

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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CLEAN CHEMISTRY, INC.,

Petitioner,

v.

ENVIRO TECH CHEMICAL SERVICES, INC.,

Patent Owner.

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Case IPR2025-01472

Patent 8,546,449

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**PATENT OWNER'S PRELIMINARY RESPONSE**

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Patent Owner's Preliminary Response

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| 2020 | U.S. Patent No. 7,919,122 (“Okano 1”)                                                                                                                                                  | Presently<br>Submitted |
| 2021 | <i>Enviro Tech v. Clean Chemistry</i><br>Declaration by Dr. Alexander M. Klibanov in Support of<br>Clean Chemistry’s Opening Claim Construction Brief<br>(Exhibit 09 to Docket No. 34) | Presently<br>Submitted |
| 2022 | Declaration of Gregory T/ Whiteker, Ph.D. Regarding the<br>Proposed Combination of Okano and Withenshaw                                                                                | Presently<br>Submitted |

## I. INTRODUCTION

This Petition should be denied, both on the basis of the compelling grounds for discretionary denial briefed in Paper 10, as well as for the reasons delineated herein.

As an initial matter, this Petition is emblematic of the overarching problems with *inter partes* review (“IPR”) proceedings. Congress’s goal in creating the IPR process was to “improve patent quality by providing a more efficient means to adjudicate patent validity issues” using a process that was faster and cheaper. *The Patent Trial and Appeal Board and Inter Partes Review*, Congress.Gov, R48016, (May 28, 2024).<sup>1</sup> In theory, the USPTO would consider whether the patent would still have issued if the art presented to it in the IPR had been presented during prosecution. And yet, the IPR process has become essentially a mini court case, relying heavily on bloated expert declarations and mini treatises interpreting the art, none of which would have been present during the original examination.

Here, Petitioner relies heavily on its expert to fill blanks in the prior art and to make inconsistent arguments that render his testimony not credible. In fact, the only way that Petitioner can claim that the prior art invalidates the claims of U.S.

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<sup>1</sup> <https://www.congress.gov/crs-product/R48016#:~:text=Congress's%20stated%20aim%20when%20creating,the%20patent%20in%20that%20forum.>

Patent No. 8,546,449 (the "'449 Patent") is to directly contradict this same expert's testimony in the parallel district court litigation and in co-pending IPR2025-01459 as to the proper construction of the term "solution." Using the construction of the term "solution" previously advocated by Petitioner, Petitioner cannot show that any of the prior art teaches all of the claimed elements of the method taught by the '449 Patent. Because the Petition, therefore, does not have a "reasonable likelihood of success" of establishing that at least one of the claims of the '449 Patent is unpatentable, institution should be denied.

Petitioner has also failed to define a person of ordinary skill in the art ("POSITA"), rendering its claims of obviousness incomplete and impossible to ascertain.

In addition, Petitioner has failed to comply with the claim construction requirements of 37 C.F.R. § 42.104(b)(3), which is itself a separate basis for denial of institution.

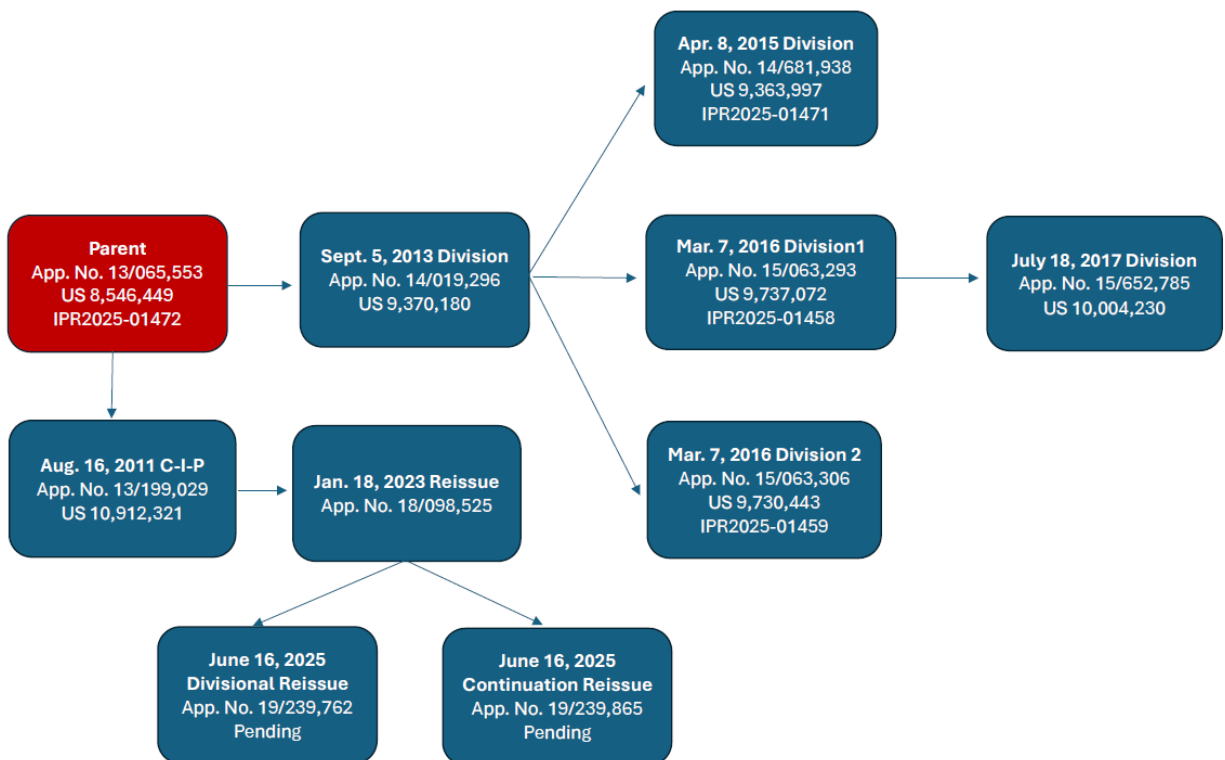
## **II. BACKGROUND**

### **A. Technology Overview of the 8,546,449 Patent Family**

#### ***1. The 8,546,449 Patent Family***

The '449 Patent is the parent patent of a larger patent family, the 8,546,449 Patent Family, which is directed to methods and compositions for the generation of peracetic acid on site at the point-of-use. The '449 Patent was subject to a

restriction requirement during prosecution and, as a result, multiple divisional applications and a continuation-in-part application followed. Three of the divisional patents, U.S. Patent No. 9,737,072 (the “’072 Patent”) U.S. Patent No. 9,730,443 (the “’443 Patent”), and U.S. Patent No. 9,363,997 (the “’997 Patent”) are also presently facing their own IPRs, IPR2025-01458, -01459, and -01471, respectively. A representation of the U.S. 8,546,449 Patent Family is as follows, where the subject patent is shown in red:



***2. The Prior Art: Equilibrium solutions of peracetic acid.***

The '449 Patent and its divisionals share a common specification and are directed to a novel method of generating peracetic acid ("PAA") on-site, in the location where it will ultimately be used as a sanitizer. (Exhibit 1001, '449 Patent.) Prior art PAA formulations were directed to methods of making equilibrium peracetic acid solutions off-site and then transporting the PAA to the location where it would be used. (*Id.* at 1:25-41.) The prior use methodology was fraught with complications for several reasons.

First, due to the typically low concentration of the equilibrium solutions of PAA (1-15%), in order to have sufficient active ingredients, it is necessary to keep, store, and transport large volumes of solution, consisting mostly of inert ingredients, which increases the cost of storage and transportation of the equilibrium PAA, as well as the cost of the inert ingredients needed to stabilize the PAA. (*Id.* at 1:42-48.)

Second, the vast amount of inert ingredients needed to stabilize the PAA also increases the cost of the solution. (*Id.* at 1:48-54.)

Third, certain of the stabilizers needed for the equilibrium PAA solutions are subject to FDA regulations limiting the amount of those stabilizers (such as hydroxyethylidene diphosphonic acid ("HEDP") or dipicolinic acid) that can be

applied to food products. (*Id.* at 1:54-58.) As a result, the amount of equilibrium PAA that can be used is similarly limited because the stabilizers are part and parcel of the PAA solution.

Fourth, the reaction that creates the PAA continues over time, such that PAA does not reach its maximum concentration until several days after the initial reaction. (*Id.* at 1:29-31; 1:58-63.) As a result, the equilibrium PAA solutions must be stored for several days before they can be tested for quality control purposes and before the solution can be shipped to customers, again increasing storage costs. (*Id.*)

Fifth, although commercial products can yield up to 30% PAA concentration, solutions with that high a concentration of PAA cannot be safely transported, due to the “extremely hazardous and explosive properties” of such a solution. (*Id.* at 1:37-41.) In fact, any solution that is more than 6% PAA is considered a dangerous product and must be labeled with the DOT marking “Organic Peroxide,” Hazard Class 5.2, 8 (oxidizer, corrosive). (*Id.* at 1:63-67). Producers are limited to an annual amount of 6,666 pounds of 15% PAA before they are required to file Risk Management Plans with the EPA and local authorities, and anyone shipping PAA over 6% must be permitted by their local fire department and pay an extra hazardous material shipping fee. (*Id.* at 1:67-2:7.)

***3. The Prior Art: Prior attempts to create non-equilibrium peracetic acid solutions.***

Due to the challenges involved with equilibrium solutions of PAA, those in the industry attempted to make non-equilibrium solutions of PAA, which could be made on-site at the point of use. (Exhibit 1001 at 2:12-14.) These attempts, however, failed to achieve a commercially feasible product due to various issues with their manufacture. Vineyard (U.S. Patent No. 7,012,154) proposed a system for making non-equilibrium PAA, but it was expensive, suffered from “significant safety hazards associated with the production of pure PAA due to its explosive properties,” and was complex and required highly trained personnel to execute. (*Id.* at 2:14-29.) Methods and devices belonging to Steris Corp. (U.S. Patent No. 6,171,551) and Applied Biosystems LLC (U.S. Patent No. 6,387,236) were expensive, energy-intensive, resulted in an extremely low yield of PAA, and were ideally performed on a continuous basis. (*Id.* at 2:30-43.) Other methods, including those taught by Permelec (WO 2004/0245116), Danisco (WO 2008/140988), and Buschmann (U.S. Pub. No. 2009/0314652) required expensive equipment and a large footprint for the equipment, presented challenges in maintaining the conditions needed for the reactions, and experienced challenges in operating with air as a source of the oxygen, which can limit or eliminate PAA production. (*Id.* at 2:44-3:13.) Other methods were not suitable for large-scale production, required

expensive and quickly degraded equipment, created explosion hazards and contaminants, used chemicals that are hazardous, and were challenging to perform. (*Id.* at 3:14-4:37.)

***4. The inventions of the U.S. 8,546,449 Patent Family solved the prior art problems.***

The shared specification for the members of the 8,546,449 Patent Family teaches a method of preparing a non-equilibrium solution of PAA that does not suffer from the limitations of prior art solutions. The invention is directed to the creation of hydrogen peroxide-acetyl precursor solutions (“Precursor Solutions”) that can be used to create a non-equilibrium solution of PAA. (Exhibit 1001 at 5:8-18.) The Precursor Solutions are efficient and “remarkably stable,” therefore “overcom[ing] one or more problems of the known prior art,” including being “free of the regulatory reporting, permitting, and shipping restrictions that govern equilibrium PAA products.” (*Id.* at 5:18-28.) Similarly:

This method addresses one or more problems of the known prior art. The method is easy to perform, inexpensive to operate, and requires only basic and common equipment. The method is safe, in that it does not isolate pure PAA, and there is no possibility of a catastrophic event due to an equipment failure, such as over-pressurization or explosions. When triacetin is used as the acetyl precursor, it is inexpensive, non-toxic, safe, non-corrosive, non-irritating, non-flammable, sanctioned as Generally Recognized as Safe (GRAS) by the FDA, and converted

quickly and with a high conversion rate into PAA. The method does not require the use of perhydrolase enzymes, acetic acid, or acetic anhydride, all of which suffer from the aforementioned limitations and problems. The method generates a PAA product that does not contain ammonium hydroxide. The method can be performed to generate a PAA product in a continuous or intermittent fashion. Further, the method allows the end-user the choice of utilizing the on site generated PAA immediately or later over the course of a working day.

(*Id.* at 6:37-55.) The non-equilibrium PAA ultimately generated by the methods of the U.S. 8,546,449 Patent Family in turn have unique properties that are generally advantageous. They yield high levels of PAA (1-7.1%), are alkaline (thus avoiding the risks associated with the acidic formulations of the prior art), and may be used flexibly, as the reaction can be stopped at will by neutralizing the solution, and then the reaction can be re-started and used as needed. (*Id.* at 17:52-18:11 .)

#### **B. Prosecution History of the '449 Patent**

The '449 Patent peremptorily discusses thirteen prior art references in the “Background of the Invention,” and cites a total of 25 patents and five non-patent references on its face, all of which were considered by the Examiner during examination. (Exhibit 1001.) In the sole Office Action (other than a restriction requirement), the Examiner noted that “the level of skill in the art is high,” and that there is a “high degree of unpredictability of the chemical art” disclosed in the

specification. (Exhibit 1002, '449 Prosecution History at 065, 066.) In the Notice of Allowance, the Examiner stated that the claims were “neither anticipated nor rendered obvious over the art of record, and therefore are allowable. A suggestion for modification of a reference to obtain the instant processes has not been found.” (*Id.* at 026.)

**C. Person of Ordinary Skill in the Art**

Petitioner fails to provide a definition of a person of ordinary skill in the art (“POSITA”).

During prosecution of the '449 Patent, the Examiner defined the level of skill in the art as “high.” (Exhibit 1002 at 065.) Consistent with this assessment by the USPTO, Enviro Tech proposes that a POSITA be determined based upon a combination of education and work experience, where a higher degree in chemistry, chemical engineering, or a related discipline requires less work experience in chemical syntheses:

- Bachelor's Degree – A person with a bachelor's degree in chemistry, chemical engineering, or a related discipline would need 5 years of working experience in chemical syntheses.
- Master's Degree - A person with a master's degree in chemistry, chemical engineering, or a related discipline would need 3 years of working experience in chemical syntheses.

- Doctorate Degree – A person with a Ph.D. in chemistry, chemical engineering, or a related discipline would not need additional working experience by virtue of the additional training and lab work associated with their educational training.

(Exhibit 2019, District Court Declaration of Dr. Whiteker at ¶ 15.)

### III. CLAIM CONSTRUCTION

#### A. Petitioner's Proposed Construction: Order of Steps

Petitioner has provided one issue for construction, which was also at issue in *Enviro Tech Chem. Servs., Inc. v. Clean Chemistry, Inc.*, No. 1:24-cv-01313-ADA (W.D. Tex.) (the “District Court Case”), and which has been construed by the Court in that case. The construction issue raised is whether the method steps of Claim 1 need to be performed in the order in which they are recited in the claim. Petitioner argues, as it did in the District Court Case, that the steps need to be performed in the recited order, while Enviro Tech took the position that the order of the steps was not so limited:

A POSA would understand that the addition of reactants for the claims are not restricted to being “performed sequentially in the same order in which they are recited in the claim,” as Dr. Klibanov and Clean Chemistry contend, because the specification of the Asserted Patents teaches multiple embodiments where the order of addition of the reaction components can vary, and that the reactants can also be added simultaneously. This intrinsic evidence, supported by experimental

data, teaches a POSA that there is no technological barrier to performing the steps in a different order or performing steps simultaneously.

(**Exhibit 2019**, District Court Declaration of Dr. Whiteker at ¶ 35.) Enviro Tech's expert further supported this position with intrinsic evidence, including citations to the '449 Patent specification that contradict Petitioner's proposed construction. (*Id.* at ¶¶ 36-39.) The District Court found that variability in the order of the steps was permitted, as follows:

**Arrangement; order of steps ('449 Patent, Claim 1):** Steps (a) to (e) must be performed sequentially in the same order in which they are recited in the claim or in the following order: (a), (b) and (d) simultaneously, (c), (e).

(**Exhibit 2005**, Claim Construction Order at Term #1.)

**B. Petitioner's Proposed Construction: All Other Terms**

Petitioner states that: "For the purposes of this Petition only, with the single exception described below regarding the order of steps recited in claim 1, Petitioner adopts [Patent Owner's] 'no construction necessary' proposed constructions from the underlying district court litigation." (Petition, Paper 2 at 10-11.) Petitioner's proposed constructions herein are inconsistent with its positions taken in the District Court Case. Petitioner's positions in the District Court Case

relevant to the '449 Patent – other than the “Order of Steps” construction discussed above – are as follows:

| <b>Claim Term</b>                                                                                                                           | <b>Clean Chemistry's Proposed Construction</b>                                                                                                                                    |
|---------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| “[a] nonequilibrium solution [of peracetic acid]” (Claims 1 and 17)                                                                         | Indefinite; otherwise plain and ordinary meaning, but includes irreversibility.                                                                                                   |
| “about [a numerical value]” (Claims 3, 7, 10, 12-13, 20, and 22-23)                                                                         | Indefinite.                                                                                                                                                                       |
| “allowing the reaction medium sufficient time to maximize the conversion of the hydrogen peroxide triacetin into peracetic acid.” (Claim 9) | “Allowing the reaction medium sufficient time to achieve the highest possible conversion of the hydrogen peroxide [and] the triacetin into peracetic acid;” otherwise indefinite. |
| “...determine the time required to maximize the amount of hydrogen peroxide triacetin that are converted into peracetic acid.” (Claim 11)   | “...determine the time required to achieve the highest possible conversion of the hydrogen peroxide [and] the triacetin into peracetic acid.”                                     |

| Claim Term                                                                                                                                                | Clean Chemistry's Proposed Construction                                                                                                                                                                                                                              |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>“the time to maximize the conversion of the hydrogen peroxide triacetin into peracetic acid is about 30 seconds to about five minutes.” (Claim 10)</p> | <p>Indefinite, otherwise should be construed as “the time to achieve the highest possible conversion of the hydrogen peroxide [and] the triacetin into peracetic acid is about 30 seconds to about five minutes.”</p>                                                |
| <p>“The percent of triacetin that is converted into peracetic acid is about 40.9% to about 85.7%.” (Claim 12)</p>                                         | <p>Plain and ordinary meaning: the formula for percent conversion should read as shown in the footnote 2. Triacetin does not have a specialized meaning within this claim term different from the parties' agreed upon construction for “triacetin.”</p>             |
| <p>“The liquid is triacetin defining a hydrogen peroxide-triacetin solution.” (Claim 19)</p>                                                              | <p>Indefinite. Plaintiff concedes claim 19 is invalid and should be cancelled. Hence any claim construction dispute regarding claim 19 is moot. No terms from either claims 20 and 21 were proposed for construction by Plaintiff. Plaintiff's untimely position</p> |

| Claim Term | Clean Chemistry's Proposed Construction                          |
|------------|------------------------------------------------------------------|
|            | regarding claims 20 and 21 are not properly<br>before the Court. |

(**Exhibit 2005** at Term #3-6, 8, 10, and 11.<sup>2</sup>) None of these positions is simply “no construction necessary,” the position taken in the present Petition.

#### IV. ALLEGED PRIOR ART ASSERTED BY PETITIONER

##### A. Okano (Translated)

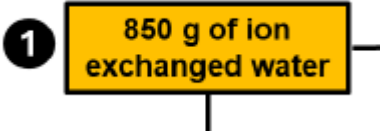
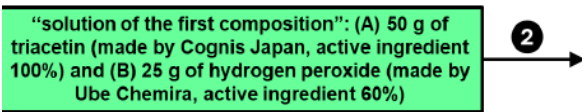
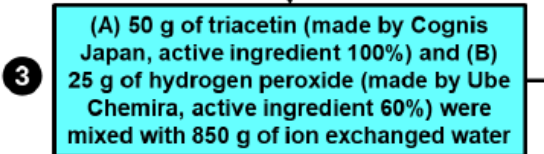
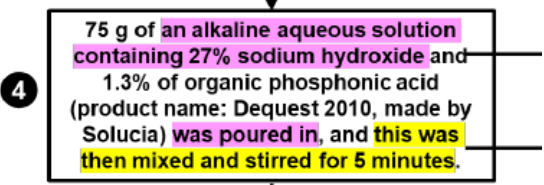
JP 2006-045147 (“Okano”) is directed to “[a] sterilizing cleaner composition for hard surfaces, containing water and an organic peracid obtained by reacting (A) an ester of polyhydric alcohol and an organic acid with (B1) hydrogen peroxide in a specific molar ratio in water at a pH of 8 to 12, and having a pH of 1 or more and less than 7 at 25°C.” (Exhibit 1005 at 1.)

Okano is cumulative to U.S. Patent No. 7,919,122 (**Exhibit 2020**, “Okano 1”), also to Okano, which was considered by the Examiner during the prosecution of the '449 Patent. Although Patent Owner does not concede that either Okano

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<sup>2</sup> At the time that Petitioner filed this Petition, no claim construction had issued in the District Court Case, and Petitioner did not update its Petition in light of the Claim Construction Order that issued on November 12, 2025.

patent teach the invention of the '449 Patent, when compared against one another, the portions of Okano cited by Petitioner in support of its argument that Claim 1 of the '449 Patent is invalid are sufficiently similar to Okano 1 to be cumulative of that art:

| Okano Example 1, Per Petition                                                                                         | Comparable Citations in Okano 1                                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
|  <p>(Petition, Paper 2 at 19.)</p>   | <p>“Deionized water was added...”<br/> (Exhibit 2020, Example 3 at 29:30.)</p>                                                      |
|  <p>(Petition, Paper 2 at 19.)</p>  | <p>“...to the components (A) and (B)...”<br/> (Exhibit 2020, Example 3 at 29:30.)</p>                                               |
|  <p>(Petition, Paper 2 at 19.)</p> | <p>Where component (A) can include triacetin and component (B) can be aqueous hydrogen peroxide.<br/> (Exhibit 2020, Table 10.)</p> |
|                                    | <p>“...organic phosphonic acid (trade name Dequest 10, manufactured by Solutia Japan Ltd.) and an alkaline pH</p>                   |

| Okano Example 1, Per Petition                                                                                                                                                                                                                                                                                                                                                       | Comparable Citations in Okano 1                                                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>(Petition, Paper 2 at 19.)</p>                                                                                                                                                                                                                                                                                                                                                   | <p>adjusting agent in the amounts shown in Table 10... This mixture was mixed with stirring for about 10 minutes in a 200 mL beaker.”</p> <p>(<b>Exhibit 2020</b>, Example 3 at 29:31-35; Table 10 (listing sodium hydroxide as an alkaline pH adjusting agent).)</p>                     |
| <div data-bbox="235 1123 755 1318"> <div data-bbox="235 1207 267 1249">5</div> <div data-bbox="300 1144 738 1312"> <p>Afterward, 75 g of a mixed acid solution containing 30% sulfuric acid and 6% phosphoric acid was immediately added to prepare the sterilizing cleaner composition (I) containing the organic peroxy acid.</p> </div> </div> <p>(Petition, Paper 2 at 19.)</p> | <p>“Thereafter, the mixture was rapidly adjusted to the objective pH by using an acidic pH adjusting agent in a weight shown in Table 10...”</p> <p>(<b>Exhibit 2020</b>, Example 3 at 29:36-38; Table 10 (listing phosphoric acid and sulfuric acid as acidic pH adjusting agents).)</p> |

“A reference is cumulative when it ‘teaches no more than what a reasonable examiner would consider to be taught by the art already before the PTO.’”

*Regeneron Pharms., Inc. v. Merus N.V.*, 864 F.3d 1343, 1350 (Fed. Cir. 2017)

(quoting *Regents of Univ. of Cal. v. Eli Lilly & Co.*, 119 F.3d 1559, 1575 (Fed. Cir. 1997)). Here, it would be difficult for Petitioner to argue that Okano and Okano 1, which teach the same elements that Petitioner itself cites as the basis for its claim that Okano invalidates the '449 Patent, are not cumulative of one another.

**B. Oringer**

U.S. Patent No. 3,432,546 ("Oringer") was specifically discussed in the '449 Patent, along with its shortcomings:

Other attempts to produce non-equilibrium PAA solutions on site, at the point-of-use, for bleaching cellulosic materials have reacted hydrogen peroxide with acetic anhydride. For example, U.S. Pat. No. 3,432,546 discloses a process where hydrogen peroxide, acetic anhydride, and an ammonium hydroxide catalyst were metered to a tubular reactor to continuously produce a solution containing 3.25% PAA with a conversion of 78% hydrogen peroxide. However, the process generated measurable amounts of diacetyl peroxide (0.44%) which is an explosion hazard. Moreover, the reaction product would be unsuited for any application other than cellulosic bleaching purposes because there was no attempt to remove the ammonium hydroxide catalyst from the reaction medium. Ammonium hydroxide is an undesirable contaminant in PAA products that are used as disinfectants and sanitizers in the dairy, food, and beverage processing industries, and in PAA products used in fruit and vegetable washing acid in the treatment of meat, poultry, and seafood.

(Exhibit 1001 at 3:54-4:4.)

**C. Withenshaw**

WO 01/46519 (“Withenshaw”) was expressly discussed in the ’449 Patent, along with the reasons why it is problematic:

Yet another process for generating non-equilibrium solutions of PAA on site at the point-of-use is disclosed in WIPO International Publication No. WO 01/46519 A1. This process utilized the metering of an aqueous solution of hydrogen peroxide into an agitated tank and co-metering a solid dry source of tetraacetylenediamine (TAED) from a storage-hopper using a screw feeder. The agitator kept the solid TAED suspended in the hydrogen peroxide solution which was then fed to an in-line static mixer where aqueous sodium hydroxide was introduced. The mixture was then directed through 200 meters of coiled tubing immersed in a cooling tank so that the temperature rise accompanying the exothermic reaction was contained. Upon exiting the coiled tubing, the mixture containing PAA could be directed to the water requiring treatment. Disadvantages of this approach include the difficulty of accurately metering a solid and a liquid simultaneously, and the high capital equipment cost of the metering system, electronic controllers, agitation tank, coiled tubular reactor, and the cooling system.

(Exhibit 1001 at 4:19-37.) Withenshaw does not teach the use of triacetin. (*Id.*)

**V. THE PETITION FAILS TO PROVIDE THE CLAIM CONSTRUCTIONS REQUIRED BY 37 C.F.R. § 42.104(b)(3) AND,**

**PURSUANT TO PRECEDENTIAL PTAB DECISIONS, SHOULD  
THEREFORE BE DISMISSED**

Pursuant to 37 C.F.R. § 42.104(b)(3), Petitioner must identify “[h]ow the challenged claim is to be construed.” If the proposed construction is inconsistent with the Petitioner’s proposed constructions in other proceedings, “that petitioner should, at a minimum, explain why alternative positions are warranted.” *Revvo Techs., Inc. v. Cerebrum Sensor Techs., Inc.*, IPR2025-00632, Paper 20 at 3-4 (Nov. 3, 2025) (precedential). Just as in the present proceeding, in *Revvo Techs.*:

Revvo Technologies, Inc. (“Petitioner”) did not propose its own constructions for claim terms in the Petition, but instead accepted Cerebrum Sensor Technologies, Inc.’s (“Patent Owner”) proposed constructions from the parties’ district court litigation. Although Petitioner proposed different constructions for the claim terms for the claim terms in the district court litigation, Petitioner did not explain why it was taking a different position here.

*Id.* at 2 (internal citations omitted). Director Squires noted that “the rules discourage petitioners from seeking broader constructions at the Board to support a patentability challenge while seeking narrower constructions in litigation to avoid infringement liability.” *Id.* at 4. Finding that “[a]llowing petitioners to continue this practice does not further the Office’s goal of ‘providing greater predictability and certainty in the patent system,’” and that “[s]imply noting that the petitioner is

adopting a patent owner's claim construction proposals from the district court, however, is not a sufficient reason for advancing different positions in two forums," Director Squires concluded that a Petitioner's failure to comply with Rule 42.104(b)(3) by proposing Patent Owner's district court constructions would, ordinarily, result in a denial of institution. *Id.* at 4, 5.

Just as in *Revvo Techs.*, the present Petition abandons the narrower claim construction positions taken in the District Court Case, and instead summarily seeks to adopt the Patent Owner's simpler constructions. And just as in *Revvo Techs.*, Petitioner does so without explanation. In addition, Petitioner takes a contrary position on claim construction in later portions of its brief without noting that it has done so. For example, the term "solution" was not construed in the District Court Case; however, Petitioner offered a definition in that case and is now seeking to apply a broader construction herein.

Because Petitioner failed to comply with Rule 42.104(b)(3) when it adopted Enviro Tech's broader claim construction proposals and abandoned constructions championed in the District Court Case, without explanation, institution should be denied.

**VI. THE PETITION ALSO FAILS TO DEFINE A POSITA, AN OMISSION FATAL TO THE WHOLE PETITION, WHICH RELIES SOLELY ON OBVIOUSNESS**

A petition must include an explanation of “[h]ow the construed claim is unpatentable under the statutory grounds identified in paragraph (b)(2) of this section.” 37 C.F.R. § 42.104(b)(4).

The present Petition only contends that the claims at issue are rendered obvious by certain prior art references. A fundamental element of any obviousness analysis is a clear understanding of what a person of ordinary skill in the art (“POSITA”) would know. “Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined.” *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966). In fact, the entire obviousness analysis is held up to the lens of a POSITA’s knowledge and motivation:

As is clear from cases such as *Adams*, a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art. Although common sense directs one to look with care at a patent application that claims as innovation the combination of two known devices according to their established functions, it can be important to identify a reason

that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does.

*KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007).

Here, Petitioner never states who a POSITA would be, yet repeatedly contends that “[a] POS[IT]A would understand” various elements of the invention to be known. (*See, e.g.*, Petition, Paper 2 at 12, 26, 30, 31, 36-39, 47, 51, 61.) This elastic, undefined use of a POSITA as a person who would inherently know whatever is convenient to Petitioner, without having any metes or bounds placed on who such a POSITA might be is improper. Much like it is improper to change claim constructions to suit one’s purpose, as discussed *supra* with regard to 37 C.F.R. § 42.104(b)(3), it is similarly improper to argue obviousness based on the knowledge of an undefined, amorphous POSITA who can miraculously know whatever is convenient for Petitioner at the moment.

Because the Petition is silent as to who a POSITA would be, yet relies on the knowledge of a POSITA to allege obviousness, Petitioner’s arguments must fail as they do not “resolve” “the level of ordinary skill in the pertinent art.”

## **VII. NO CLAIMS OF THE '449 PATENT ARE OBVIOUS**

Petitioner makes the following arguments regarding obviousness:

| Ground | Claims            | Cited Art                               |
|--------|-------------------|-----------------------------------------|
| 1      | 1-7, 9-22         | Okano                                   |
| 2      | 1, 4-5, 14-16, 18 | The combination of Okano and Withenshaw |
| 3      | 8                 | The combination of Okano and Oringer    |

(Petition, Paper 2 at 4.)

**A. Claim 1 Is Not Rendered Obvious Pursuant to Grounds 1 or 2**

***1. Ground 1: Claim 1 is not rendered obvious by Okano because Okano does not teach a non-equilibrium solution, as defined by Petitioner, and because Okano teaches away from the invention of the '449 Patent.***

1. A method of generating non-equilibrium solution of peracetic acid, comprising:

- providing water;
- introducing a hydrogen peroxide-triacetin solution to the water;
- mixing the hydrogen peroxide-triacetin solution and the water to form a mixture;
- adding an aqueous source of an alkali metal or earth alkali metal hydroxide to the mixture; and
- forming a reaction medium comprising a non-equilibrium solution of peracetic acid.

**a. Okano does not teach a “solution” as defined by Petitioner.**

According to Petitioner, when construing the phrase “a non-equilibrium solution of peracetic acid,” a “solution,” as used in Claim 1 of the '449 Patent, only exists when listed ingredients have been adequately mixed to become homogeneous:

37. The use of the term “solution” in this claim phrase would indicate to a POSA that it is a *homogeneous* (i.e., uniform) mixture, rather than a heterogeneous one. Nothing in the patent specification illuminates whether or how the homogeneity is determined, or when a mixture that might begin as a heterogenous mixture transforms into a homogeneous one (i.e., a liquid solution), or how the homogeneity should be determined empirically. Without such guidance from the intrinsic record, a POSA would not know when a mixture becomes sufficiently homogeneous to constitute the claimed aqueous “solution.”

38. A POSA would understand that there are many ways to assess homogeneity of a mixture, including an aqueous solution, and different degrees of homogeneity that could lead a POSA to conclude whether a mixture remains heterogeneous or has become homogeneous and is thus a solution. Homogeneity is itself a term of degree and depends upon the level of uniformity at which solutes are disbursed within a solvent. If uniformly distributed throughout the solvent at the molecular level, then solutes are considered by a POSA to be in solution with the solvent. If not uniformly distributed, a POSA would understand that the combination of the solutes and the solvent is a heterogeneous mixture, i.e., is *not* a solution.

(**Exhibit 2021**, Klibanov Declaration at ¶¶ 37, 38 (emphasis original); *see also id.* at ¶ 78.<sup>3</sup>)

Similarly, in the co-pending case IPR2025-01459, Petitioner discusses “Okano 1,” U.S. Patent No. 7,919,122, which has a specification and disclosures similar to that of the presently discussed Okano, as discussed *supra*. In that case, Petitioner takes a different position, arguing that the combination of the listed components do not constitute a solution until they are mixed to homogeneity:

As discussed above, Okano 1 makes clear to a person of ordinary skill in the art that non-equilibrium solutions of peracetic acid containing peracetic acid, hydrogen peroxide, triacetin, 1,2,3-propanetriol (glycerol), an aqueous source of an alkali metal hydroxide or an earth alkali metal hydroxide, and water, are necessarily disclosed by disclosing mixtures that are comprised of all of these components, Exhibit 1008, paragraph 141, *once such mixtures are sufficiently mixed to homogeneity so as to constitute a solution.*

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<sup>3</sup> The stand-alone term “solution” was not construed in the District Court Case; however, Petitioner offered a definition in that case and is now seeking to apply a broader construction herein. This is yet another basis to find that Petitioner failed to comply with 37 C.F.R. § 42.104(b)(3) and that this Petition should be denied.

(*Clean Chemistry, Inc. v. Enviro Tech Chem. Servs., Inc.*, IPR2025-01459, Petition, Paper 2 at 36 (Aug. 27, 2025) (emphasis added).) To provide further context for what Petitioner means by “sufficiently mixed to homogeneity so as to constitute a solution,” one needs only to look to Petitioner’s pinpoint cites to “Okano 1,” which are highlighted in yellow below:

EXAMPLE 3

Deionized water was added to the components (A) and (B), organic phosphonic acid (trade name: Dequest 2010, manufactured by Solutia Japan Ltd.) and an alkaline pH adjusting agent in the amounts shown in Table 10, to adjust the total weight of the mixture to 100 g. This mixture was mixed with stirring for about 10 minutes in a 200 mL beaker. The pH in this step was 8 to 12. Thereafter, the mixture was rapidly adjusted to the objective pH by using an acidic pH adjusting agent in a weight shown in Table 10, followed by adding deionized water to adjust the total amount to 110 g. At this point in time (just after preparation), the mixture was measured for organic peracid concentration and hydrogen perox-

ide concentration, and about 30 minutes after the stirring, the aqueous solution for sterilization was adjusted to an organic peracid concentration of 3000 ppm, and its sterilizing effect was confirmed. The method of measuring the hydrogen peroxide concentration and the organic peracid concentration was conducted according to the method of measuring the organic peracid concentration in Example 1. The sterilization test method was in accordance with measurement of sterilizing effect of bacterial spores in Example 2, but in this example, the temperature and time for contacting the aqueous solution for sterilization with bacteria were 60° C. and 20 seconds respectively, and as the objective bacteria, *Bacillus cereus* IFO13494 and *Bacillus subtilis* var. *niger* were used. The results are shown in Table 10.

EXAMPLE 6

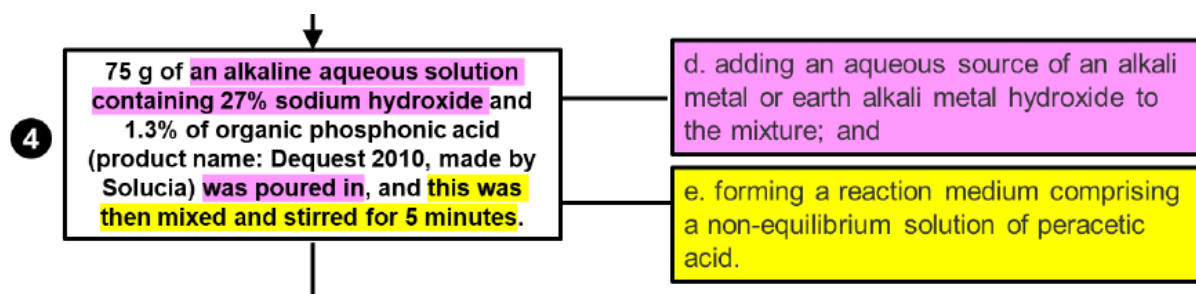
Deionized water was added to the components (A) and (B), organic phosphonic acid (trade name: Dequest 2010, manufactured by Solutia Japan Ltd.) and an alkaline pH adjusting agent in the amounts shown in Table 23, to adjust the total weight of the mixture to 100 g (first step). This mixture was mixed for about 10 minutes with stirring in a 200 mL beaker. The pH in this step was 8 to 12. Thereafter, the mixture was rapidly adjusted to the objective pH by using an acidic pH adjusting agent in a weight shown in Table 21, followed by adding deionized water to adjust the total amount to 110 g (second step). At this point in time (just after preparation), the mixture was measured for organic peracid concentration and hydrogen peroxide concentration, and a change in the organic

peracid concentration with time (just after preparation, 30 minutes, 60 minutes and 120 minutes after preparation) was measured. After 120 minutes, the aqueous solution for sterilization was adjusted to an organic peracid concentration of 3000 ppm, and its sterilizing effect was confirmed. The method of measuring the hydrogen peroxide concentration and the organic peracid concentration was conducted according to the method of measuring the organic peracid concentration in Example 5. The sterilization test method was in accordance with measurement of sterilizing effect of bacterial spores in Example 5a, but in this example, the temperature and time for contacting the aqueous solution for sterilization with bacteria were 60° C. and 20 seconds respectively, and as the objective bacteria, *Bacillus cereus* IFO13494 and *Bacillus circulans* IFO3967 were used.

(Exhibit 2020 at 29:28-41; 30:28-41; 47:41-56; 48:41-56.) The blue highlighting in each of the Examples from Okano 1 identifies references to mixing the components that take place before the point identified by Petitioner as describing a mixture “sufficiently mixed to homogeneity so as to constitute a solution.” These

Examples make clear that under Petitioner's definition of "solution," the combination of materials are merely a mixture until after they have been mixed for ten minutes, and do not become a solution until after the mixture has sat for at least 30 minutes.

Petitioner claims that Okano teaches all of the elements of the '449 Patent, but Petitioner fails to make any argument that Okano teaches a "solution" in accordance with Petitioner's apparent construction of the term. Rather, it is plain that Okano does not teach a "solution" as defined by Petitioner. The example upon which Petitioner relies to show that Claim 1 is obvious (Composition I) teaches that the mixture is "mixed and stirred for 5 minutes," after which an acidic solution is "immediately added." Petitioner does not identify any steps taken after the mixing and stirring for five minutes to show that a solution is formed:



(Petition, Paper 2, at 19.) As is clear from Petitioner's discussion of the "solution" formed in "Okano 1," this is not sufficient stirring, nor is it sufficient time, to create a "solution," as previously defined by Petitioner. Petitioner should not be permitted to argue a narrow construction for the purposes of the District Court

Case and other related IPRs, but then conveniently broaden (without explanation) its interpretation of this term in the present IPR in order to try and invalidate the '449 Patent. This should, consistent with *Revvo Techs.*, result in dismissal of this IPR. At a minimum, Petitioner should not be able to benefit from its gamesmanship and should be forced to live with its narrow construction of “solution,” which conclusively indicates that Petitioner has failed to provide evidence that Okano teaches element (e) of Claim 1.

Petitioner bears the burden of showing that every element of the patented invention is taught by the alleged prior art in order to invalidate the '449 Patent. *See, e.g.*, MPEP § 2143.03 (Ninth ed. Rev. 01.2024) (“Examiners must consider all claim limitations when determining patentability of an invention over the prior art.”). Petitioner’s failure to show that Okano teaches a “solution” as defined by Petitioner is fatal to its argument. In reviewing the Petition, the Director and the Board are limited to the arguments raised by Petitioner in the Petition, and as stated by the Board in the underlying *inter partes* review, “failure to direct [the Board] to evidence sufficient to establish” obviousness of a claim will mean that such an argument is not properly before the Director and the Board. *AMP Plus, Inc. v. DMF, Inc.*, 131 F.4th 1320, 1323-24 (Fed. Cir. 2025). “[T]he law of obviousness does not require the court, or the Board, to develop arguments for a limitation that

the petition simply did not make.” *Id.* at 1325. Petitioner has failed to make an argument that Claim 1 of Okano includes a “solution” consistent with Petitioner’s own construction of that term as made in multiple other filings, and the absence of such a showing means that Okano does not teach all elements of Claim 1 of the ’449 Patent.

b. Okano teaches away from the invention of the ’449 Patent.

One of the novel features of the invention of the ’449 Patent is that it achieves a non-equilibrium solution of peracetic acid using a stable, basic solution. A POSITA reading Okano, however, would note both the use of a stabilizer (phosphonic acid) and the immediate addition of an acidic solution to the Okano solution taught at [0057], and would understand the invention of Okano to be highly unstable. (Exhibit 1005 at [0057].) As a result, a POSITA would (1) believe that the combination of triacetin and hydrogen peroxide to yield peracetic acid is an unstable reaction, and would not teach a stable solution that could easily be transported and used at the point of use; (2) believe that any solution combining triacetin and hydrogen peroxide to make peracetic acid would require the use of a stabilizer; and (3) believe that it is necessary to stop the triacetin-hydrogen peroxide reaction quickly and stabilize the solution with acid, because it could not run over a period of time.

As a result, a POSITA would not expect that the combination of triacetin and hydrogen peroxide taught by Okano would yield a stable, readily transportable solution for on-site use absent the use of stabilizers and acids to limit the reaction, and would not turn to Okano to solve the problem that the '449 Patent seeks to address. For this additional reason, there is no motivation to use the Okano reference, and Okano cannot render obvious Claim 1 or any other claim of the '449 Patent. There must be “a reason” for a skilled artisan to “combine the elements in the way the claimed new invention does.” *KSR Int'l Co.*, 550 U.S. at 418; *see also Arctic Cat Inc. v. Bombardier Rec. Prods.*, 876 F.3d 1350, 1363 (Fed. Cir. 2017).

***2. Ground 2: Claim 1 is not rendered obvious in view of the combination of Okano and Withenshaw because there is no motivation to combine these references.***

In order to show that the combination of Okano and Withenshaw would render Claim 1 of the '449 Patent obvious, Petitioner must first demonstrate “that a skilled artisan would have been motivated to combine prior art references disclosing certain subsets of the claimed features with a reasonable expectation of success.” *See Tris Pharma, Inc. v. Actavis Labs. FL, Inc.*, 2022 USPQ.2d 627 (Fed. Cir. 2022). “[O]bviousness concerns whether a skilled artisan not only *could have made* but *would have been motivated to make* the combinations or modifications of

prior art to arrive at the claimed invention.” *Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1073 (Fed. Cir. 2015) (emphasis original).

Contrary to Petitioner's assertion that “a POSA would also have been specifically motivated to combine Okano's preferred triacetin-hydrogen peroxide method for efficiently generating peracetic acid solutions with Withenshaw's disclosed ‘continuous peroxyacid generating system’ to automate and scale up Okano's method into an industrial process with desirable features” (Petition, Paper 2 at 55), there are at least four reasons that a skilled artisan would not be motivated to combine Okano with Withenshaw to create the invention of the '449 Patent with a reasonable expectation of success.

First, Withenshaw does not teach or suggest the use of triacetin and so is non-analogous art. Instead, Withenshaw only contemplates the use of other acetyl precursors — chiefly, tetraacetylenediamine (TAED). (*See* Exhibit 1006 at 1:7-12; 5:6-11.) A skilled artisan looking for a way to improve a triacetin-based peracetic acid production process would not look to a process using TAED, such as the process of Withenshaw, to improve their triacetin-based process. (**Exhibit 2022**, Whiteker Declaration ¶¶ 19, 20.) Since Withenshaw is non-analogous art and does not teach or suggest the use of triacetin, there would be no motivation to combine Okano with Withenshaw.

Second, the combination suggested by Petitioner would render the device of Withenshaw at least unsuitable for its intended purpose. TAED is a solid that is dispensed into the reaction vessel of Withenshaw with a hopper and screw-drive device, shown below as elements 10 and 11, respectively. (Exhibit 1006 at 8:17-18, Figure 1.) As discussed in the attached declaration from Gregory Whiteker, a hopper/screw-drive system is uniquely suited to disperse solid reagents and is unsuitable for liquid reagents, such as triacetin. (**Exhibit 2022 ¶ 16.**)

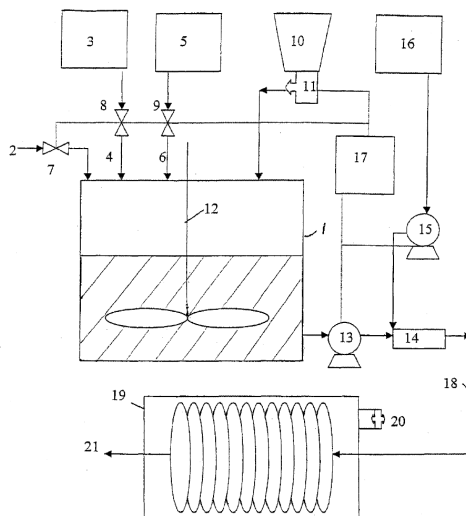


Figure 1

Third, Neither Withenshaw nor Okano provide the guidance that would be required by a skilled artisan in order to adapt the device of Withenshaw to the production of peracetic acid using triacetin. (**Exhibit 2022 ¶¶ 17-18.**) As discussed above, substantial alterations to the device of Withenshaw would be required to dispense an oily liquid reagent, such as triacetin, rather than a solid reagent, such

as TAED. A skilled artisan would not be able to adapt the device of Withenshaw to dispense liquid triacetin without substantial alterations that are well beyond the realm of routine experimentation. (*Id.*) The cited references do not contemplate such alterations and would not provide the skilled artisan with the guidance necessary to make such alterations. (*Id.*)

Finally, Withenshaw teaches away from the use of triacetin as the acetyl precursor. (**Exhibit 2022 ¶ 19.**) Withenshaw discusses the advantages of using TAED agglomerates in the production of bleaching solutions throughout the specification. Withenshaw notes that TAED, as a solid acetyl precursor, “facilitates accurate dosing and also allows for easy recovery from accidental spillage.” (Exhibit 1006 at 5:3-4.) Triacetin would not have either advantage, as an oily and dense liquid precursor. (**Exhibit 2022 ¶ 19.**) Withenshaw also notes that TAED may be agglomerated to avoid the use of carriers or binders. (Exhibit 1006 at 2:10-3:3.) As a liquid compound, triacetin cannot form agglomerates, and so must either be conveyed as an oily pure liquid or as a solution. (**Exhibit 2022 ¶¶ 18, 19.**) For these reasons, a skilled artisan would not be motivated to use triacetin in the process described in Withenshaw; at best, they might be motivated to locate another, superior solid acetyl precursor. (*Id.*) “[W]hen the prior art teaches away from combining certain known elements, discovery of a successful means of

combining them is more likely to be nonobvious.” *KSR Int’l Co.*, 550 U.S. at 416; *see also Arctic Cat Inc.*, 876 F.3d at 1363.

Therefore, the preponderance of the evidence does not establish that a skilled artisan would have been motivated to combine Okano and Withenshaw with a reasonable expectation of success, and rather, the preponderance of the evidence establishes that a skilled artisan would have been dissuaded from combining these references to arrive at the method taught in the ’449 Patent. *See Immunex Corp. v. Sandoz Inc.*, 964 F.3d 1049, 1067 (Fed. Cir. 2020) (affirming that there was no motivation to combine where the district court concluded that “a [skilled artisan] would be dissuaded from selecting or combining the components as claimed.”); *Rembrandt Wireless Techs., LP v. Samsung Elecs. Co.*, 853 F.3d 1370, 1379 (Fed. Cir. 2017) (“Surely a showing that a prior art reference teaches away from a given combination is evidence that one of skill in the art would not have been motivated to make that combination to arrive at the claimed invention.”); *In re Gordon*, 733 F.2d 900, 902 (Fed. Cir. 1984); MPEP § 2143.01(V) (“If a proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, there may be no suggestion or motivation to make the proposed modification.”).

Because there is no motivation to combine Okano and Withenshaw, the combination of Okano and Withenshaw cannot render obvious the claims of the '449 Patent.

**B. Claim 2 Is Not Rendered Obvious Pursuant to Ground 1**

2. The method of claim 1, further comprising, prior to step (b), a step of providing the hydrogen peroxide-triacin solution comprising: introducing triacetin to a solution of aqueous hydrogen peroxide; and allowing the triacetin and the solution of aqueous hydrogen peroxide to mix to form the hydrogen peroxide-triacetin solution.

Claim 2 is not rendered obvious by Okano because Claim 2 depends from independent Claim 1, which is non-obvious. *In re Fine*, 837 F.2d 1071, 1076 (Fed. Cir. 1988) (“Dependent claims are nonobvious under section 103 if the independent claims from which they depend are nonobvious.”).

**C. Claim 3 is Not Rendered Obvious Pursuant to Ground 1**

3. The method of claim 1, wherein the hydrogen peroxide-triacetin solution has a mole ratio of hydrogen peroxide to triacetin of about 2.98:1 to about 12.84:1.

Claim 3 is not rendered obvious by Okano because Claim 3 depends from independent Claim 1, which is non-obvious. *In re Fine*, 837 F.2d at 1076.

To the extent that Petitioner asserts that the range of acceptable molar ratios of hydrogen to peroxide taught by Okano range from 0.05:1 to 10:1 (a 200-fold range) overlaps with the claimed range, Petitioner fails to show that the extremely

large range disclosed by Okano was enabled. *See In re Kumar*, 418 F.3d 1361, 1368 (Fed. Cir. 2005) (“Although published subject matter is ‘prior art’ for all that it discloses, in order to render an invention unpatentable for obviousness, the prior art must enable a person of ordinary skill to make and use the invention.”).

Moreover:

Although a patent's specification need not “describe how to make and use every possible variant of the claimed invention,” “when a range is claimed, there must be reasonable enablement of the scope of the range.” To qualify as “reasonable,” “the specification . . . must teach those skilled in the art how to make and use the full scope of the claimed invention without ‘undue experimentation.’”

*McRO, Inc. v. Bandai Namco Games Am., Inc.*, 959 F.3d 1091, 1100 (Fed. Cir. 2020) (internal citations omitted).

Thus, the Okano range must be supported by specific examples or other explicit teachings that enable the claimed range. Such specific examples do not, however, exist. Rather, as conceded by Petitioner, “[t]he molar ratio of hydrogen peroxide:triacetin in Okano's Example 1 is 1.9:1,” which is clearly outside the claimed range. (Petition, Paper 2 at 33.) Because Okano did not disclose or enable any compositions within the claimed range, and because Okano taught ratios far

below those claimed, Okano does not enable, and therefore does not teach, and cannot render obvious, the claimed ranges.

**D. Claims 4 and 5 Are Not Rendered Obvious Pursuant to Grounds 1 or 2**

4. The method of claim 1, wherein the provided water is an aqueous stream.

5. The method of claim 1, wherein the provided water is contained in a mixing tank or other vessel.

***1. Ground 1: Claims 4 and 5 are not rendered obvious by Okano.***

Claims 4 and 5 are not rendered obvious because Claims 4 and 5 depend from independent Claim 1, which is non-obvious. *In re Fine*, 837 F.2d at 1076.

In addition, Claims 4 and 5 are not rendered obvious by Okano because Petitioner's arguments as to Claims 4 and 5 are mutually exclusive and unsupported. Claim 4 is directed to the method of Claim 1, wherein the provided water is an aqueous stream, while Claim 5 is directed to the method of Claim 1, wherein the provided water is contained in a mixing tank or other vessel. In the '449 Patent, these embodiments are not performed together: the use of an aqueous stream is taught in a first embodiment and the use of a mixing tank or other vessel, presumably holding a static amount of water, is taught in the second embodiment. (Exhibit 1001 at 13:39-56; 16:4-14.)

Petitioner, heavily relying on its expert's report, seems to argue that both an aqueous stream and a mixing tank are simultaneously the form of the provided

water. With regard to Claim 4, Petitioner claims that Paragraph 57 of Okano teaches an aqueous stream because “[w]ater, as a liquid, is essentially always transported in the form of a stream and a stream of water is, by definition, an *aqueous* stream.” (Petition, Paper 2 at 34.) But then, Petitioner argues with regard to Claim 5 that Paragraph 57 of Okano teaches that the water is held in a mixing tank or other vessel because “[w]ater is a liquid that is not a free-standing composition.” (*Id.* at 35.) Thus, Petitioner simultaneously takes the position that water is “by definition, an aqueous stream,” yet it is also “not a free-standing composition.” In other words, it is by definition, flowing, yet it is also contained.

Putting Petitioner's contradictions aside, the '449 Patent teaches that there are specific types of aqueous streams (“[t]he water may be flowing in, for example, a pipe, a flume, a canal, or other types of aqueous streams”) and various types of containers of water (“such as a mixing tank or other vessel”). (Exhibit 1001 at 13:46-47; 16:8-9.) None of which are cited by Petitioner as being disclosed in Okano at [57] or elsewhere.

It is improper for Petitioner to try to assert a claim element is disclosed or obvious based on apparent guesses by its “expert,” particularly when the reference clearly does not disclose that element. Where a declaration “merely repeats, *verbatim*, the conclusory assertion for which it is offered to support, and “does not

cite to any additional supporting evidence or provide any technical reasoning to support his statement,” it is “conclusory and unsupported, adds little to the conclusory assertion for which it is offered to support, and is entitled to little weight.” *Xerox Corp. et al. v. Bytemark, Inc.*, IPR2022-00624, Paper No. 9 at 15 (Aug. 24, 2022) (precedential).

Okano, therefore, does not render Claims 4 or 5 obvious, because it does not teach the use of an “aqueous stream” or of a “mixing tank or other vessel” as required by the claims.

***2. Ground 2: Claims 4 and 5 are not rendered obvious in view of the combination of Okano and Withenshaw.***

Claims 4 and 5 are not rendered obvious because Claims 4 and 5 depend from independent Claim 1, which is non-obvious. *In re Fine*, 837 F.2d at 1076. Nor are Claims 4 and 5 rendered obvious because there is no motivation to combine Okano and Withenshaw. (*See* discussion at Claim 1, *supra*.) The combination of Okano and Withenshaw cannot, therefore, render obvious Claims 4 and 5 of the '449 Patent.

**E. Claim 6 Is Not Rendered Obvious Pursuant to Ground 1**

**6.** The method of claim 1, wherein the aqueous source of the alkali metal or earth alkali metal hydroxide is sodium hydroxide.

Claim 6 is not rendered obvious by Okano because Claim 6 depends from independent Claim 1, which is non-obvious. *In re Fine*, 837 F.2d at 1076.

**F. Claim 7 Is Not Rendered Obvious Pursuant to Ground 1**

7. The method of claim 6, wherein the sodium hydroxide is about 1.82% to about 7.28%.

Claim 7 is not rendered obvious by Okano because Claim 7 depends from Claim 6, which in turn depends from independent Claim 1, which is non-obvious. *In re Fine*, 837 F.2d at 1076.

**G. Claim 8 Is Not Rendered Obvious Pursuant to Ground 3**

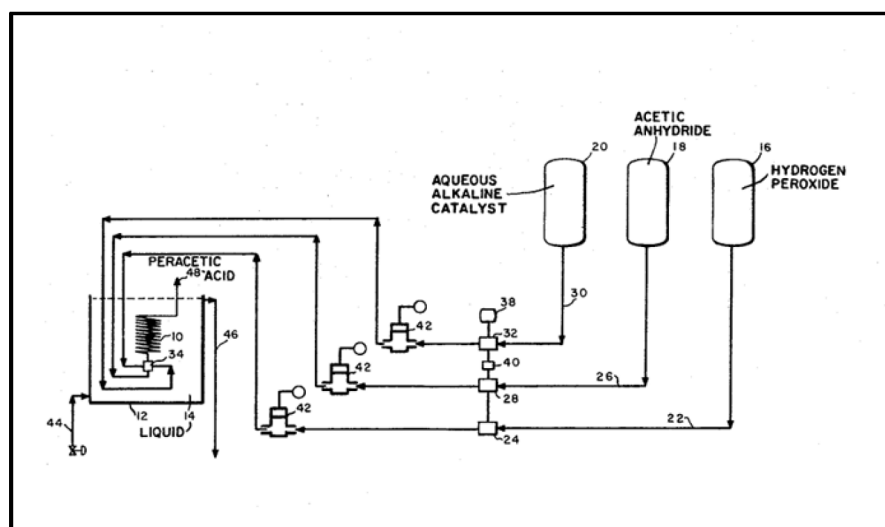
8. The method of claim 1, wherein step (d) is performed simultaneously with step (b).

Claim 8 is not rendered obvious in view of the combination of Okano and Oringer because Claim 8 depends from independent Claim 1, which is non-obvious. *In re Fine*, 837 F.2d at 1076.

In addition, Okano does not disclose the additional element required by Claim 8: simultaneous addition of an alkali metal or earth alkali metal hydroxide and a hydrogen peroxide-triacetin solution to water. Paragraphs [0057] and [0059] of Okano, cited by Petitioner, clearly show stepwise addition: “50 g of triacetin ... and ... 25 g of [60%] hydrogen peroxide ... were mixed with 850 g of ion exchanged water, 75 g of an alkaline aqueous solution containing 27% sodium

hydroxide and 1.3% of organic phosphonic acid ... was poured in, and this was then mixed and stirred for 5 minutes.” (Exhibit 1005 at [0057].)

Petitioner cites Oringer for the additional element of simultaneous addition, but Okano is not compatible with the disclosures of Oringer. Okano is directed to a process that is superficially similar to the one claimed in the instant application. Oringer, in contrast, is an older patent directed to a much harsher process for the production of peracetic acid: rather than sodium hydroxide and triacetin, the Oringer process employs acetic anhydride and aqueous ammonium hydroxide in a tubular reactor at 80-140 °F, yielding much harsher reaction conditions. (Exhibit 1007, Abstract at 1:14-21 and Figure.) In fact, Oringer shares only one reagent in common with the instantly-claimed reaction: hydrogen peroxide. Otherwise, the reaction and reaction conditions of Oringer are completely different.



(*Id.*, Figure.)

There is no teaching or suggestion in Okano to render the process continuous, and there is no teaching or suggestion in Oringer to use either triacetin or sodium hydroxide. A skilled artisan would not look to the disclosures of Oringer, concerning an older, harsher process with different reagents, to modify the method of Okano. *See Immunex Corp.*, 964 F.3d at 1067 (affirming that there was no motivation to combine where “a [skilled artisan] would be dissuaded from selecting or combining the components as claimed.”). However, even if they did so, neither Okano nor Oringer provide the guidance that a skilled artisan would require in order to modify the device of Oringer to use sodium hydroxide and triacetin rather than ammonium hydroxide and acetic anhydride. Acetic anhydride is a very different reagent than triacetin and would require different reaction conditions relative to triacetin. Modifying the device of Oringer to replace two of the three reagents with different reagents requiring different reaction conditions is a task well beyond the realm of routine experimentation.

As such, Claim 8 is not obvious in light of Okano and Oringer, nor in light of any other cited reference.

#### **H. Claim 9 Is Not Rendered Obvious Pursuant to Ground 1**

9. The method of claim 1, further comprising allowing the reaction medium sufficient time to maximize the conversion of the hydrogen peroxide triacetin into peracetic acid.

Claim 9 is not rendered obvious by Okano because Claim 9 depends from independent Claim 1, which is non-obvious. *In re Fine*, 837 F.2d at 1076.

**I. Claim 10 Is Not Rendered Obvious Pursuant to Ground 1**

10. The method of claim 9, wherein the time to maximize the conversion of the hydrogen peroxide triacetin into peracetic acid is about 30 seconds to about five minutes.

Claim 10 is not rendered obvious by Okano because Claim 10 depends from Claim 9, which in turn depends from independent Claim 1, which is non-obvious. *In re Fine*, 837 F.2d at 1076.

**J. Claim 11 Is Not Rendered Obvious Pursuant to Ground 1**

11. The method of claim 10, further comprising, after step (e), a step of sampling the reaction medium to determine the time required to maximize the amount of hydrogen peroxide triacetin that are converted into peracetic acid.

Claim 11 is not rendered obvious by Okano because Claim 11 depends from Claim 10, which in turn depends from Claim 9, which then depends from independent Claim 1, which is non-obvious. *In re Fine*, 837 F.2d at 1076.

In addition, Petitioner does not identify any portion of Okano that teaches this step and instead relies solely on conclusory expert argumentation as to what a POSITA would have known and would have done. This should be entitled to no weight. *See Xerox Corp.*, IPR2022-00624, Paper No., 9 at 15; *see also Star S.A. - Indústria De Implementos Agrícolas v. Agco Corp.*, IPR2024-01459, Paper 12 at

32-33 (Mar. 25, 2025). As discussed above, however, Petitioner never defined what qualifications a POSITA might have, rendering these arguments meaningless. For this additional reason, Petitioner fails to prove that Claim 11 is obvious in light of Okano.

**K. Claim 12 Is Not Rendered Obvious Pursuant to Ground 1**

12. The method of claim 9, wherein and the percent of triacetin that is converted into peracetic acid is about 40.9% to about 85.7%.

Claim 12 is not rendered obvious by Okano because Claim 12 depends from Claim 9, which in turn depends from independent Claim 1, which is non-obvious. *In re Fine*, 837 F.2d at 1076.

Additionally, Petitioner has failed to demonstrate that a triacetin conversion of about 40.9% to about 85.7% is reflected in Okano, as alleged. Okano does not discuss anywhere the conversion of triacetin. As such, Petitioner seeks to estimate the conversion of triacetin by (i) calculating the moles of hydrogen peroxide consumed between the beginning of the reaction and the isolation of the final cleaning solution; (ii) assuming that every consumed hydrogen peroxide molecule consumed one triacetin ester group and formed one molecule of peracetic acid, and (iii) calculating the resulting alleged triacetin conversion on this basis.

The issue with this argument stems from step (ii). Hydrogen peroxide is a notoriously unstable molecule even when stored alone at low temperatures. When

used in a reaction mixture comprising sodium hydroxide, three separate acids, triacetin, and mixing equipment, a skilled artisan would expect more rapid decomposition of this peroxide. Additionally, hydrogen peroxide is known to react with 1,2,3-propanetriol, which is present in the reaction mixture as a byproduct.

As such, it is not possible to calculate the triacetin conversion based only on the hydrogen peroxide conversion. The amount calculated by the Petitioner — 57% — is the *maximum* amount of triacetin conversion that could be expected, if one assumes that every single molecule of hydrogen peroxide generated one molecule of peracetic acid, and none of the hydrogen peroxide decomposed or engaged in any side reactions, such as the oxidation of 1,2,3-propanetriol.

Given that the maximum possible triacetin conversion based on Petitioner's own calculations is only slightly above the 40.7% conversion required by Claim 12, it is very likely that the actual conversion of triacetin is well below this threshold. It is simply not possible to know the triacetin conversion based on the information provided by Okano. As such, Okano cannot render obvious the subject matter of Claim 12.

**L. Claim 13 Is Not Rendered Obvious Pursuant to Ground 1**

13. The method of claim 7, wherein the mole ratio of the sodium hydroxide to the hydrogen peroxide to the triacetin is about 4.2:3.8:1.

Claim 13 is not rendered obvious by Okano because Claim 13 depends from Claim 7, which depends from Claim 6, which in turn depends from independent Claim 1, which is non-obvious. *In re Fine*, 837 F.2d at 1076.

In addition, Okano does not teach the limitation of Claim 13. In an attempt to show that this claim is taught by Okano, Petitioner performs theoretical calculations as to what percentage of these compositions would be present *after* the reaction is completed. This is incorrect; Claim 1 discloses the presence of these compositions *before* the reaction has begun, and nothing in Claims 1 and 13 indicate that the molar ratios should be calculated to determine the volumes and molar ratio of these materials existing after the solution is fully reacted. When the calculation is properly performed for the amounts of these compositions present at the start of the reaction, the math is different:

| Component                                   | Grams | Moles | Mole Ratio |
|---------------------------------------------|-------|-------|------------|
| Sodium Hydroxide<br>(75 g of 27% solution)  | 20.25 | 0.506 | 2.21       |
| Hydrogen Peroxide<br>(25 g of 60% solution) | 15    | 0.441 | 1.93       |
| Triacetin<br>(50 g of 100% solution)        | 50    | 0.229 | 1          |

When properly calculated, therefore, the disclosure of [57] of Okano does not teach a mole ratio of sodium hydroxide to hydrogen peroxide to triacetin of 4.2:3.8:1.

Furthermore, in addition to the general teaching-away discussed above for Claim 1, Okano actively teaches away from the ratio required by Claim 13. Claim 13 requires a 3.8:1 ratio of hydrogen peroxide to triacetin. A balanced stoichiometric reaction would have three moles of peroxide for each mole of triacetin; as such, Claim 13 requires a significant 0.8 mol excess of hydrogen peroxide. Okano, however, notes in paragraph [0035] that “the molar ratio of [hydrogen peroxide] per ester group of [triacetin] is preferably mole increased by a factor of 2 or less, and particularly preferably mole increased by a factor of 0.3 to 2, from the viewpoints of efficiently generating an organic peracid and reducing unreacted hydrogen peroxide.” (Exhibit 1005 at [0035].) Furthermore, Okano notes that hydrogen peroxide should be “preferably 0.2 wt% or less.” (*Id.* at [0023].) Given these statements, a skilled artisan would seek to minimize the amount of unreacted hydrogen peroxide remaining in the reaction by using an equimolar (*i.e.*, 3:1) ratio of peroxide to triacetin or would perhaps even use an excess of triacetin (*i.e.*, a less-than 3:1 ratio). A skilled artisan certainly would not use a 3.8:1 ratio, as

required by Claim 13. As such, Claim 13 is not obvious in light of the disclosures of Okano.

**M. Claims 14 and 15 Are Not Rendered Obvious Pursuant to Ground 1 or 2**

14. The method of claim 1, wherein steps (a) through (e) are performed on a continuous basis.

15. The method of claim 1, wherein steps (a) through (e) are performed on an intermittent basis.

***1. Ground 1: Claims 14 and 15 are not rendered obvious by Okano.***

Claim 14 is not rendered obvious by Okano because Claim 14 depends from independent Claim 1, which is non-obvious. *In re Fine*, 837 F.2d at 1076.

In addition, Claim 14, which claims that the steps of Claim 1 are performed on a continuous basis, is not disclosed by Okano. Petitioner bases its conclusion that Okano is performed on a continuous basis not on a disclosure in the patent to that effect, but rather because “there would be high demand” for the product taught by Okano, so it would certainly be performed continuously and be automated. But Okano simply does not disclose this; the sole disclosure relied upon by Petitioner, Paragraph 57, teaches that the reaction taught in steps (a) through (e) of Claim 1 is immediately halted after five minutes by the addition of acid to the mixture. The process is not, therefore, performed continuously; as disclosed by Okano, the

process is started, run for 15 minutes, and then stopped. (*Id.*). Because Okano does not teach a continuous process, Claim 14 is not rendered obvious by Okano.

This point is apparently conceded by Petitioner when it argues next that the same paragraph of Okano renders obvious Claim 15, which calls for the steps to be performed on an intermittent basis. Because Petitioner has disingenuously argued that the same claim element that purportedly teaches that Claim 1 is performed on an intermittent basis as required by Claim 15, also teaches that Claim 1 is performed on a continuous basis as required by Claim 14, Petitioner should not be allowed to argue that *either* of the claims are rendered obvious by Okano.

***2. Ground 2: Claims 14 and 15 are not rendered obvious in view of the combination of Okano and Withenshaw.***

Claims 14 and 15 are not rendered obvious by Okano because Claims 14 and 15 depend from independent Claim 1, which is non-obvious. *In re Fine*, 837 F.2d at 1076.

Nor are these claims rendered obvious because there is no motivation to combine Okano and Withenshaw as discussed *supra* under Claim 1. Thus, the combination of Okano and Withenshaw cannot render obvious Claims 14 and 15 of the '449 Patent.

**N. Claim 16 is Not Rendered Obvious Pursuant to Ground 1 or 2**

**16.** The method of claim 1, wherein the peracetic acid solution is for immediate use.

Claim 16 is not rendered obvious by Okano because Claim 16 depends from independent Claim 1, which is non-obvious. *In re Fine*, 837 F.2d at 1076.

Moreover, Petitioner alleges that this claim element is taught because the specification references a hydrogen peroxide content achieved “*immediately* after preparation of the composition.” (Petition, Paper 2 at 49 (emphasis original).) But this does not teach that the solution itself is “for immediate use.” Rather, the remainder of the sentence partially quoted by Petitioner makes clear that the solution is *not* for immediate use: “This hydrogen peroxide content is preferably achieved immediately after the preparation of the composition, *and even more so at the time of use.*” (Exhibit 1005 at [0023] (emphasis added).) The time of use is, based on contextual clues, clearly *later* than the time at which the composition is first created, and therefore, Claim 16 is not taught by the reference disclosed by Petitioner. Petitioner’s failure to identify any teaching of this element of the claim is fatal to its assertion because, in reviewing the Petition, the Director and the Board are limited to the arguments raised by Petitioner in the Petition, and, as stated by the Board in the underlying *inter partes* review, “failure to direct [the Board] to evidence sufficient to establish” obviousness of a claim will mean that

such an argument is not properly before the Director and the Board. *AMP Plus, Inc.*, 131 F.4th at 1323-24. “[T]he law of obviousness does not require the court, or the Board, to develop arguments for a limitation that the petition simply did not make.” *Id.* at 1325.

**O. Claim 17 Is Not Rendered Obvious Pursuant to Ground 1**

17. The method of claim 1, further comprising, after step (e), a step of adding a source of acid to stabilize the non-equilibrium solution of peracetic acid for storing and using throughout a working day.

Claim 17 is not rendered obvious by Okano because Claim 17 depends from independent Claim 1, which is non-obvious. *In re Fine*, 837 F.2d at 1076.

**P. Claim 18 Is Not Rendered Obvious Pursuant to Ground 1 or 2**

18. The method of claim 1, wherein the peracetic acid solution is prepared on a site having a point-of-use.

Claim 18 is not rendered obvious by Okano because Claim 18 depends from independent Claim 1, which is non-obvious. *In re Fine*, 837 F.2d at 1076.

This claim suffers from the same issue as Claim 16: it is supported by Petitioner's misleading citation to only half of a sentence from the Okano specification, when the whole sentence makes clear that immediate use is not disclosed: “This hydrogen peroxide content is preferably achieved immediately after the preparation of the composition, *and even more so at the time of use.*” (Exhibit 1005 at [0023] (emphasis added).) The time of use is, based on contextual

clues, clearly *later* than the time at which the composition is first created, and the cited portion of Okano does not disclose immediate preparation and use on a site having a point-of-use. Petitioner has, therefore, failed to show that Okano renders this claim obvious. *AMP Plus, Inc.*, 131 F.4th at 1325 (“the law of obviousness does not require the court, or the Board, to develop arguments for a limitation that the petition simply did not make.”).

**Q. Claim 19 Is Not Rendered Obvious Pursuant to Ground 1**

19. The method of claim 2, wherein the liquid is triacetin defining a hydrogen peroxide-triacetin solution.

Claim 19 is not rendered obvious by Okano because Claim 19 depends from Claim 2, which depends from independent Claim 1, which is non-obvious. *In re Fine*, 837 F.2d at 1076.

**R. Claim 20 Is Not Rendered Obvious Pursuant to Ground 1**

20. The method of claim 19, wherein the hydrogen peroxide-triacetin solution has a mole ratio of hydrogen peroxide to triacetin of about 2.98:1 to about 12.84:1.

Claim 20 is not rendered obvious by Okano because Claim 20 depends from Claim 19, which depends from Claim 2, which in turn depends from independent Claim 1, which is non-obvious. *In re Fine*, 837 F.2d at 1076.

In addition, for the same reasons discussed *supra* with regard to Claim 3, Okano does not enable a range that overlaps with that of Claim 19 and therefore does not render Claim 19 obvious.

**S. Claim 21 Is Not Rendered Obvious Pursuant to Ground 1**

**21.** The method of claim 19, wherein the aqueous source of the alkali metal or earth alkali metal hydroxide is sodium hydroxide.

Claim 21 is not rendered obvious by Okano because Claim 21 depends from Claim 19, which depends from Claim 2, which in turn depends from independent Claim 1, which is non-obvious. *In re Fine*, 837 F.2d at 1076.

**T. Claim 22 Is Not Rendered Obvious Pursuant to Ground 1**

**22.** The method of claim 21, wherein the sodium hydroxide is about 1.82% to about 7.28%.

Claim 22 is not rendered obvious by Okano because Claim 2 depends from Claim 21, which depends from Claim 19, which depends from Claim 2, which in turn depends from independent Claim 1, which is non-obvious. *In re Fine*, 837 F.2d at 1076.

**VIII. CONCLUSION**

There are multiple bases to deny this Petition, in addition to those outlined in the Discretionary Denial Brief (Paper 10). First, Petitioner has failed to comply with the requirements of 37 C.F.R. § 42.104(b)(3), which alone is a sufficient basis for denial of institution. Second, Petitioner has failed to make a single complete

argument of obviousness because it fails to include a definition of a POSITA, an essential element for such an analysis. And finally, when interpreted consistently with Petitioner's own proposed constructions, none of the references identified by Petitioner contain all of the elements of Claim 1 of the '449 Patent, and therefore these references fail to render obvious any of the claims of the '449 Patent. Because Petitioner has failed to meet the "reasonable likelihood of success" standard that any of the claims of the '449 Patent are unpatentable, for this additional reason, denial of institution is proper. Enviro Tech, therefore, respectfully requests that the Director deny institution of *Inter Partes* Review of the '449 Patent.

Dated: December 18, 2025

*Respectfully Submitted,*

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**CERTIFICATION OF WORD COUNT**

This Petition complies with the type-volume limitations as mandated in 37 C.F.R. § 42.24, totaling 10,543 words. Counsel has relied upon the word count feature provided by Microsoft Word.

Dated: December 18, 2025

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**CERTIFICATE OF SERVICE**

The undersigned hereby certifies that the foregoing ***Patent Owner's Preliminary Response*** was served via electronic mail, per agreement of the parties, in its entirety, on Petitioner's attorneys of record in IPR2025-01472 on the date indicated below.

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