandmother's, the recipe was infringed/if it turns out like a brick, it was not.

[163] In view of the sometime equivocal evidence and lack of quantification, the Court finds that rigidification is: increasing the yield stress of a mineral deposit rapidly whereby the flow of the deposit is minimized and the weight of subsequent layers of like deposits is supported.

VIII. Anticipation

[164] Valid patent claims must disclose an invention that is novel, that is, one must not be able to anticipate the invention.

[165] It is well accepted that the test for anticipation is first, that the Prior Art must disclose the subject matter that would infringe the claim at issue if practised, and second, that the Prior Art

must enable that subject matter: *Apotex Inc v Sanofi-Synthelabo Canada Inc*, 2008 SCC 61 at paras 24-30, [2008] 3 SCR 265 [*Sanofi*]. The test for anticipation is rigorous. Justice Hughes in *Abbott Laboratories v Canada (Health)*, 2008 FC 1359 at para 75, aff'd 2009 FCA 94, provides a useful summary of requirements for anticipation that also apply to this case:

> 1. For there to be anticipation there must be both disclosure and enablement of the claimed invention.
>
> 2. The disclosure does not have to be an "exact description" of the claimed invention. The disclosure must be sufficient so that when read by a person skilled in the art willing to understand what is being said, it can be understood without trial and error.
>
> 3. If there is sufficient disclosure, what is disclosed must enable a person skilled in the art to carry out what is disclosed. A certain amount of trial and error experimentation of a kind normally expected may be carried out.
>
> 4. The disclosure when carried out may be done without a person necessarily recognizing what is present or what is happening.
>
> 5. If the claimed invention is directed to a use different from that previously disclosed and enabled then such claimed use is not anticipated. However if the claimed use is the same as the previously disclosed and enabled use, then there is anticipation.
>
> 6. The Court is required to make its determinations as to disclosure and enablement on the usual civil burden of balance and probabilities, and not to any more exacting standard such as quasi-criminal.
>
> 7. If a person carrying out the prior disclosure would infringe the claim then the claim is anticipated.

IX. Prior Art Documents

A. *Gallagher*

[166] It is no surprise that the Gallagher Patent is put forward as an anticipating Prior Art. The objectives, language and invention are almost identical to the 581 Patent. Conceding that Gallagher is directed to achieving a solidification of material similar to the 581 Patent (steps 1 and 3 of Claim 1), the Defendant argues that the result is achieved in an entirely different way - combining tailings with *dry* solid particles of polymer that have an intrinsic viscosity of at least 3 dl/g.

[167] Ciba is correct in that there is no disclosure of in-line addition of water soluble polymer solution in Gallagher. Although there is recognition that solution addition is an alternative form of treatment, it does not disclose this form of addition on the balance of probabilities to achieve the desired result. Gallagher is clearly disclosing the use of dry solid polymer particles to achieve the desired result.

[168] Dr Klein relies on passages at pages 14 and 15 of Gallagher to state that a Skilled Person would understand the references as disclosing the known “alternative” of using polymer in solution form to rigidify slurries. Dr Farrow comments that Dr Klein does not acknowledge that the references in Gallagher refer to an emulsion addition and water insoluble or swellable polymers, which all led to settling not rigidification.

[169] I agree with Dr Klein to the extent that Gallagher can be read in a way that contrasts solution addition from particle addition; however, I do not find that this equates to sufficient disclosure of rigidification, as defined in this case. In its closing arguments, SNF argued that the Court should adopt UK jurisprudence stating that comparing, contrasting and even disparaging is sufficient disclosure for anticipation. It is not necessary in this case to adopt this jurisprudence as the Court is able to make its determination on the civil balance of probabilities - the Gallagher claims specifically disclose dry particle addition of the polymer to achieve the desired rigidification.

[170] Even if this Court was to accept that there is sufficient disclosure of solution addition to achieve rigidification in Gallagher, this is not enabled by Gallagher. A major controversy in this litigation centered on the alleged Gallagher teachings regarding particle addition compared to solution addition and how each would engage in a slurry. An agreement on when these different characteristics of polymer addition became Common General Knowledge was not reached. However, in my opinion, this is irrelevant. The experts agreed that the form of addition is integral to the process followed and this is relevant as enablement for particle addition does not equate to enablement for solution addition due to their different characteristics. Thus, by teaching particle addition and providing a process to its application, Gallagher does not enable solution addition without meaningful experimentation.

B. *Steward, Backer & Busch [SBB]*

[171] SBB is a publication by the United States Department of the Interior, Bureau of Mines. The Abstract of this publication states the following:

> To decrease the potential for fine coal waste slurry impoundment failures, the Bureau of Mines investigated a new disposal technique. The fine coal waste slurry is rapidly thickened (i.e., dewatered) and deposited on a slightly sloping surface. To accomplish rapid dewatering, a chemical flocculation system using polymers was developed to treat the fine coal waste slurry stream. The fine solids formed flocs, settled from suspension, and rapidly released excess water…

[172] SBB discloses a process of in-line flocculation with a solution polymer resulting in a rapidly thickened fine coal waste slurry deposited on a slightly sloping surface. The publication arguably discloses all three steps of Claim 1. However, there are two primary issues that prevent SBB from anticipating the 581 Patent. First, notwithstanding this is partially due to the description of the term, the Court is unable to determine if rigidification actually occurred in SBB. Although the solids content of the slurry increased and water was released rapidly, it cannot be determined if the treated material stood and rigidified or if 68 days were needed for the material to spread and develop strength.

[173] The second issue is that the 581 Patent discloses the application of this process to *any* material, while SBB limits it to "all mines". Submissions on this distinction were not provided by the parties and as a result, this Court will comment no further on its legal implications. Overall, the stringent requirements of an anticipatory document are not met by SBB.

C. *Condolios*

[174] The Condolios Patent claims an installation for spreading clayey mud on ground, which is free from water, and reclaiming land.

[175] There is no disclosure or enablement by this document. Condolios only discloses a process for treating clayey mud and this is reflected in the described apparatus and procedure. The treatment of other materials is not disclosed and most importantly, it is unclear if the Condolios deposit is analogous to the deposit of 581. The civil burden is not met due to the following considerations described in Condolios:

- The solids concentration of the untreated slurry was 10-13%, which is below the range claimed by the 581 Patent and there was no disclosure on how the solids concentration increased with sand addition;
- The deposit characteristics including low viscosity and consolidation over many months are not analogous to those in the 581 Patent; and,
- The polymer disclosure is contentious as its molecular weight was not provided and was therefore assumed in order to determine the intrinsic viscosity - without accurate disclosure of the polymer used, there can be no enablement.

D. *Prior Uses*

[176] The Prior Uses in this case were largely disclosed orally. In assessing these uses, the Court was cautious of the witnesses' recollection of events occurring in the 1970s. There is a real danger in accepting a witness' recollection of oral disclosure based solely on memory. In a situation where the recollection is dated and the nature of the relationship or discussion is uncertain, corroboration is likely required (*Novapharm Ltd v Eli Lilly & Co*, 2010 FC 915 at para 84, aff'd 2011 CAF 220, leave to appeal refused 2011 CarswellNat 3819 (SCC)).

E. *Fos-sur-Mer [FOS]*

[177] In the course of this trial, the evidence of this prior use was complicated by a set of assumptions provided to the key witnesses. When these assumptions were fact checked against Dr Poteur's actual testimony, they fell short of accuracy and some remain unproven. For this reason, the Court cannot confidently rule FOS as anticipatory.

[178] The discrepancies between the trial conducted at the Fos-sur-Mer site and the subsequent full scale implementation were immensely different and thus, do not provide sufficient disclosure or enablement. Additionally, the disclosure is not found to be enabling. Although Poteur spoke to other companies and ports about FOS, there is not sufficient evidence to conclude that this communication reflected the application of the trial or implementation process or if it provided adequate detail. Aside from his reports, there is limited corroboration on the important details of events that occurred at that time.

[179] Also relevant to the disclosure is the polymer, PERMASILT, used by Dr Poteur in the process. The Court was provided a stipulation confirming this polymer as anionic with a molecular weight of approximately 12-14 Daltons. Without evaluating the evidence that disputes the disclosure of PERMASILT and its intrinsic viscosity, there is no evidence that a Skilled Person could have determined PERMASILT's characteristics. Therefore, it cannot be determined that the Skilled Person would accept disclosure of PERMASILT to be analogous to the polymers described in the Patent, the invention is not enabled.

F. *John Brown Harris and Central Coal Company*

[180] The evidence of these prior uses was not corroborated. As a result, any evidence provided by Hyatt cannot be relied upon to establish anticipation.

X. Obviousness

[181] The test for Obviousness is defined by section 28.3 of the *Patent Act*, RSC 1985 c P-4:

28.3 The subject-matter defined by a claim in an application for a patent in Canada must be subject-matter that would not have been obvious on the claim date to a person skilled in the art or science to which it pertains, having regard to	**28.3** L'objet que définit la revendication d'une demande de brevet ne doit pas, à la date de la revendication, être évident pour une personne versée dans l'art ou la science dont relève l'objet, eu égard à toute communication :
(*a*) information disclosed more than one year before the filing date by the applicant, or by a person who obtained knowledge, directly or indirectly, from the applicant in such a manner that the information became available to the public in Canada or elsewhere; and	*a*) qui a été faite, plus d'un an avant la date de dépôt de la demande, par le demandeur ou un tiers ayant obtenu de lui l'information à cet égard de façon directe ou autrement, de manière telle qu'elle est devenue accessible au public au Canada ou ailleurs;
(*b*) information disclosed before the claim date by a person not mentioned in paragraph (a) in such a manner that the information became available to the public in Canada or elsewhere.	*b*) qui a été faite par toute autre personne avant la date de la revendication de manière telle qu'elle est devenue accessible au public au Canada ou ailleurs.

[182] In *Sanofi*, at para 67, the Supreme Court outlined a four-part test to determine Obviousness, summarized by this Court in *Eli Lilly Canada Inc v Mylan Pharmaceuticals ULC*, 2015 FC 125 at para 158, as follows:

> a) Identify the notional "person skilled in the art" and the relevant common general knowledge of that person;
>
> b) Identify the inventive concept claimed in the patent;
>
> c) Identify the differences between the common general knowledge and the inventive concept;
>
> d) Do those differences require a degree of invention, or are they more or less self-evident?

[183] At the fourth step, the issue of "obvious to try" may arise, particularly in areas where experimentation is intrinsic. The following list of non-exhaustive factors should be considered in this context:

1. 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?
2. 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?
3. Is there a motive provided in the Prior Art to find the solution the patent addresses? (*Sanofi*, at para 69)

[184] The Skilled Person is described above at paragraphs 101-102. Importantly, this person in order to effectively treat mineral slurries at various sites must have the relevant skill set to

problem solve by accommodating and experimenting with the process and materials. Each mineral site differs in its waste management scheme and its polymer application.

[185] Having found that in-line flocculation was part of the Common General Knowledge, the following teachings from prior arts discussed during the course of the litigation also form part of the Common General Knowledge and are important for this Obviousness analysis (transcript references included):

- The usual practise was to add a water-soluble polymer in aqueous solution to the treated material (Dr Farrow (cross) page 1576 line 27 to page 1577 line 9);
- All of the polymers referred to in the 581 Patent were known prior to its claim date and the Patent did not teach anything new about how these polymers were made at the source (Dr Farrow (cross) page 1556 line 24 to page 1557 line 18);
- Generally, the higher the flocculant dose, the greater the flocculation (Dr Farrow (cross) page 1543 lines 10-11);
- The fluidity of a material during transfer was maintained during in-line flocculation (Dr Farrow (cross) page 1617 line 20 to page 1618 line 1);
- Rigidification is a state that a suspension will take on deposition and the phenomenon of rigidification is not new (Dr Farrow (cross) page 1497 line 20 to page 1498 line 3); and,
- Different degrees of rigidification could be achieved (Dr Farrow (answer to Judge's question) Page 1743 lines 15-20).

[186] Dr Farrow repeatedly emphasized that paste thickener technology was the focus in terms of state of the art; however, Common General Knowledge includes what a person may reasonably be expected to know and to be able to find out (*Novopharm Limited v Janssen-Ortho Inc*, 2007 FCA 217 at para 25, 158 ACWS (3d) 986). The knowledge includes past knowledge. Thus, accepting that the focus of the mineral waste management industry was on paste thickeners, it was still known that some degree of rigidification could occur with in-line addition of a water-soluble polymer in aqueous solution.

[187] Although each party's articulation differs, each refer to the same inventive concept or difference between the state of the art and the inventive concept. The real issue is whether the difference was obvious.

[188] In Dr Klein's opinion, the inventive concept was the addition of a polymer in solution form to a slurry while it was being transported such that when the slurry was discharged it would stand and develop solid-like behaviour.

[189] In Mr Hyatt's opinion, the inventive concept was a process of treating a slurry with a high molecular weight polymer in solution form such that the slurry remained fluid during transfer but formed a viscous mass on deposition that solidified as the solids compacted and allowed aqueous liquid to be released.

[190] Relying on Dr Farrow's report, Ciba states the inventive concept is “the addition of an effective dose of an aqueous solution of a water soluble polymer (having an intrinsic viscosity as

so claimed) to a slurry (while maintaining the transferability of the slurry) as the slurry is being transferred or transported to a deposition area, such that the slurry undergoes a significant and rapid solidification upon deposition." The inventive concept articulated by the Defendant is therefore a process characterized by the corresponding rapid dewatering that quickly yields a deposit previously associated with dry depositions or stacking.

[191] Considering the Common General Knowledge, it is apparent that the invention is the effective rigidifying amount of an aqueous solution of water soluble polymer that leads to rigidification as defined by the Court. The Patent is argued to be an advancement over what was known and part of the Common General Knowledge as to the potential result of a solution addition of water soluble polymers to a mineral slurry. Thus, the difference and the inventive concept is that an effective amount of solution addition of water soluble polymer can result in a rigidification analogous to the deposit of a paste thickener. It is noted that this type of deposit is only one of several claimed by the Patent under the disguise of rigidification.

[192] At this stage, it must be determined if it was obvious to the Skilled Person that an effective addition of the polymers listed in the 581 Patent would result in rigidified deposit.

[193] Ciba's closing submissions focused immensely on the perceived impact of the optimum dosage of water soluble polymer, which would allegedly deter the Skilled Person from attempting to troubleshoot with this form of polymer. This argument is unconvincing for a number of reasons. First, the Patent does not teach the use of dosages above an optimum amount.

The range disclosed in the Patent, 10-10,000 grams per tonne of material solids, is not claimed and is extremely broad covering ranges in Prior Art documents.

[194] Second, this concern was not raised in the Patent and the discussion of optimum dosage effects only became relevant in Dr Klein's cross examination. It was not supported with consistent theory. Third, and most importantly, there is no evidence that the dosage requirements to achieve the desired result in 581 are beyond any known or perceived optimum levels. Thereby, overdosing would not achieve rigidification.

[195] The Skilled Person would have gone directly and without difficulty to the step of using a minimum dosage of polymer to achieve the level of rigidification of the slurry deposit for the job. It is routine for the Skilled Person to decide, *inter alia*: the nature of the polymer; its form and dosage; and, the point of addition to the slurry line. Thus, applying an "effective" amount is obvious, as the Skilled Person would continue to apply the necessary polymer to achieve the necessary outcome and discontinue polymer application once overdosing occurred.

[196] I find an effective amount of solution addition of a water soluble polymer would have been obvious to try in order to achieve a "rigidified" deposit and therefore, the 581 Patent is invalid for Obviousness. The "obvious to try" test is appropriate in this circumstance as the evidence of Hyatt, Dr Poteur and Scammell demonstrated to the Court that polymer application includes a degree of experimentation due to the different objective, slurry composition and site mechanics at each site.

[197] An important factor in this determination is the "actual course of conduct which culminated in the making of the invention" (*Sanofi* at para 70). Although the evidence of the history of the invention must be approached with caution, it is nonetheless relevant in this consideration. Scammell admittedly was discouraged from using a solution addition of the water soluble polymer. He was counselled by his employer to stay within the boundaries of the Gallagher Patent and particle addition due to the underlying patent protection. A solution addition would be obvious to try as it was part of the Common General Knowledge.

[198] It is difficult to conclude (and unnecessary for this litigation) to hold that the Gallagher Patent was part of the Common General Knowledge since the Plaintiff's experts were unaware of it. However, its principal teachings were part of that knowledge.

In the context of this case, the inventors were aware of Gallagher and it influenced their actions. There was little, if any, evidence that a Skilled Person conducting a reasonably diligent search would have come upon Gallagher.

[199] There are a finite number of identified predictable forms of polymer (polymer in solution, powder or emulsion) known to the Skilled Person to treat a mineral slurry. As demonstrated by Hyatt, the Skilled Person would experiment with the amount of polymer that could be added before reaching an ineffective level. In the course of this experimentation, trials are routine and necessary due to the factors affecting deposits - mineral composition, size, type of polymer, flow rate, thickener use and deposit space.

[200] Finally, there was a good reason to pursue the solution over the particle addition as it would lead to commercial success and client retention. The Skilled Person is motivated to construct the best possible waste management process for each site including, if desired, rigidified tailings.

[201] I therefore concluded that the invention was in fact “obvious to try” and the 581 Patent is invalid on that basis.

[202] Having found that the 581 Patent is invalid for Obviousness (obvious to try), it is not strictly necessary to make findings on the subsidiary matters raised. However, for completeness and out of respect for the parties who diligently put forward every argument possible on a validity challenge, I will address the other points raised which merit comment.

XI. Sufficiency

[203] To be sufficient, a patent specification need only describe the invention and its use so that persons skilled in the art will be able to use the invention. As held in *Teva Canada Ltd v Pfizer Canada Inc*, 2012 SCC 60 at paras 10 and 70, [2012] 3 SCR 625 [*Teva*], there are three questions to be answered:

1. What is the invention?
2. How does it work?
3. Can the Skilled Person (using only the specifications) make the same successful use of the invention as the inventor at the time of his patent application?

[204] The specification requirements are specifically set forth in s 27(3) of the *Patent Act*:

27. (3) The specification of an invention must	**27.** (3) Le mémoire descriptif doit :
(*a*) correctly and fully describe the invention and its operation or use as contemplated by the inventor;	*a*) décrire d'une façon exacte et complète l'invention et son application ou exploitation, telles que les a conçues son inventeur;
(*b*) set out clearly the various steps in a process, or the method of constructing, making, compounding or using a machine, manufacture or composition of matter, in such full, clear, concise and exact terms as to enable any person skilled in the art or science to which it pertains, or with which it is most closely connected, to make, construct, compound or use it;	*b*) exposer clairement les diverses phases d'un procédé, ou le mode de construction, de confection, de composition ou d'utilisation d'une machine, d'un objet manufacturé ou d'un composé de matières, dans des termes complets, clairs, concis et exacts qui permettent à toute personne versée dans l'art ou la science dont relève l'invention, ou dans l'art ou la science qui s'en rapproche le plus, de confectionner, construire, composer ou utiliser l'invention;
(*c*) in the case of a machine, explain the principle of the machine and the best mode in which the inventor has contemplated the application of that principle; and	*c*) s'il s'agit d'une machine, en expliquer clairement le principe et la meilleure manière dont son inventeur en a conçu l'application;
(*d*) in the case of a process, explain the necessary sequence, if any, of the various steps, so as to distinguish the invention from other inventions.	*d*) s'il s'agit d'un procédé, expliquer la suite nécessaire, le cas échéant, des diverses phases du procédé, de façon à distinguer l'invention en cause d'autres inventions.

[205] The Plaintiff argues that, assuming that the Patent was not obvious (to try), then the Patent fails to teach the Skilled Person how to carry out the process to achieve rigidification. Specifically, the Patent:

- only tells the Skilled Person to add the polymer solution anywhere on the slurry transfer system so long as the slurry retains fluidity during transfer and rigidifies on standing;
- there is no volumetric flow rate despite Dr Farrow testifying that such a flow rate was important; and,
- the dosage of polymer is critical to the result but the Patent is non specific and covers a range of dosages from 10 grams to 10,000 grams per tonne depending on the particular materials being treated. The dosages covered are dosages referred to in the Prior Art.

[206] The issue of sufficiency is closely tied to that of claim construction. The definition of rigidification, as found by the Court, leads, along with other evidence, to the conclusion that the Patent describes a process that was obvious to try given the Prior Art. Thus, based on legal requirements, the 581 Patent's disclosure was sufficient.

[207] However, as noted in the discussion on claim construction, if the Defendant's interpretation was adopted as described by Dr Farrow, rigidification occurs when one obtains the result one desires.

[208] Therefore, not only would the specification be insufficient since one does not know how to achieve that goal, but that approach is to "game the system" criticized by the Supreme Court of Canada in *Teva* at para 80.

[209] I conclude that insufficiency cannot be made out on the basis of the claims as construed by the Court but, alternatively, if the claims are construed as the Defendant asserts, the specifications are insufficient.

XII. Overbreadth

[210] The test for overbreadth, as set out in *Lovell Manufacturing Co v Beatty Brothers Ltd*, (1962) 41 CPR 18 (Can Ex Ct), is whether the claims read fairly and illustrated in the specifications and drawing are wider than the invention itself.

In *Leithiser v Pengo Hydra-Pull of Canada, Ltd*, [1974] 2 FC 954 at para 21, 17 CPR (2d) 110, the issue of overbreadth is described as involving two questions.

> **21** The first is whether the claims of the appellant's patent claim more than he invented. The second is whether the claims are broader than the invention which is described in the specification. If the answer to either question is in the affirmative, as I understand the law, the claims are invalid.

[211] The Plaintiff's principal point is the subject matter of the Patent is broader than what the inventors invented because it includes within its claims, treatment of oil sands tailings.

[212] There is a basis for this argument in that Mr Scammell had not been to the oil sands nor had any involvement with them. That evidence was compounded by the Defendant filing for another patent which taught the identical process as the 581 Patent but applied it to dispersed particulate solids which are in whole or in part, oil sands tailings.

[213] I conclude that the claims are not broader than the invention disclosed in the specifications. The Patent states that the invention has broad application and it was Scammell's intention that it be useful in several different industries. While Scammell did not necessarily focus (or even consider) the tar sands – which arguably means the claims could be broader than the invention made – there is no requirement to claim a particular or all benefits of the invention. Given the scope of the invention I cannot also conclude that the claims are broader than the invention made.

[214] Therefore, the challenge on the grounds of overbreadth is not sustained.

XIII. False and Misleading Statements

[215] The starting point for analysis of this issue is s 53 of the *Patent Act*:

53. (1) A patent is void if any material allegation in the petition of the applicant in respect of the patent is untrue, or if the specification and drawings contain more or less than is necessary for obtaining the end for which they purport to be made, and the omission or addition is wilfully made for the purpose of misleading.	**53.** (1) Le brevet est nul si la pétition du demandeur, relative à ce brevet, contient quelque allégation importante qui n'est pas conforme à la vérité, ou si le mémoire descriptif et les dessins contiennent plus ou moins qu'il n'est nécessaire pour démontrer ce qu'ils sont censés démontrer, et si l'omission ou l'addition est volontairement faite pour induire en erreur.

[216] Therefore, to invalidate the 581 Patent, it must be shown that the impugned statement(s) were:

a) untrue;

b) material;

c) made in the drafting of the Patent with wilful intent to mislead; and,

d) the statement would be likely to mislead the Skilled Person.

[217] Statements concerning the Gallagher Patent were inserted into the 581 Patent during the prosecution of its application. Peatfield was directly involved in both patents. The words in the Gallagher application were of his choosing.

[218] The words at issue in that patent were:

> It is surprising that the process according to the invention forms a product which rigidifies far better than alternative treatments.
>
> One advantage of additions in powder form is that the viscosity does not increase or diminish as rapidly as solution based addition.

[219] Internal Ciba communications confirmed that aqueous polymer addition was contemplated as a workable alternative solution with the Gallagher process. In fact, a European patent agent confirmed, consistent with the belief of Ciba employees, that the Gallagher application covered aqueous solution addition.

[220] It was Peatfield's view that the words used in the Gallagher application did not actually state that aqueous polymer addition would be ineffective, just that other additions, particularly powder, would be better.

[221] Peatfield was also involved in the processing of the 581 application providing an overview of the process. He added in the Prior Art references but admitted in internal communication that he had a difficult time distinguishing the Prior Art from the new process being applied for.

[222] The patent proposal given to Peatfield was, on its face, merely a substitution of aqueous solution for the powder. He admitted that he knew that the solution would work much as the powder did and achieve essentially the same results.

[223] Despite this background, the 581 Patent characterized Gallagher as teaching that the use of aqueous solutions of water-soluble polymer would be ineffective. The priority document of the 581 Patent stated that Gallagher held:

> … the importance of using particles of water soluble polymer is emphasised and it is stated that the use of aqueous solutions of the dissolved polymer would be ineffective.

[224] Peatfield admitted that if these words were taken to mean that these words appeared in Gallagher that would be false. Those words did not appear in Gallagher.

[225] In my view, those words were intended to convey exactly that meaning and that they were false and known to be false. One cannot help escape the conclusion that it was done to try to make the 581 Patent look like something new and different when it was known that it was not.

[226] The 581 Patent also states that its inventors “unexpectedly found that the addition of the aqueous solution of polymer to the material does not cause instant rigidification or substantially

any settling of the solids prior to standing". The statement purportedly addressed concern that solidification would occur in transit and plug the pipe before its end. This concern came from an implication said to arise from the Gallagher Patent about powder not increasing or decreasing viscosity as rapidly as solution.

[227] There was no such statement but the words were designed to suggest a problem in the Prior Art which the 581 Patent solved. This was misleading. It was even more so in that Ciba's own testing showed that the solution addition would work just as well as the powder addition.

[228] Ciba engaged in activities designed to make the 581 Patent look new. It deliberately made these statements which it knew (or ought to have known) would mislead.

[229] Ciba is saved only by the issue of materiality. A statement is material if it affects how the public makes use of the invention taught by the 581 Patent (see *Procter & Gamble Co v Bristol-Myers Ltd*, [1978] FCJ No 812 (QL) at para 37, 39 CPR (2d) 145; *Weatherford Canada Ltd v Corlac Inc*, 2011 FCA 228, 95 CPR (4th) 101).

[230] There is no evidence that the false and misleading statements were material in that legal sense. Ciba's conduct may be reprehensible but it was not material. The Patent would not be declared invalid on that ground alone. However, the evidence surrounding those statements indicates just how obvious the 581 Patent was given the Gallagher Patent.

XIV. Australian Proceedings

[231] A theme or undercurrent in this trial was the existence of decisions by the Federal Court of Australia, both at the trial and appellate levels, where a similar patent was held to be valid. This Court was also advised that proceedings had been commenced in Australia to re-open the judgment on grounds that it had been obtained improperly.

[232] The Federal Court of Australia is the sibling court to this Court and its decisions are held in the highest regard by the judges of this Court. However, this is a circumstance where we depart from our very southern colleagues – which we do with the greatest of respect.

[233] As persuasive as judgments from the Australian Federal Court may be, the decision here turns on the facts and law applicable here. The Australian court dealt with an innovation patent, a type of patent not existing in Canada. The applicable laws are different; the evidence on the key issues of anticipation and obviousness was different both in terms of witnesses and in terms of documents.

[234] Testimony from the Australian Federal Court was only taken into evidence in these proceedings where it was relevant and where it was put to the witness here such as the inconsistent evidence of Dr Farrow regarding rigidification.

[235] This decision with respect to obviousness was not influenced by any evidence from Australia, which was not put in evidence before this Court. The status of the motion to re-open

the Australian judgment is unknown and is irrelevant. Therefore, the Australian Federal Court decisions were of interesting context only.

XV. Conclusion

[236] For all these reasons, the Plaintiff will be successful. The 581 Patent and all claims thereof are and have always been invalid, void and of no force and effect. The precise terms of the Final Order shall be settled upon hearing from the parties.

[237] Costs shall be in favour of the Plaintiff on such terms as the Court may determine.

[238] The parties shall have thirty (30) days from the date of these Reasons to file submissions consistent with these Reasons on the terms of the Final Order and the matter of costs.

"Michael L. Phelan"
Judge

Ottawa, Ontario
August 24, 2015

APPENDIX I

CLAIMS

1. A process of rigidifying a material whilst retaining the fluidity of the material during transfer, in which the material comprises an aqueous liquid with dispersed particulate solids that is transferred as a fluid to a deposition area, then allowed to stand and rigidify, by combining with the material during transfer an effective rigidifying amount of an aqueous solution of a water-soluble polymer, said water-soluble polymer having an intrinsic viscosity of at least 5 dl/g (measured in 1 M NaCl at 25°C).

2. A process according to claim 1 in which the water soluble polymer has an intrinsic viscosity of at least 5 dl/g and is formed from ethylenically unsaturated water-soluble monomer or blend of monomers.

3. A process according to claim 1 or claim 2 in which the water soluble polymer is anionic.

4. A process according to claim 3 in which the polymer is formed from monomer(s) selected from (meth) acrylic acid, allyl sulphonic acid and 2-acrylamido-2-methyl propane sulphonic acid as the free acids or salts thereof, optionally in combination with non-ionic co-monomers, selected from (meth) acrylamide, hydroxy alkyl esters of (meth) acrylic acid and N-vinyl pyrrolidone.

5. A process according to claim 1 or claim 2 in which the water soluble polymer is non-ionic.

6. A process according to claim 5 in which the polymer is formed from monomer(s) selected from (meth) acrylamide, hydroxy alkyl esters of (meth) acrylic acid and N-vinyl pyrrolidone.

7. A process according to claim 1 or claim 2 in which the water soluble polymer is cationic.

8. A process according to claim 7 in which the polymer is formed from monomer(s) selected from dimethyl amino ethyl (meth) acrylate – methyl chloride (DMAEA.MeCl) quaternary ammonium salt, diallyl dimethyl ammonium chloride (DADMAC), trimethyl amino propyl (meth) acrylamide chloride (ATPAC) optionally in combination with non-ionic co-monomers, selected from (meth) acrylamide, hydroxy alkyl esters of (meth) acrylic acid and N-vinyl pyrrolidone.

9. A process according to any one of claims 1 to 8 in which the dispersed particulate solids are mineral.

10. A process according to any one of claims 1 to 9 in which the process comprises the disposal of mineral slurry residues from a mineral processing operation.

11. A process according to any one of claims 1 to 10, which provides a heaped geometry.

12. A process according to any one of claims 1 to 11, which further comprises co-disposal of coarse and fine solids as a homogeneous mixture.

13. A process according to any one of claims 1 to 10, which provides a heaped geometry, which co-immobilises fine and coarse fractions of the solids in the material, and in which water release has a higher driving force to separate it from the material by virtue of hydraulic gravity drainage.

14. A process according to any one of claims 1 to 13, in which the material is derived from the tailings from a mineral sands process.

15. A process according to any one of claims 1 to 14 in which the dispersed particulate solids have particle sizes less than 100 microns.

16. A process according to claim 15, in which at least 80% of the particles have sizes less than 25 microns.

17. A process according to any one of the claims 1 to 16 in which the dispersed particulate solids has a bimodal distribution of particle sizes comprising a fine fraction and a coarse fraction, in which the fine fraction peak is less than 25 microns and the coarse fraction peak is greater than 75 microns.

18. A process according to any one of claims 1 to 17, in which the material has a solids content in the range 15% to 80% by weight.

19. A process according to claim 18, in which the material has a solids content in the range of 40% to 70% by weight.

20. A process according to claim 18, in which the material has a solids content in the range of 50% to 70% by weight.

21. A process according to any one of claims 1 to 20, comprising flocculating an aqueous suspension of solids in a vessel to form a supernatant layer comprising an aqueous liquor and an underflow layer comprising thickened solids forming the material, separating the supernatant layer from the underflow, wherein the underflow containing the particulate material flows from the vessel and, in which the material is then pumped to a deposition area where it is allowed to stand and rigidify, and wherein the effective rigidifying amount of the aqueous solution of the water-soluble polymer is mixed with the material after flocculating the suspension and before the material is allowed to stand.

22. A process according to claim 21 in which wet or dry coarse particles are added to the underflow from the vessel either before or during the addition of an effective rigidifying amount of the water soluble polymer.

23. A process according to claim 21 or 22 in which the material is transferred to a holding vessel prior to being pumped to the deposition area.

24. A process according to any one of claims 1 to 23 in which the material is pumped to an outlet, where it is allowed to flow over the surface of previously rigidified material, wherein the material is allowed to stand and rigidify to form a stack.

25. A process according to any one of claims 1 to 24 in which the effective rigidifying amount of the aqueous solution of the water-soluble polymer is mixed with the material prior to a pumping stage.

26. A process according to any one of claims 1 to 24 in which the effective rigidifying amount of the aqueous solution of the water-soluble polymer is mixed with the material during or subsequent to a pumping stage.

27. A process according to any one claims 1 to 24 in which the effective rigidifying amount of the aqueous solution of the water-soluble polymer is mixed with the material as it exits the outlet.

28. A process according to any one of claims 1 to 27 in which the material is dewatered during rigidification, releasing liquor.

29. A process according to claim 28 in which the liquor is recycled to a mineral processing operation.

30. A process according to claim 28 or claim 29 in which the clarity of the liquor is improved by the addition of an aqueous solution of water-soluble polymer.

31. A process according to any one claims 28 to 30 in which the liquor contains dissolved valuable materials and, in which the liquor is subjected to further processing to reclaim or re-use the valuable materials.

32. A process of rigidifying a mineral material whilst retaining the fluidity of the material during transfer, in which the material comprises an aqueous liquid with dispersed particulate solids is transferred as an underflow from a thickener to a deposition area, then allowed to stand and rigidify and release aqueous liquid, by combining with the material an effective rigidifying amount of an aqueous solution of a water-soluble polymer having an intrinsic viscosity of at least 5 dl/g (measured in 1 M NaCl at 25°C), wherein the water-soluble polymer is anionic and is formed from ethylenically unsaturated water-soluble monomer or blend of monomers, and wherein the water-soluble polymer is formed from monomer(s) selected from the group consisting of (meth)acrylic acid, allyl sulphonic acid and 2- acrylamido-2-methyl propane sulphonic acid as the free acids or salts thereof, optionally in combination with non-ionic co-monomers, selected from the group consisting of (meth)acrylamide, hydroxy alkyl esters of (meth)acrylic acid and N-vinyl pyrrolidone.

33. A process according to claim 32 in which the process comprises the disposal of mineral slurry residues from a mineral processing operation.

34. A process according to any one of claims 32 to 33, in which the material is derived from the tailings from a mineral sands process.

35. A process according to any one of claims 32 to 33 in which the dispersed particulate solids have particle sizes less than 100 microns, in which at least 80% of the particles have sizes less than 25 microns.

36. A process according to any one of claims 32 to 33 in which the dispersed particulate solids has a bimodal distribution of particle sizes comprising a fine fraction and a coarse fraction, in which the fine fraction peak is substantially less than 25 microns and the coarse fraction peak is substantially greater than 75 microns.

37. A process according to any one of claims 32 to 36 in which the material has a solids content in the range 15% to 80% by weight.

38. A process according to any one of claims 32 to 37 comprising flocculating an aqueous suspension of solids in a vessel to form a supernatant layer comprising an aqueous liquor and an underflow layer comprising thickened solids forming the material, separating the supernatant layer from the underflow, wherein the underflow containing the particulate material flows from the vessel and, in which the material is then pumped to a deposition area where it is allowed to stand and rigidify, and wherein the effective rigidifying amount of the aqueous solution of the water-soluble polymer is mixed with the material after flocculating the suspension and before the material is allowed to stand.

39. A process according to claim 38 in which wet or dry coarse particles are added to the underflow from the vessel either before or during the addition of an effective rigidifying amount of the water soluble polymer.

40. A process according to claim 38 in which the material is transferred to a holding vessel prior to being pumped to the deposition area.

41. A process according to any one of claims 32 to 40 in which the material is pumped to an outlet, where it is allowed to flow over the surface of previously rigidified material, wherein the material is allowed to stand and rigidify to form a stack.

42. A process according to any one of claims 32 to 41 in which the effective rigidifying amount of the aqueous solution of the water-soluble polymer is mixed with the material prior to a pumping stage.

43. A process according to any one of claims 32 to 41 in which the effective rigidifying amount of the aqueous solution of the water-soluble polymer is mixed with the material during or subsequent to a pumping stage.

44. A process according to claim 41 in which the effective rigidifying amount of the aqueous solution of the water-soluble polymer is mixed with the material as it exits the outlet.

45. A process according to any one of claims 32 to 44 in which the liquor is recycled to a mineral processing operation.

46. A process according to any one of claims 32 to 45 in which the clarity of the liquor is improved by the addition of an aqueous solution of water-soluble polymer.

47. A process according to any one of claims 32 to 46 in which the liquor contains dissolved valuable materials and, in which the liquor is subjected to further processing to reclaim or re-use the valuable materials.

48. A process according to any one of claims 32 to 47, wherein the process provides a heaped geometry.

49. A process according to any one of claims 32 to 48, wherein the process comprises codisposal of coarse and fine solids as a homogenous mixture.

50. A process according to claim 49, wherein the process provides a heaped geometry and water release has a higher driving force to separate it from the material by virtue of hydraulic gravity drainage.

FEDERAL COURT

SOLICITORS OF RECORD

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