Citation: The Coca-Cola Company (Re), 2025 CACP # 2
Commissioner's Decision #1683
Décision du commissaire nº 1683
Date: 2025-03-07

TOPIC: O00 Obviousness

SUJET : O00 Évidence

Application No. 2718279
Demande nº 2 718 279

IN THE CANADIAN PATENT OFFICE

DECISION OF THE COMMISSIONER OF PATENTS

Patent application number 2718279, having been rejected under subsection 30(3) of the *Patent Rules* (SOR/96-423) as they read immediately before October 30, 2019, refused under section 40 of the *Patent Act* and then having had the proposed method claims remanded for reconsideration after appeal to the Federal Court under section 41 of the *Patent Act*, has subsequently been reviewed according to the direction of the Court. The recommendation of the Patent Appeal Board and the decision of the Commissioner are to refuse the application.

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INTRODUCTION

[1] This recommendation concerns the review of rejected patent application number 2,718,279, which is entitled “BIO-BASED POLYETHYLENE TEREPHTHALATE POLYMER AND METHOD OF MAKING THE SAME” and is owned by The Coca-Cola Company. Pursuant to the judgment of the Federal Court of Canada in *The Coca-Cola Company v Canada (Attorney General)*, 2023 FC 424 [*Coca-Cola*] dated March 28, 2023, the application was referred back to the Commissioner of Patents for redetermination of the method claims of the proposed claims under section 28.3 of the *Patent Act*, RSC 1985, c P-4.

[2] A panel of the Patent Appeal Board (“the Board”) was established to conduct a review of the application on behalf of the Commissioner in accordance with the Court’s direction. As explained below, the Board’s recommendation is that the Commissioner refuse the application.

BACKGROUND

The application

[3] The application was filed under the Patent Cooperation Treaty and has an effective filing date in Canada of March 3, 2009. It was laid open to public inspection on October 1, 2009.

[4] The application relates to food and beverage containers made from a bio-based polyethylene terephthalate (PET) polymer, instead of the standard petroleum-based PET, and to methods for preparing them. The bio-based PET is said to be more environmentally friendly because one of the two monomers used to produce it is made from bio-based raw material that is renewable and does not contribute to greenhouse gas emissions in the same manner as those derived from fossil fuels.

Prosecution history

[5] This application was rejected in a Final Action issued on October 23, 2017 that was ultimately not withdrawn and so the application was referred to the Patent Appeal Board for review on behalf of the Commissioner as communicated to the Applicant on September 13, 2018.

[6] During the review, the Applicant made oral and written submissions that included a further set of proposed claims 1 to 18 dated March 15, 2021. At the conclusion of the review, the Board recommended that the application be refused. The recommendation was accepted and the application was refused in the Commissioner's Decision *Re The Coca-Cola Company,* 2021 CACP 26, CD 1579.

[7] The Applicant appealed that decision and the Federal Court granted the appeal in part, referring the proposed method claims (i.e., proposed claims 14 to 18 dated March 15, 2021) back to the Commissioner for redetermination of the issue of obviousness under section 28.3 of the *Patent Act* in *Coca-Cola*.

[8] A new panel of the Board was formed to review the application and redetermine the obviousness issue on behalf of the Commissioner for the proposed method claims 14 to 18 (herein referred to as "claims 14 to 18 of record" for sake of ease). An "on-remand" preliminary review letter dated August 7, 2023 was provided to the Applicant outlining the panel's analysis and preliminary opinion that claims 14 to 18 of record define subject-matter that would have been obvious under section 28.3 of the *Patent Act*. Pursuant to subsection 86(9) of the *Patent Rules*, SOR/2019-251, the letter notified the Applicant of a further defect, namely that the subject-matter of claim 16 of record was ambiguous and a preliminary analysis of that issue was also provided. That letter invited the Applicant to attend a hearing and to make further oral and written submissions.

[9] In a response dated October 25, 2023 (the "first response") the Applicant provided written submissions addressing those preliminary views ahead of the hearing that had been postponed to November 8, 2023 at the request of the Applicant.

[10] On October 27, 2023, the Board sent a letter informing the Applicant that one of the panel members had regrettably passed away. The Applicant was given the option of continuing the review process with the two remaining panel members, Ms. Cara Weir and Mr. Lewis Robart, which was viewed as the most expeditious way of proceeding. The Applicant understandably preferred to proceed with a three member panel, and so the hearing was postponed pending the appointment of a new panel.

[11] This present panel was appointed comprising one new member, Mr. Owen Terreau, along with the other two members of the previous panel. In a letter dated November 17, 2023, we informed the Applicant that this panel had been formed and outlined in detail the process that would be followed, in view of the unusual circumstances of changing panels mid-process. We also informed the Applicant that starting with a new panel would cause a delay of approximately three months, and asked the Applicant to confirm that they wanted to proceed with the new three member panel. The Applicant confirmed that they wished to proceed with the three person panel in spite of the delay in a letter dated November 30, 2023.

[12] On April 10, 2024, we sent a letter informing the Applicant that the three panel members had conducted a preliminary review of the application including claims 14 to 18 of record and all of the material of record except for the Applicant's first response letter. In accordance with the steps set out in our previous letter, we explained that those written submissions would be fully considered in the next stage of the review process along with any further oral or written submissions that may be forthcoming. We informed the Applicant that the preliminary views and opinions set out in the first panel's letter of August 7, 2023 were wholly consistent with the preliminary views of the new panel, and so we adopted that letter as our own, herein referred to as "our first letter".

[13] Our letter of April 10, 2024, herein referred to as "our second letter", also invited the Applicant to attend a hearing on May 14, 2024 and to provide further written submissions, in addition to those provided in the first response letter, if desired. To help progress the review expeditiously, our second letter also identified points

that might benefit from further clarification at the hearing in relation to a newly proposed set of claim amendments submitted with the Applicant's first response, inviting further submissions on these points in writing and/or at the hearing.

[14] The Applicant needed to postpone that hearing, first because of scheduling issues and a change of co-counsel, and again later because one of the co-counsel had a personal emergency. After arranging a new hearing date, the Applicant provided a second set of written submissions (the "second response") on September 25, 2024 ahead of the hearing which was held on October 3, 2024.

[15] On October 4, 2024, the day after the hearing, the Applicant provided revised proposed claims 14 to 26 as was discussed and agreed to at the hearing.

[16] We have completed our review and have set out our analysis below.

THE ISSUE IS OBVIOUSNESS

[17] As stated above, the Federal Court referred the application back to the Commissioner for redetermination of whether the method claims 14 to 18 of record are obvious under section 28.3 of the *Patent Act*.

[18] As further stated above, the Applicant was notified of an additional issue that arose during the course of the review relating to whether the subject-matter of method claim 16 of record was ambiguous, contrary to subsection 27(4) of the *Patent Act*. However, on further consideration we are now satisfied that this claim complies with subsection 27(4) of the *Patent Act*, and have therefore limited our analysis to the issue of obviousness.

PURPOSIVE CONSTRUCTION

Legal principles

[19] In accordance with *Free World Trust v Électro Santé Inc*, 2000 SCC 66 and *Whirlpool Corp v Camco Inc*, 2000 SCC 67, purposive construction is performed

from the point of view of the person skilled in the art in light of the relevant common general knowledge (CGK), considering the whole of the disclosure including the specification and drawings. In addition to interpreting the meaning of the terms of a claim, purposive construction distinguishes the essential elements of the claim from the non-essential elements. Whether or not an element is essential depends on the intent expressed in or inferred from the claim, and on whether it would have been obvious to the skilled person that a variant has a material effect upon the way the invention works.

[20] We consider that all elements set out in a claim are presumed essential unless it is established otherwise or if the skilled person would understand from the claim language that the Applicant did not intend to make the element essential.

Analysis

Claims 14 to 18 of record

[21] Claims 14 to 18 of record are all directed to a method of producing a bio-based PET polymer beverage container. Claim 14 is the only independent claim:

> 14. A method of producing a bio-based polyethylene terephthalate (PET) polymer beverage container, comprising:
>
> processing a bio-based PET polymer to form a bio-based resin, the bio-based PET polymer comprising a petrochemical derived terephthalate component comprising terephthalic acid and having negligible carbon-14 (C-14) levels, and ethylene glycol of which at least 70 weight percent derives from at least one bio-based material and comprising C-14, said ethylene glycol comprising higher C-14 levels compared to said petrochemical derived terephthalate component; and
>
> injection molding or stretch blow molding said bio-based resin to form said bio-based PET beverage container.

[22] Dependent claims 15 to 17 define further limitations relating to the bio-based source material (claim 15), the decay rate of carbon-14 (C-14) comprised in the

PET polymer (claim 16) and the type of beverage container (claim 17). Dependent claim 18 defines a further method step of recycling the beverage container:

> 18. The method of any one of claims 14 to 17, further comprising recycling the bio-based PET polymer beverage container through recycling systems designed for petroleum-derived PET products.

The person skilled in the art

[23] The Final Action characterized the skilled person as follows:The person skilled in the art (or person of ordinary skill in the art, POSITA) is considered to be a producer of PET containers for food or beverages. In the correspondence of 12 February 2016, the applicant refers to the POSITA as a “converter”, i.e., a person “engaged in the conversion of plastic resins into finished products, e.g., food and beverage containers”, but “not a person of skill in the preparation of polymers”. In the examiner’s view, it is clear that the POSITA is involved in the preparation of the PET polymer, in particular in selecting appropriate monomers for the polymerization. In any case, both views are taken into account in the analysis that follows.

[24] After reviewing the record and considering the Applicant’s submissions, we expressed the preliminary view in our first letter that this characterization was reasonable and invited the Applicant to provide further comments if they disagreed. In our second letter, we clarified our earlier language by expressly stating our preliminary view that the skilled person would be a team that includes both a polymer chemist and a converter.

[25] The Applicant’s first response disputed our characterization, asserting that the skilled person should be considered as a converter engaged in the conversion of plastic resins into finished products, e.g., food and beverage containers, and not a person of skill in the preparation of polymers. The Applicant’s second response modified this assertion stating that the skilled person would be a converter “and not solely” a person of skill in the preparation of polymers.

[26] At the hearing, the Applicant clarified that the “not solely” language of its second response intended to convey that they agreed the skilled person would be a team including both a converter and a person of skill in the preparation of polymers, such as a polymer chemist. The Applicant added that the skilled person’s expertise would include an understanding of container recycling. We agree that this is reasonable.

The common general knowledge

[27] Our first letter sets out our preliminary views of CGK elements based on background information from the instant description and further expressed that relevant information found in the following textbooks, encyclopedia and handbooks, which all published at least ten years before the publication date of the application, would have been CGK:

J E Brady and J R Holum, “Chemistry: the study of matter and its changes” (John Wiley & Sons, Inc, 1993) at pages 44-45, 50, 54 (Brady and Holum);

Gillespie et al, “Atoms, molecules and reactions, an introduction to chemistry” (Prentice-Hall International, Inc, 1994) at page 25 (Gillespie et al);

J Karhu, “Geochemistry: Encyclopedia of Earth Science, Carbon isotopes” (Springer Dordecth, 1998) at page 67 (Karhu);

M P Stevens, “Polymer chemistry, an introduction, 2nd edition” (New York: Oxford University Press, 1990) at pages 26, 31-32, 94 and 393-395 (Stevens);

C A Harper (editor in chief), “Modern plastics handbook / modern plastics” (New York: McGraw-Hill,1999) at pages 1.35, 1.37-1.39, 12.17, 12.28-12.29, 12.33-12.34 (Harper); and

M M Gauthier (editor), “Engineered materials handbook desk edition” (ASM International, 1995) at pages 292-294 (Gauthier).

[28] The Applicant did not disagree that any of the specific background information that we pointed to from the description (as detailed below) was CGK. Likewise, the Applicant did not contest that any of these reference books are appropriately cited in support of the CGK. However, the Applicant's first response maintained that the information in these references is directed to chemistry in general, disclosing certain properties of C-14 and to conventional petroleum-based PET resin manufacturing. We agree and similarly add that these reference books disclose conventional methods of recycling petroleum-based PET resin containers, including bottles specifically, as detailed below.

[29] We also expressed the preliminary view that the information from the background section of document D5 of record that pertains to conventional PET synthesis and petroleum-derived PET resins is more appropriately regarded as CGK than prior art. Importantly, D5 is a patent document that was previously cited on the record as prior art, not CGK:

D5: US 6500890 EDWARDS et al December 31, 2002

[30] Our first letter explained that the relevant teachings are provided as background information pertaining to conventional PET synthesis involving petroleum-derived PET that was well known in the field. The Applicant had previously acknowledged on the record (page 13 of their March 15, 2021 letter) that the information in the background section of D5 pertained to conventional PET synthesis and the use of petroleum-derived PET resins in rigid packaging, such as bottles. On that basis, and since the same information is also found in the other references books that are now part of the record, our preliminary view was that the information was more appropriately considered as CGK.

[31] The Applicant did not concede in the first or second response that D5, a patent document, would have formed part of the CGK.

[32] The principles governing the assessment of CGK, which were reviewed in our first letter, were stated in *Eli Lilly and Co v Apotex Inc*, 2009 FC 991 at para 97; aff'd, 2010 FCA 240, citing *General Tire & Rubber Co v Firestone Tyre & Rubber Co Ltd*, [1972] RPC 457 (Eng CA) at pages 482 and 483. In sum, CGK is a

concept derived from a common sense approach to the practical question of what would in fact be known to an appropriately skilled addressee. Generally, scientific articles form part of the CGK provided they are generally known and generally regarded as a basis for further action by the bulk of those who are engaged in a particular art.

[33] Established reference works (such as textbooks, review articles, handbooks, etc.) or demonstrated commonality of certain knowledge in a number of disclosures in the field are relevant to the inquiry: see the *Manual of Patent Office Practice* at § 12.02.02c [*MOPOP*].

[34] Our preliminary view on D5 was expressed having these principles in mind.

[35] This matter was addressed at the hearing. The Applicant generally disagrees that a patent document would be more appropriately regarded as a CGK document than as prior art, citing the same excerpt §12.02.02c from the *MOPOP*.

[36] We explained that because the relevant information was confined to the background section of the patent (i.e., providing context in the field) and is also found in the reference books cited in our letter, this demonstrates a commonality of knowledge in a number of disclosures in the field. Since the relevant information is also found in sources that qualify as “established reference materials”, we asked if the Applicant would consider it more appropriate for us to withdraw the D5 reference altogether.

[37] Even though D5 does contain additional information outside of the background section that was not well known, which is in large part why patent documents are not generally regarded as CGK documents, the Applicant did not disagree that the background information in columns 1 to 2 of D5 was well known. The Applicant did not agree that D5 should be withdrawn outright because, regardless of whether the information in D5 was regarded as prior art or CGK, the information relating to the quality of bottle resin at column 2, lines 28-30 is relevant to the obviousness inquiry. We agree.

[38] In our view the CGK would have included the following information, which was included in our first letter and was not contested or commented on by the Applicant in response, and is further supported in some instances by the Applicant's expert declaration dated September 16, 2016 from Dr. Robert J. Schiavone, who is asserted to be an expert in PET Packaging Plastics and holds a PhD in Organic Chemistry and Macromolecular Science:

- It is known in the art that the C-14 isotope, which has a half-life of about 5,700 years, is found in bio-based materials but not in fossil fuels: description, para [0016].

- All the isotopes of a given element have virtually identical chemical properties—all give the same kinds of chemical reactions: Brady and Holum, pages 44-45.
- Chemical reactivity and chemical properties are dictated by an atom's electrons (and protons) and not by how many neutrons it carries, the number of neutrons being the difference between the carbon isotopes C-12, C-13 and C-14: Brady and Holum, pages 44-45, 50, 54.

- The isotopic abundance of C-14 in nature is relatively low (~10^{-10}%) compared to the stable isotopes C-12 and C-13 which have a percent natural abundance of 98.89% and 1.11%, respectively: Gillespie et al, page 25; Karhu, page 67.

- C-14 content can be determined by measuring its decay process (disintegrations per minute per gram of carbon or dpm/gC) through liquid scintillation counting: description, para [0017].

- PET is the most widely used linear polyester among the principal engineering plastics that are well known for having superior mechanical properties and greater durability: Stevens, pages 31-32, 393.

- PET is well known as an injection-molding grade material for blow molded bottles, its resins are widely used to produce packaging such as two-litre soft drink containers and have virtually replaced glass in packaging numerous consumer products such as carbonated soft drinks: Harper, page 1.35; D5, col 1, lines 21-30.

- PET is produced by polymerizing ethylene glycol (EG) and terephthalic acid (TA) directly or they can be reacted in an esterification reaction to form the bis(2-hydroxyethyl) terephthalate (BHET) monomer that is subsequently polymerized to PET: Stevens, pages 393-395; D5, col 1, lines 50-56; Harper, pages 1.37-1.38; Gauthier, page 294.

- TA and EG are typically derived from petroleum: description, para [0003].

- PET has a characteristic glass transition temperature around 69°C and contains a standard 1:1 molar ratio of TA:EG in the polymer backbone, which translates to a weight percentage of about 70% TA and about 30% EG: Stevens, pages 26, 94, 395; Harper, pages 1.38-1.39.

- In conventional techniques of manufacturing bottle resin, PET is first polymerized in the melt phase to a lower molecular weight and intrinsic viscosity of about 0.6 dl/g and is then polymerized in the solid phase to further increase the degree of polymerization and the molecular weight to achieve a higher intrinsic viscosity that better promotes bottle formation: D5, col 1, lines 30-35 and lines 62-col 2, line 10; Gauthier, page 294.

- This solid phase polymerization technique, also known as “solid-stating”, was well known in PET resin manufacturing for increasing the molecular weight and intrinsic viscosity of PET to the desired level in order to insure good mechanical properties and suitability for a greater number of applications: Harper, pages 12.33-12.34; Gauthier, page 294.

- PET is typically converted into a bottle by a two-step process by injection molding molten PET into a preform which is reheated and placed on a bottle mold followed by stretching and inflating with high-pressure air and forming into a bottle: D5, col 2, lines 14-25; Schiavone declaration, para 6.

- PET soft drink bottles were the first post-consumer plastic containers recycled on a large scale which began almost simultaneously with the introduction of the bottle in 1977: Gauthier, page 293; Harper, pages 12.28-12.29.

- PET from bottles is generally either recovered and formed into PET flakes or pellets that can be reused to produce new products (secondary/physical recycling) or the PET is decomposed back down to its constituent monomers, e.g. TA and EG or BHET, which can be re-used to prepare other polymers or to regenerate virgin PET (tertiary/chemical recycling): Gauthier, pages 292-294; Harper, page 12.17, 12.33-12.34.

[39] Based on the knowledge relating to C-14, we reasoned that the skilled person would have known that any C-14 that is present in bio-based EG (which would be ~10^{-10}% or 0.0000000001% of the bio-based carbon atoms or less) would give rise to the same chemical reactions as the other isotopes of carbon. On that basis, our preliminary view was that the skilled person would have reasonably expected bio-based EG and bio-based TA to have the same chemical properties and give rise to the same chemical reactions as their petroleum-derived counterparts. For that reason, our preliminary view was that bio-based and petroleum-based PET products would be indistinguishable in terms of appearance, function and recyclability.

[40] The Applicant disputed this in the written submissions, explaining at the hearing that, carbon isotopes aside, bio-based EG would not react in the same way as petroleum-derived EG unless it was sufficiently pure, adding that the bio-based monomers are difficult to purify. In order to clarify, we asked if the properties would be similar to petroleum-based EG if the bio-based EG was purified, and the Applicant said that it would “depend on what [a producer of bio-based EG] did to purify it”.

[41] On further review, we find that the Applicant’s argument is consistent with a similar statement in the background section of D5 (column, 1, lines 46-50) that the purity of the monomers used to produce PET is an important factor in this field. We therefore qualify our view as follows: the skilled person would expect bio-based EG and bio-based TA to have the same chemical properties and give rise to the same chemical reactions as their petroleum-derived counterparts. On that basis they would be useful in place of a petroleum-derived monomer to

polymerize PET. However, in order to produce bottle-grade PET resin, those bio-based monomers would also have to be sufficiently pure.

[42] Apart from purity, the Applicant also explained at the hearing that PET resins are not all the same, even when comparing two petroleum-based PET resins, and so they will not necessarily give rise to similar products that would be indistinguishable in terms of appearance, function and recyclability. The Applicant cited D5 as support that the quality of the resin is critical to achieving commercially acceptable bottles.

[43] This is also consistent with the CGK set out above. The ability to form bottles requires processing to a certain intrinsic viscosity, and would therefore change with the degree of polymerization and molecular weight of the PET polymer. Further, based on information in the description, Harper and the Schiavone declaration, it was well known that properties can be modified or tailored with additives that improve the base properties of PET resin.

[44] In view of the Applicant's submissions relating to purity and quality, and since the properties of the PET product can be changed by modifying the resin, we add the following information to the CGK:

- Bottle-grade PET resin is prepared using EG and TA monomers that are sufficiently pure: D5, col 1, lines 46-50.
- Defects in the preform are typically transferred to the bottle and so the quality of the bottle resin used to form injection-molded preforms is critical to achieving commercially acceptable bottles: D5, col 2 lines 26-30.
- Other ingredients may be added to the PET resin in order to improve its desired properties for a given application: Schiavone declaration, para 9; Harper, pages 1.39, 1.79-1.80; description, para [0014].

Meaning of terms

CLAIM 16: AT LEAST 0.1 DPM/GC OF C-14

[45] Dependent claim 16 of record defines the bio-based PET polymer as having an overall C-14 decay rate of at least 0.1 dpm/gC. Our first letter expressed the preliminary view that the skilled person reading the claims in the context of the description, including Example I, would interpret this as indicating that the bio-based PET polymer comprises at least about 1% bio-based material. This was based on the conclusion in Example I associating an average C-14 decay rate of about 0.14 dpm/gC for every 1% percent of bio-based material in the sample.

[46] In response, the Applicant did not concede or dispute this interpretation, although amended language was proposed for clarity defining a C-14 decay rate of 0.14 dpm/gC, rather than 0.1, and reframing the decay rate as an average rate for each weight percent of EG.

[47] We have reconsidered our preliminary interpretation based on this and other proposed amendments and clarifications submitted with the Applicant responses.

[48] The C-14 decay rate, which is specific only to the carbon atoms contained in EG or PET, will necessarily decrease very slowly over time as the C-14 decays and the overall C-14 content slowly decreases. Even though the C-14 will slowly decrease over time, that would not change the fact that the bio-based PET and its bio-based EG component are (and will remain) bio-based.

[49] For that reason, the skilled person would interpret “at least 0.1 dpm/gC” as indicating the minimum amount of C-14 contained or remaining in the polymer.

Essential elements

[50] As mentioned above, we consider that all of the elements set out in a claim are presumed essential unless it is established otherwise or if the skilled person would understand from the claim language that the Applicant did not intend to make the element essential. In our view, the skilled person reading claims 14 to 18 in the context of the specification as a whole and the CGK would understand

that there is no use of language in the claims indicating that any of the elements are optional, preferred or were otherwise intended as being non-essential. For that reason, we expressed our preliminary view that all of the elements of claims 14 to 18 of record are essential in our first letter.

[51] The Applicant did not contest or comment on this view in response, and so for the same reasons set out above we conclude that the skilled person would construe all of the elements as essential.

CLAIMS 14 TO 18 OF RECORD ARE OBVIOUS

Legal principles

[52] Section 28.3 of the *Patent Act* requires claimed subject-matter to not be obvious:

> 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
>
> (a) information disclosed before the one-year period immediately preceding the filing date or, if the claim date is before that period, before the claim 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
>
> (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.

[53] In *Apotex Inc v Sanofi–Synthelabo Canada Inc*, 2008 SCC 61 at para 67 [*Sanofi*], the Supreme Court of Canada stated that it is useful in an obviousness inquiry to follow the following four-step approach:

(1)(a) Identify the notional “person skilled in the art”;

(b) Identify the relevant common general knowledge of that person;

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

(3) Identify what, if any, differences exist between the matter cited as forming part of the “state of the art” and the inventive concept of the claim or the claim as construed;

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

Analysis

(1) Identify the notional person skilled in the art and the relevant common general knowledge

[54] Our characterizations of the skilled person and relevant CGK are set out above.

(2) Identify the inventive concept of the claim in question or if that cannot readily be done, construe it

[55] We note that most of the arguments in the Applicant’s first response are repeated in the second response, and so we will refer primarily to the second response for sake of ease. We also note that the Applicant’s responses argue for different sets of proposed claims from those remanded by the Federal Court, but the arguments nevertheless apply to claims 14 to 18 of record and are considered as part of our analysis.

[56] Our first letter expressed the preliminary view that the skilled person would consider the inventive concepts of claims 14 to 18 as being the same as the individual claims as construed. We added that it would be implicit to the skilled

person that the bio-based EG and PET, which are essential elements in all of claims 14 to 18, are renewable and more environmentally friendly than those conventionally derived from fossil fuels.

[57] On page 8, the Applicant's second response argues that the claimed methods provide three advantages that should be included as part of their inventive concepts. Namely, the claimed method advantageously produces beverage containers that i) have similar properties to those formed from petroleum-derived PET, ii) could be used in existing PET manufacturing facilities; and (iii) are recyclable in existing PET recycling streams.

[58] The Supreme Court of Canada in *Sanofi* recognizes at paras 76 to 78 that the inventive concept of a claim can differ from its construction where the inventive concept of a patent is not clear from the claims themselves, for example, as may be the case with a bare chemical formula. In such circumstances it is acceptable to read the specification to determine the inventive concept of the claims. Of course, it is not permissible to read the specification in order to construe the claims more narrowly or widely than the text will allow: *Sanofi* para 77.

[59] Although *Sanofi* dealt with a selection patent, subsequent decisions from the lower courts have considered that, outside the context of a selection patent, the inventive concept can consider special properties, along with any alleged advantages that are disclosed in the description. For example, in *Apotex Inc v Shire LLC*, 2021 FCA 52 at para 84, the Federal Court of Appeal states:

> In sum, the judge committed no error in having regard to these properties and beneficial features of LDX in determining the inventive concept of the claims in issue. I am also satisfied that the description was sufficient to allow the judge to construe these properties as features of the compound as claimed in the independent claims, such that they should form part of the inventive concept. Unlike the situation in (*Bristol-Myers Squibb Canada Co v Teva Canada Limited*, 2017 FCA 76 [*Bristol-Myers*]), these beneficial properties were the "solution taught by the patent" claim. They explain the source of motivation to pursue the solution (*Bristol-Myers* at para 75).

[60] With this in mind, we must consider whether the essential elements of claims 14 to 18 would necessarily have the three advantages asserted above and whether the description is sufficient to construe them as part of the “solution taught by the patent” and the inventive concepts of claims 14 to 18.

[61] Looking to the description, paras [0004]-[0006] address the need for a renewable, environmentally friendly substitute for petroleum-derived PET. One prior approach in the art was to use polylactic acid (PLA) but the description explains that this was not a satisfactory substitute due to “significantly different properties” between the two polymers that makes PLA containers less suitable for beverage containers than PET. For example, para [0005] states that PLA has a lower gas barrier property than PET which makes PLA less suitable for storing carbonated beverages. This paragraph also states that most recycling systems currently in use are designed for PET and would be contaminated if PLA was introduced.

[62] Para [0006] of the description identifies a need for a PET derived from renewable resources that would share “similar properties” as petroleum-derived PET. No specific properties of petroleum-based PET are identified, although the Applicant’s second response does say the following on page 19:

> The bottles need to have desirable properties similar to petroleum based bottles with proper clarity and strength to be able to withstand manufacturing facilities (ability to withstand movements and shelving) and be filled with a variety of beverage products some of which are carbonated.

[63] Importantly, the description never expressly states that bio-based PET has “similar properties” to petroleum-derived PET or provides an example demonstrating this. Instead, para [0005] highlights the differences between PET and PLA that prevent PLA from being a satisfactory substitute for PET, and the description goes on to present bio-based PET as a suitable replacement for producing PET beverage containers.

[64] In our view, the skilled person reading the specification, including these paragraphs, would understand that this is referring generally to the base

properties that are unique to PET, especially those relevant to this field. The skilled person would know that a fundamentally different polymer, such as PLA, would have a different chemical composition in its backbone and its own unique set of properties.

[65] In other words, the skilled person reading the description would understand that bio-based PET is PET: it is fundamentally the same polymer as petroleum-based PET. While some minor differences are possible depending on how it is polymerized, the chemical composition of the PET polymer backbone is the same. That is why PET has its own set of properties that serve to distinguish it from other polymers, such as a glass transition temperature around 69°C and the superior mechanical properties and durability that PET is well known for.

[66] The description discloses this as an advantage over other polymers that are not PET. Since incorporating this advantage would not construe the inventive concepts more widely or narrowly than the text of claims 14 to 18 allows, we agree that it is appropriate to include this advantage as part of their inventive concepts. Namely, that bio-based PET is PET and can therefore be used as a substitute for petroleum-based PET in a way that other fundamentally different polymers cannot.

[67] However, in our view it would be a step too far to include that the beverage container will necessarily have similar properties to containers formed from petroleum-derived PET as part of the inventive concept. We accepted the Applicant’s arguments under CGK that not all PET products are equal and their properties are not dictated by the choice of polymer alone. As discussed above under CGK, it is common to modify the intrinsic viscosity of the resin through solid-stating, or alter its base properties with additives, in line with its intended use: Schiavone declaration, para 9; Harper, pages 1.39, 1.79-1.80; description, para [0014].

[68] With regard to the other two advantages, the description does indicate at para [0006] that it would be “desirable in some applications” if the bio-based PET could be processed through existing PET manufacturing facilities and/or can be

readily recycled through systems designed for petroleum-derived PET. This language alone is not sufficient to include this as part of the inventive concepts in claims 14 to 17, in our view, and would construe these claims more narrowly than their text would allow.

[69] By contrast, the additional step of recycling the bio-based container through systems designed for petroleum-derived PET products is expressly claimed as an essential element in claim 18. The description discloses the ability to be recycled through existing PET systems as an advantage (or disadvantage avoided) because most systems in use are designed for PET and would therefore be contaminated if PLA was introduced: para [0005]. The existing systems could be adapted to a new polymer, or by investing in new streams or sorting technology but this would be costly: para [0005]. Since the description teaches being recyclable in existing recycling systems designed for petroleum-based PET as an advantage that is part of the solution taught by the patent claim, and this would not construe the claim more narrowly or broadly than its text would allow, we agree that this is appropriately considered as part of the inventive concept of claim 18.

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

[70] We identified document D6 as the closest prior art in our first letter:

D6: JP 2007-176873 KATO et al July 12, 2007

[71] We note that the Applicant disputed this in their second response on the basis that a properly construed skilled person would not have identified D6. However, since the Federal Court of Appeal has stated that findability of the prior art is more appropriately considered under step 4, those arguments are addressed in the next section: *Hospira Healthcare Corporation v Kennedy Trust for Rheumatology Research*, 2020 FCA 30 at para 86.

[72] Our first letter describes D6 as including the following information:

- using raw materials derived from biomass to prepare commercial polymer resins, such as PET, as an alternative to the petroleum-derived monomers that are conventionally used (paras [0064], [0068], [0083]).
- methods of preparing various organic raw materials from biomass including ethylene glycol (paras [0062]-[0064]).
- preparing bio-based PET polymers from TA and EG using the same standard methods conventionally used with petroleum-based monomers (para [0068]).
- an example preparing a bio-based PET polymer from bio-based TA and petroleum-based EG that has a glass transition temperature of 69°C (paras [0083]-[0084]).
- replacing petroleum-based precursors with bio-based materials can simultaneously solve the problems of suppressing global warming and the depletion of non-renewable petroleum resources without impairing the mechanical characteristics and heat resistance characteristics of the resin and can be used for resin molded products (paras [0026], [0069]).
- PLA was attracting the most attention as a plant-based biomass resin raw material but these resins are of limited use since they generally have low mechanical properties and low heat resistance (para [0007]).

[73] The Applicant's second response took issue with our summary, stating that it mischaracterizes the general teachings by essentially cherry-picking statements from within several exhaustive open-ended laundry lists (page 9). According to the Applicant, the teachings of D6 broadly encompass the possibility of making hundreds, if not thousands, of various chemically distinct bio-based precursors that can then purportedly be used to make at least as many polymer resins (page 11). The Applicant added the following at pages 12-13:

> We submit that, at most, D6 is directed to solving the technical problem of providing a method for producing a resin raw material from biomass that is

> carbon neutral ([0008]). D6 describes the solution as a method whereby raw material from biomass is made into a carbon-neutral fuel source (i.e. an organic compound, ([0061]) that is then converted into a bio-resin raw material that can be used for producing a resin ([0009]). D6 describes the method as comprising steps in which each step encompasses an open-ended laundry list implying a myriad of biomass sources, a myriad of possible organic compounds, a myriad of possible zeolites selected for a specific organic compound, a myriad of methods to isolate and convert the organic compound to a resin raw material and a myriad of possible resin raw materials for produce [sic] a myriad of undefined biomass resins.

[74] With regard to cherry-picking, we agree that our summary focuses on the passages from D6 that relate directly to PET and its monomers. In our view, it is reasonable that a skilled person engaged in this field and involved in the preparation of PET would focus on the passages from D6 that are specific to PET and its monomers. Further, as stated on page 18 in our first letter, our view is that the skilled person would recognize that bio-based PET and its monomers feature prominently in D6 since PET is the only bio-based resin polymer that is prepared in the examples.

[75] In any event, in view of the Applicant's comments, we have focused our analysis and the above summary primarily on the same paragraphs that were considered by the Federal Court in *Coca-Cola* at paras 70, 79, 83 and 84. Since it is directly relevant to the inventive concept of claim 15, we add that para [0030] of D6 discloses using sugarcane and corn as biomass sources.

[76] Our first letter identified four main differences between the inventive concept of claim 14 and D6. The first is that the bio-based PET polymer that is produced in the D6 example (para [0083]) and processed to form a bio-based resin is not subsequently injection or stretch blow molded to form a container.

[77] The second is that D6 does not mention producing beverage containers specifically.

[78] The third main difference is that the composition of the bio-based PET polymer in the D6 example is the reverse, source-wise, to that in claim 14 in that it contains bio-based TA and petroleum-based EG (instead of the reverse).

[79] The fourth main difference is that D6 does not specifically disclose using a bio-based monomer that is “at least 70 weight percent” derived from bio-based material, the monomer being TA in the example at para [0083]. The Applicant agreed (second response, page 14) and emphasized that the claims are more specific in reciting that at least 70 weight percent of EG derives from bio-based material. We agree.

[80] The Applicant agreed that these are four main differences from D6 and identified two more. First, the Applicant disputed that D6 discloses bio-based EG and a method for its preparation in paras [0062]-[0064]: second response, page 14.

[81] Looking to D6, resin raw materials derived from biomass, including EG, are discussed at paras [0062] and [0063], and a method for preparing EG is disclosed at para [0064]. D6 does not provide step-by-step instructions where bio-based EG is prepared, but a method for its preparation is disclosed, as was acknowledged by the Federal Court in *Coca-Cola* at para 70:

> …while D6 does not provide an example of a process for making PET from a diol component derived from a biomass, as aptly described by the Commissioner, it discloses the use of conventional methods for the synthesis of PET from biomass derived raw materials (at para [0083]) and discloses methods of extracting various organic raw materials from biomass including ethylene glycol (at paras [0062]-[0064]).

[82] We therefore do not agree that bio-based EG is a further difference.

[83] Second, the Applicant submitted that the presence of C-14 in bio-based EG, the absence of C-14 in the petrochemical derived TA and the relative difference in C-14 content between them is a further difference from D6: second response, pages 14-15.

[84] On pages 16-17 of our first letter, we expressed our preliminary view that even though the example at para [0083] does not explicitly state as much, this would have been an implicit part of the third difference since the skilled reader would have recognized that the bio-based TA component of the PET polymer would have comprised C-14 and the petroleum-based EG component would not. Even if this was not the case, this relative presence and absence of C-14 would have been inherently disclosed in D6 since the carbon atoms obtained from biomass would have necessarily contained trace amounts of C-14 in the order of ~10^{-10}%, unlike petroleum-based carbon: Gillespie et al, page 25; Karhu, page 67.

[85] In view of the Applicant's submissions, we reframe the third main difference as follows: the composition of the bio-based PET polymer in the D6 example is the reverse, source-wise, to that of claim 14 in that it contains bio-based TA that comprises C-14 and petroleum-based EG that does not (instead of the reverse).

[86] We have added an advantage to the inventive concept of claim 14 that must also be considered. Namely, the bio-based PET polymer is PET and can be used as a substitute in place of petroleum-based PET in a way that other non-PET polymers with different chemical compositions and properties cannot. However, this is not a further difference because this advantage is also disclosed in D6.

[87] D6 discloses that bio-based resins that are biodegradable, such as PLA, generally have low mechanical properties and low heat resistance which limits their usefulness as a viable carbon-neutral replacement for conventional petroleum-based resins (para [0007]). D6 proposes solving the problem by preparing well known commercial resins using bio-based raw materials in place of the usual petroleum-based raw materials so the properties of the resin are maintained (paras [0026], [0068]-[0069]). D6 also demonstrates this in the example at para [0083] where bio-based PET is polymerized in the melt and solid-stated to raise the intrinsic viscosity to 0.8 dl/g. This bio-based PET was shown to have the same well known glass transition temperature as conventional PET that is derived from petroleum (para [0084]).

[88] Since the advantage from the inventive concept of claim 14 is disclosed in D6, it is not a further difference.

[89] For claim 15, our first letter stated that there is no additional difference for the inventive concept of this claim because D6 discloses using sugarcane or corn as the bio-based source material. The Applicant's second response disputed this at page 15, saying that D6 does not explicitly teach or suggest the "recited source of the bio-based material that forms at least 70 weight percent of the ethylene glycol" in combination with the recited petrochemical derived TA component.

[90] Claim 15 reads as follows: (emphasis added)

> 15. The method of claim 14, wherein the at least one bio-based material is selected from the group consisting of **corn, sugarcane**, beet, potato, starch, citrus fruit, woody plant, cellulosic lignin, oily wood feedstock, and combinations thereof.

[91] To the extent that the Applicant is saying that claim 15 does not encompass sugarcane or corn because those sources would not produce EG that is at least 70 weight percent bio-based, or would not produce PET with an EG component that is at least 70 weight percent bio-based, we disagree. This is inconsistent with the plain language of claim 15 which explicitly defines corn and sugarcane as the "at least one bio-based material" of claim 14. Further, this is contradicted by the Applicant's own Example I at para [0019] which teaches that bio-based EG made from 100% and 98% bio-based material (which are "at least 70%" bio-based) can be prepared from sugars and corn (samples 1 and 2, respectively). The example also discloses a bio-based PET (sample 6) that is within the scope of the claims 14 and 15 that is produced from EG that is 100% bio-based (sample 1).

[92] Since D6 expressly identifies sugarcane and corn as sources of biomass, there is no additional difference from the inventive concept of claim 15.

[93] Our first letter identified the additional features of the inventive concepts of dependent claims 16 to 18 as further differences since D6 does not disclose: that

the bio-based PET polymer comprises at least 0.1 dpm/gC of C-14 (claim 16); forming a bottle (claim 17); or that molded products made from bio-based PET polymer are recycled through recycling systems designed for petroleum-derived PET products (claim 18). The Applicant did not dispute that these are further differences in response.

[94] With regard to claim 18, we have acknowledged above in our step 2 analysis that being recyclable in existing PET recycling systems in a way that non-PET containers would not be is an advantage that is part of the inventive concept. This is an additional difference that is not disclosed in D6.

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

CLAIMS 14 TO 17

[95] Our first letter set out an analysis of the differences and expressed our preliminary view that the subject-matter would have been obvious to the skilled person. Specifically, it would have been obvious to the skilled person reading D6 through the lens of the CGK to substitute a bio-based PET resin in place of petroleum-based PET resin in a method for producing molded products, including beverage containers and bottles specifically. We further expressed the view that it would have been obvious to produce bio-based PET using either bio-based EG, bio-based TA or both, instead of petroleum-derived monomers.

[96] With respect to the first difference that the bio-based PET in the D6 example is not injection molded or stretch blow molded to form a container, we pointed out that D6 discusses that conventional resins, such as PET, are used to make molded products. We expressed the preliminary view that the skilled reader would have known that PET containers, and PET bottles specifically—the second difference identified—are among the most widely produced molded PET products. We added that general methods for forming PET containers by injection and stretch blow molding were part of the CGK: first letter, pages 18-19.

[97] With regard to the third difference that the D6 example prepares PET from petroleum-derived EG and bio-based TA (instead of the reverse) our preliminary view was that it would have been obvious to the skilled reader to produce bio-based PET using a bio-based version of either one of the monomers, EG or TA, or both to conserve the environment and avoid depleting petroleum resources: first letter, page 20.

[98] With respect to the fourth difference that the EG is at least 70 weight percent derived from bio-based material, we expressed our preliminary view that the skilled person would not attribute inventive ingenuity to this feature. Instead, our preliminary view was that the skilled person would regard this as an arbitrary selection with no advantage arising from that particular choice: first letter, page 20.

[99] The Applicant made several arguments in response to our preliminary analysis. The first main argument from the second response (pages 16-17) is premised on the skilled person being characterized as a converter only. However, the Applicant effectively withdrew this position at the hearing in acknowledging that the skilled person further includes a polymer chemist, as discussed.

[100] The second main argument is that our preliminary analysis relies on a misinterpretation of D5 without any evidence that the skilled person would find D6 or combine it with D5. The Applicant disputed that a properly construed skilled person would have identified D6, submitting that a “converter” would not have located or considered it. The Applicant’s second letter also points to the fact that D6 was not identified earlier during prosecution as supporting their assertion.

[101] Again, the Applicant agreed at the hearing that the skilled person would further include a person of skill in the preparation of polymers, such as a polymer chemist. Further, the Federal Court has already considered the timing of when D6 was first cited against this application and concluded that the fact that it was not cited earlier was insufficient to draw any definitive conclusions as to its findability: *Coca-Cola* at para 75.

[102] Our view is that the skilled polymer chemist on the team would have located and considered D6 through the lens of the CGK. With regard to combining it with D5, our view is that this point is moot since the only information from D5 that is relevant to claims 14 to 18 of record was CGK.

[103] A third argument is that the cost of using bio-based components is much higher than petroleum-based components and this would generally dissuade a skilled person to look to bio-based solutions (page 19, Applicant's second response). The Applicant referred to the Schiavone declaration which explains that raw materials represent a significant percentage of the cost of producing PET bottles and plastic converters are motivated to keep the cost of PET resin as low as possible (para 10).

[104] This argument is consistent with the following general statement from Harper, page 12.8:

> Processes have been developed to substitute renewable resources (biomass) for petroleum as a plastics feedstock. At present, they are not economical, but they are available should petroleum supplies diminish and/or prices rise significantly.

[105] The Federal Court of Canada considered a similar argument in *Bauer Hockey Ltd v Sport Maska Inc (CCM Hockey)*, 2020 FC 624 [*Bauer*]. In that case, the Court concluded that declining to adopt a design because it was not profitable does not render it any less obvious. Obviousness relates to technical feasibility, not to economic or commercial considerations: *Bauer*, para 165. We agree that obviousness considers technical feasibility and our view is that obviousness would not turn on demotivation due to costs alone in this case. Further, in contrast to the Applicant's argument, D6 discusses and demonstrates that there was motivation in the field to look to bio-based solutions.

[106] The fourth main argument is that the teachings of D6 are so broad as to encompass a science project and a conclusion that the differences were obvious can only be arrived at through improper hindsight analysis using "cherry-picked"

statements found in exhaustive laundry lists recited in D6 (second response, pages 18-19).

[107] With regard to “cherry-picking” the portions of D6 that are specific to PET, we have already stated our view that it is reasonable that the skilled person in the field of producing PET resin and PET beverage containers would focus on the sections from D6 that pertain to PET and its monomers.

[108] With regard to hindsight, §18.02.02e in the *MOPOP* states that it is important to assess obviousness at step 4 without presupposing that the specific problem addressed by the inventors was recognized in the prior art, so as to avoid adopting an improper “hindsight” perspective. Where the existence or nature of a problem was unobvious, the act of identifying the problem may inform the inventive concept.

[109] The Federal Court in *Bauer* elaborates on this point as well, reinforcing that obviousness should not be assessed with hindsight, but rather at the priority date of the patent. Whether the specific problem was known to exist or not as of the priority date goes to the motivation for a skilled person to come to the invention and this can lead in different directions, depending on the context: *Bauer* para 148. For example, if only the inventor had the idea to investigate a particular problem and found a solution, this may show non-obviousness. Likewise, if a particular problem was known and all industry participants were motivated to find a solution and only the inventor found it, this may also show non-obviousness. Conversely, the state of the art may have motivated the skilled person to improve upon prior art in the direction of the patent, which tends to support an obviousness finding: *Bauer* at para 148. In our view, the present facts align with this third scenario.

[110] The evidence in the description and D6 is that the need for a bio-based replacement for PET was a known problem in the field at the priority date. The background section in the application indicates that the problems associated with petroleum-derived raw materials (i.e., that they are depleting and contribute to greenhouse emissions) were previously recognized in the field (para [0004]). The

next paragraph describes a prior approach to solving that problem by substituting PLA bioplastics for petroleum-based PET, in reference to a U.S. patent. Similarly, D6 discusses the same problem and a previous attempt to solve it using PLA (which was not satisfactory due to its properties). The description at para [0005] also refers to two other prior art patents that attempted to produce containers by injection stretch molding PLA resins, but because of significant differences in their respective properties, PLA is not a suitable substitute for PET.

[111] Thus, the Applicant was not the first or only inventor with the idea to search for a bio-based substitute for petroleum-based PET as of the priority date. The skilled person reading D6 would have been aware that this problem required a solution. Furthermore, the Applicant was not the first or only inventor with the idea to replace petroleum-based PET with a bio-based version of the same polymer. This is also disclosed in D6.

[112] For these reasons, we do not agree that our preliminary analysis was premised on impermissible hindsight. In our view, the uninventive skilled person reading D6 as of the priority date would have understood the significance of using a bio-based version of the same polymer as a replacement and how that would apply to the existing methods for producing well known commercial products molded from PET, including molded beverage containers, based on their CGK: Harper, page 1.35; D5, col 1, lines 21-30.

[113] The Applicant’s second response also argued that, without hindsight knowledge, there is no teaching in D6 that would have led the skilled person to develop a method to form PET containers from resin where at least 70% weight percent of EG derives from a bio-based material (page 18). We agree that D6 does not teach or suggest this minimum amount of at least 70 weight percent. However, based on the evidence before us, our first letter expressed the preliminary view that the skilled person would regard this particular minimum amount as an arbitrary selection that would not be attributed with inventive ingenuity. The Applicant did not contest or comment on this preliminary view in their response. Since there is nothing indicating any advantage arising from that particular design choice, our view is that the skilled person would not attribute any degree

of inventive ingenuity with this feature. Also, 70 weight percent is the minimum amount. In our view, it is reasonable that the skilled person reading D6 would have been motivated to use a bio-based monomer that derives from as much bio-based material as possible, up to 100 percent, in order to minimize the amount petroleum-derived material to the extent possible.

[114] In our view, the benefits of replacing PET with a bio-based version of the same polymer would have been self-evident to the skilled polymer chemist and the converter from D6, and that includes the ability to use existing facilities and infrastructure. More specifically, the skilled person would understand from D6 that the EG, TA or both could be substituted with a bio-based version to produce PET, and otherwise the conventional method and processing steps for producing molded products from PET resin ought to stay the same.

[115] However, to paraphrase the Applicant's fifth argument, even if the idea of substituting bio-based monomers into the existing conventional processes would have been self-evident from D6 (a point the Applicant did not concede), the implementation would require raw materials of a certain purity in order to produce bottle-grade quality PET. To that end, the Applicant's key argument in the second response (page 19) and at the hearing is that the skilled person reading D6 would not have any reasonable expectation that bio-based EG could be produced with the purity that is needed for bottle-grade quality PET resin and beverage containers. The Applicant also added on page 19 that the bio-based monomers are difficult to purify and that the intrinsic viscosity of PET depends on the purity of EG.

[116] First, we note that there is no evidence from the Applicant or on the record supporting that the intrinsic viscosity of PET is linked to, or would depend on, the purity of the EG monomer. As set out above under CGK, intrinsic viscosity is tied to the degree of polymerization and molecular weight of the polymer, not monomer purity. There is, however, evidence in D5 supporting that the person of ordinary skill in the field of producing PET beverage containers would have known that the purity of the monomers used to produce PET is a factor: D5, col 1, lines 46-50. This knowledge was included above as CGK. In this view, the

skilled person would have known that bottle-grade PET requires monomers that are sufficiently pure.

[117] Since the skilled person would have known that monomer purity was important, the question becomes whether or not the skilled person would have had the knowledge and skills needed to produce EG with sufficient purity from the instructions in D6 alone. To the extent that the Applicant is saying that they would not have the knowledge and skills required to produce EG with sufficient purity, we find this to be at odds with the Applicant's own description. This is because the description provides no guidance or instructions for purifying EG obtained from biomass, which in our view suggests that the information relating to purification would have been well known. Since the skilled person is the addressee of the description, it is not necessary for CGK to be comprehensively disclosed nor to teach things that would be plainly obvious to them: see *MOPOP* §14.02.03, citing *Sanofi* at para 37 and *Burton Parsons Chemicals, Inc v Hewlett-Packard (Canada) Ltd*, [(1976), 17 CPR (2nd), 97 (SCC)] at page 105.

[118] The description states that bio-based EG may be partially or totally derived from at least one bio-based material using any process and refers generally to conventional methods for producing EG: para [0022]. No step-by-step example is provided in the description for preparing bio-based EG. The only example, Example I at para [0019], reports C-14 decay rates and bio-based content of bio-based EG (samples 1 and 2) and bio-based PET (sample 6) that were prepared. However, the actual methods, steps and conditions that were used to prepare those samples are not disclosed as part of the example. In other words, Example I demonstrates that the Applicant produced bio-based EG from two different sources but does not describe how either one was prepared.

[119] Thus, the absence of any detail in the description relating to purity and purification supports a presumption that any additional information needed to prepare the bio-based monomers with the purity required to practice the claimed methods and produce a bio-based PET beverage container would have been CGK. To argue otherwise would effectively call patentability of the method claims into question on the separate ground of enablement. In any event, our view is

that it is reasonable that the skilled polymer chemist involved in the preparation of PET polymers reading the description or D6 would have had the knowledge and skills required to prepare EG or TA with the purity needed for producing bottle-grade PET and molded PET containers.

[120] Thus, to the extent that bio-based PET products are prepared from sufficiently pure bottle-grade PET, differences between molded PET products would more reasonably be attributed to something other than the PET polymer. As already discussed under CGK, it was known that not all PET resins will necessarily result in similar products since the resin quality and properties can be altered with additives or by processing to different intrinsic viscosities: Schiavone declaration para 9; Harper, pages 1.39, 1.79-1.80, 12.33-12.34; description, para [0014]; Gauthier, page 294.

[121] As stated above, apart from introducing at least one bio-based monomer, it is reasonable that the skilled person would expect that the rest of the conventional processing steps associated with forming PET bottles ought to stay the same. For example, if a commercial method processes the petroleum-based PET resin by “solid-stating” to a specific intrinsic viscosity, or adds ingredients to improve its base properties for a specific application, the skilled person would reasonably expect to do the same when processing bio-based PET resin. In any event, the method of claim 14 is not limited to any particular conditions or steps apart from processing the PET polymer to form a resin, and injection or stretch blow molding the resin to form the beverage container.

[122] For all of these reasons, our view is that the method of producing a beverage container of claim 14, and a bottle specifically in claim 17, would have been obvious from the teachings of D6 and the CGK.

[123] With regard to dependent claim 15, there is no additional difference from D6 and so it would have been obvious for the same reasons as claim 14. For dependent claim 16, our preliminary view was that the skilled person would not have associated any inventive ingenuity with the limitation set out in that claim and this was not disputed in the Applicant’s responses. We therefore conclude that the

subject-matter of dependent claim 16 would also have been obvious to the skilled person in view of D6 and the CGK.

CLAIM 18: RECYCLING THROUGH EXISTING FACILITIES

[124] On page 22, our first letter pointed out that it was well known that PET recycling involves either processing the PET to pellets, which are solid-stated to desired intrinsic viscosity levels and reused, or alternatively the polymer is decomposed back into its constituent monomers that are re-polymerized to produce virgin PET. Since petroleum-derived PET and bio-based PET are both fundamentally PET, it would have been self-evident to the skilled person that they have the same chemical composition and would give rise to all of the same chemical reactions that are associated with PET recycling, namely decomposition, re-polymerization and solid-stating. On that basis, our preliminary view was that it would have been obvious to the skilled person reading D6 that bio-based PET would be recyclable using the same technology and facilities as petroleum-based PET products.

[125] The Applicant did not dispute in either response that bio-based PET and petroleum-derived PET would undergo the same chemical reactions that are associated with PET recycling. Instead, the second response (page 18) argues that we failed to articulate any persuasive reasons with rational underpinning as to why it would be obvious from the generic teachings of D6 to develop a method to make a beverage bottle using bio-based PET made from bio-based EG, that could be recycled in existing recycling systems.

[126] At the hearing the Applicant explained that because “[the Applicant makes] 60 billion bottles a year” it was important “for their circular bottle economy” to develop a method where “they make it, they use it, they recycle it” and that “it can go through the existing recycling of their billions of bottles in their plants”. They further explained that the ability to be recycled through existing PET systems would tell the skilled person “that it meets the properties that are required to go into the recycling system”. They added that recycling of PET polymer bottles is “a very controlled process because…if you contaminate it,

you've got to throw out all the bottles, the bottles degrade over time and so recycling of the polymer bottles is always being tested and regulated".

[127] The Applicant also explained that PLA bottles looked promising at first but ultimately did not work:

> [The PLA bottles] had similar properties to bottles made by conventional hydrocarbon PET, so they had similar glass transition temperatures and they had similar intrinsic viscosity values. So if you just looked at the numbers and you thought, oh, it's bio-based, it has some of the same properties, this is going to be good as a bottle, but that didn't work. It was not good for carbonated based beverages and because of the nature of the polymers and how they were also degrading, we could not use them in conventional recycling. So then that's why they sought to make an improvement, to make a method to make a bottle that they, that had the right properties was recyclable.

[128] It is reasonable, in our view, that the skilled person may have questioned whether PLA bottles would have had the strength and durability required for recycling since PLA was well known as one of the few synthetic polymers that are biodegradable: Harper, pages 12.92-12.93. The same cannot be said for bio-based PET since it is PET, and PET is not a biodegradable polymer. Further, it is reasonable that the skilled person would have known that PET had the properties required for recycling since it was well known that PET soft drink bottles had been recycled on a large scale for several decades: Gauthier, page 293; Harper, pages 12.28-12.29.

[129] In our view, even if PLA was not known to be biodegradable, the skilled person would have known that any polymer other than PET, including PLA, would contaminate physical and chemical recycling systems designed for PET since any fundamentally different polymer would be different and would break down to different monomers: Gauthier, pages 292-294; Harper, page 12.17, 12.34. According to the Harper handbook, it was also well known that most commercial processes for chemical recycling by depolymerization and repolymerization are

restricted to a single polymer, which is usually either PET, nylon 6 or polyurethane: Harper, page 12.17.

[130] As stated above, the benefits of replacing a petroleum-based commercial resin like PET with a bio-based version of the same polymer would have been self-evident to the skilled person reading D6, including the ability to use existing facilities and infrastructure for processing PET containers. In our view, this would be true for the entire life cycle of the PET container, including manufacturing and recycling. Given that it was well known that PET bottle recycling had been going on since the bottle was first introduced in 1977, it is reasonable that the skilled person would be mindful of recycling when reading D6. Since bio-based PET is PET, our view is that the skilled person would have known that it could be recycled in existing PET streams in a way that other non-PET products could not.

[131] For all of these reasons, our view is that the skilled person would not attribute inventive ingenuity to the recyclability or the additional step of recycling the bio-based PET beverage container through recycling systems designed for petroleum-derived PET products. In our view, the subject-matter of claim 18 would have been obvious to the skilled person.

Conclusions on obviousness

[132] For all of the reasons set out above, our view is that claims 14 to 18 of record would have been obvious to the skilled person from D6, in view of the CGK, contrary to section 28.3 of the *Patent Act*.

NEWLY PROPOSED CLAIMS 14 TO 26 ARE OBVIOUS

[133] The Applicant proposed a new set of amended method claims 14 to 26 with the second response that were revised following the hearing and submitted on October 4, 2024. Proposed claims 14 to 18 correspond to claims 14 to 18 of record considered above, and proposed claims 19 to 26 are new but relate to further embodiments within the scope of the claims of record. More specifically, they are all methods for producing bio-based PET beverage containers using bio-

based EG. Proposed claims 19 and 20 are dependent claims that depend from independent claim 14. The new claims 21 to 26 include three new independent method claims 21, 23 and 24 that are directed to producing or manufacturing a beverage bottle specifically.

[134] In the same manner as the claims of record, our view is that the skilled person reading proposed claims 14 to 26 in the context of the specification as a whole and the CGK would understand that there is no use of language in these claims indicating that any of the elements are optional, preferred or were otherwise intended as being non-essential. For that reason, our view is that all of the elements of proposed claims 14 to 26 are essential. Further, in addition to those essential elements, their respective inventive concepts would include the same advantage as the claims of record that bio-based PET can be used as substitute for petroleum-based PET in a way that fundamentally different polymers cannot.

Proposed claims 14 to 20

[135] The newly proposed claim 14 has all of the same features as claim 14 of record and would add the further feature that the container is recyclable through a recycling system designed for petroleum-derived PET products.

[136] Further, as explained in the second response under “Purposive Construction” (page 2) the Applicant proposed deleting “at least one” in the expression “at least 70 weight percent derives from **at least one** bio-based material” from claim 14. The Applicant explained that this would be a minor amendment since it is already clear from dependent claim 15 that “a bio-based material” can include combinations of bio-based sources. We agree with the Applicant that this a minor amendment. In our view, there would be no meaningful difference from claim 14 of record in this respect.

[137] We have already considered this same subject-matter in our analysis of claim 18 of record, which includes the advantage of being recyclable in existing PET recycling systems designed for petroleum-derived PET products as part of the inventive concept, concluding that it was obvious and non-compliant with section

28.3 of the *Patent Act*. Considering all of the features of proposed amended claims 14 and 18, our view is that the subject-matter would have been obvious to the skilled person from D6 in view of the CGK for the same reasons provided above for corresponding claim 18 of record. Further, proposed claim 15 narrows the source material of claim 14 to corn or sugarcane, which is disclosed in D6 and is therefore not a further difference. In our view, the subject-matter of this claim would have been obvious from D6 and the CGK for the same reasons as proposed claim 14.

[138] Proposed claim 16 is the same as corresponding claim 16 of record except for the new wording that would specify a decay rate of 0.14 dpm/gC (instead of 0.1 dpm/gC) and would express the decay rate as an average for each weight percent of bio-based EG. Importantly, this is the same average decay rate as the bio-based PET polymer “sample 6” in Example I of the description, which is made from EG reported as being 100% bio-based.

[139] This subject-matter was already considered above as part of our analysis of claim 14 of record. As explained above, the “70 weight percent” is the minimum and our view is that the skilled person would have been motivated from D6 to use a monomer that derives from as much bio-based material as possible, up to 100 percent, in order to minimize petroleum-derived material to the extent possible. Consequently, considering all of the features of this claim together, our view is that the subject-matter of proposed claim 16 would have been obvious from D6 in view of the CGK for the same reasons.

[140] Proposed claim 17 would limit the container of claims 14 to 16 to a bottle in the same way as corresponding claim 17 of record. Considering all of the features together, our view is that the subject-matter of proposed claim 17 would have been obvious to the skilled person from D6 in view of the CGK for the same reasons as proposed claims 14 to 16 and claim 17 of record.

[141] Proposed dependent claim 19 depends on claim 14 and would add the limitation that the bio-based PET container comprises about 20 to about 30 weight percent of EG.

[142] As set out above under CGK, it was well known that the PET polymer backbone contains about 30 weight percent of the EG component. The skilled person would expect the beverage container to contain EG in an amount of around 30 weight percent. The skilled person would understand that the percentage of EG in the bottle would decrease if, for example, other ingredients were added to the PET resin, such as to improve its properties. Consequently, our view is that the skilled person would not have attributed inventive ingenuity to this feature of the inventive concept of claim 19. Considering all the features together, our view is that claim 19 would have been obvious to the skilled person from D6 in view of the CGK for the same reasons as proposed claim 14.

[143] Proposed dependent claim 20 would limit the bottle of proposed claim 17 as being for a soft drink or for an alcoholic beverage specifically. In our view, since it was well known to use PET bottles for carbonated soft drinks, the skilled person would not have associated any inventive ingenuity with this limitation. Considering all of the features together, our view is that the subject-matter of proposed claim 20 would have been obvious to the skilled person in view of D6 and the CGK for the same reasons as proposed claim 17.

Proposed claims 21 and 22

[144] The Applicant proposed new independent claim 21 which is similar to proposed claim 14 with a few additional limitations. This method produces a beverage bottle specifically, like proposed claim 17 above, specifies the average C-14 decay rate of 0.14 dpm/gC per weight percent of bio-based EG, like proposed claim 16 above, and specifies that the PET bottle comprises about 30 weight percent of the bio-based EG, which is within the about 20 to about 30 percent range defined in proposed claim 19 above. We have already determined that the skilled person would not have attributed inventive ingenuity to any of these features.

[145] Unlike the previous claims, the method of proposed claim 21 includes the actual step of “reacting a petrochemical derived terephthalate component comprising (TA)…with (EG) derived from a bio-based material to form a bio-based PET

polymer". As was already discussed as part of the analysis of claim 14 of record, D6 discloses reacting TA and EG to form PET in the conventional manner, suggests replacing one or both monomers with a bio-based version to form a bio-based PET and provides an example where petroleum-derived EG and bio-based TA are reacted to form bio-based PET. Even though this is the reverse, source-wise, of bio-based PET in proposed claim 14, we have concluded that it would have been obvious to the skilled person reading D6 to produce bio-based PET using bio-based EG.

[146] In our view, considering all of the features of the inventive concept of proposed claim 21 together, the subject-matter of this claim would have been obvious to the skilled person from D6 in view of the CGK for all of the same reasons provided above for proposed claims 14, 16, 17 and 19.

[147] Proposed claim 22 depends on proposed claim 21 and further defines the specific source of the bio-based material as including corn and sugarcane, which are explicitly disclosed in D6 and is therefore not a further difference. Considering all of the features of claim 22 together, our view is that the subject-matter would have been obvious from D6 in view of the CGK for the same reasons as proposed claim 21.

Proposed claim 23

[148] Newly proposed independent claim 23 is similar to proposed claim 21, the main difference being that the EG in the PET bottle is derived from a recycled bio-based PET polymer container: (emphasis added)

> 23. (New – Amended) A method of producing a bio-based polyethylene terephthalate (PET) polymer beverage bottle, comprising:
>
> reacting a petrochemical derived terephthalate component comprising terephthalic acid having negligible carbon-14 (C-14) levels with **ethylene glycol derived from a recycled bio-based PET polymer beverage container** to form a bio-based PET polymer, the ethylene glycol comprising

a C-14 decay rate of about 0.14 dpm/gC (distintegrations per minute per gram carbon) for each weight percent of the bio-based ethylene glycol; and

injection molding or stretch blow molding said bio-based PET polymer to form said bio-based PET polymer beverage bottle,

wherein the recycled bio-based PET polymer beverage container comprises about 30 weight percent of the bio-based ethylene glycol of which at least 70 weight percent of the ethylene glycol is derived from a bio-based material.

[149] According to the Harper handbook, making PET beverage bottles from partially recycled materials was well known. In the early 1990's major soft drink bottlers, including the Applicant, distributed their products in bottles containing 25% recycled PET: Harper, pages 12.11, 12.35; Gauthier, page 295. Further, as set out above under CGK, the chemical recycling of PET by decomposing it to its constituent monomers, which can be used again to generate virgin PET for use in new products was well known: Gauthier, pages 292-294; Harper, page 12.17, 12.34.

[150] Consequently, our view is that the skilled person would not have attributed inventive ingenuity to the additional step of recycling the bio-based PET container or using such recycled materials in the method for producing bio-based PET bottles. Considering all of the features of claim 23 together, our view is that the subject-matter would have been obvious to the skilled person from D6 in view of the CGK for the same reasons set out above for the preceding claims.

Proposed claims 24 to 26

[151] Newly proposed independent claim 24 reads as follows: (emphasis added)

24. (New) A method of manufacturing a bio-based polyethylene terephthalate (PET) beverage bottle comprising:

providing ethylene glycol derived from a bio-based material;

providing terephthalic acid completely derived from petrochemical;

processing said ethylene glycol and said terephthalic acid in a PET manufacturing facility to provide a bio-based PET resin wherein the bio-based PET resin is **characterized by 3.01 ± 0.13 dpm/gC**; and

injection molding or stretch molding the bio-based PET resin to form the bio-based beverage bottle,

wherein the bio-based beverage bottle is recyclable in a petrochemical PET container recycling system.

[152] The main difference that distinguishes proposed claim 24 from the other proposed claims is that the bio-based PET resin is characterized by the overall C-14 decay rate 3.01 dpm/gC, which is the same as the sample 6 PET from Example I. We note that this overall decay rate is equivalent to the average decay rate of 0.14 dpm/gC per weight percent of bio-based EG for sample 6 that is used in proposed claim 16 to define the same subject-matter in a different way. Similarly, proposed claim 25 depends on proposed claim 24 and adds that the bio-based EG has an overall decay rate of about 15 dpm/gC of C-14, which is also equivalent to sample 6 since it is made from the EG in sample 1 having that same overall C-14 decay rate.

[153] In our view, these are different ways of defining the same bio-based PET resin of sample 6, which we have already considered above in our assessments of proposed claims 16 and 21. We have already concluded that this subject-matter would have been obvious to the skilled person from D6 in view of the CGK.

[154] Proposed claim 26 depends on proposed claims 24 or 25 and adds the further step of recycling the bio-based PET beverage bottle through systems designed for recycling petroleum-derived PET. This step is also included in claim 18 of record. We have already considered this step of recycling and the ability to be recycled through existing PET systems and concluded that the skilled person would not have attributed inventive ingenuity to either one.

[155] Considering all of the features of claim 26 together, our view is that the subject-matter would have been obvious to the skilled person from D6 in view of the CGK for the same reasons as proposed claims 24 and 25 and claim 18 of record.

[156] For all of these reasons, we conclude that the newly proposed set of claims 14 to 26 provided with the letter of October 4, 2024 would not comply with section 28.3 of the *Patent Act*.

CONCLUSIONS

[157] Our conclusions are that the subject-matter of proposed claims 14 to 18 of record, that is proposed claims 14 to 18 received with the letter of March 15, 2021, that were remanded to the Commissioner pursuant to the judgment of the Federal Court in *Coca-Cola*, would not comply with section 28.3 of the *Patent Act*. Consequently, those proposed amendments would not render the application allowable and therefore do not qualify as “necessary” amendments under subsection 86(11) of the *Patent Rules*.

[158] We have also concluded that the newly proposed claims 14 to 26 provided with the letter of October 4, 2024 would not comply with section 28.3 of the *Patent Act* and likewise do not qualify as “necessary” amendments under subsection 86(11) of the *Patent Rules*.

RECOMMENDATION OF THE BOARD

[159] In view of the above, we recommend that the application be refused on the ground that proposed method claims 14 to 18 submitted with the letter of March 15, 2021 do not comply with section 28.3 of the *Patent Act*.

Cara Weir Lewis Robart Owen Terreau

Member Member Member

DECISION OF THE COMMISSIONER

[160] I agree with the Board's findings regarding the proposed method claims 14 to 18 that were referred back to me for redetermination pursuant to the judgment of the Federal Court in *Coca-Cola* and with the Board's recommendation that the application be refused on the ground that:

- Proposed method claims 14 to 18 submitted with the letter of March 15, 2021 do not comply with section 28.3 of the *Patent Act*.

[161] Therefore, in accordance with section 40 of the *Patent Act*, I refuse to grant a patent on this application. Under section 41 of the *Patent Act*, the Applicant has six months within which to appeal my decision to the Federal Court of Canada.

Konstantinos Georgaras

Commissioner of Patents
Dated at Gatineau, Quebec
this 7th day of March, 2025.