

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CLEAN CHEMISTRY, INC.,

Petitioner,

v.

ENVIRO TECH CHEMICAL SERVICES, INC.,

Patent Owner.

Case IPR2025-01471

Patent 9,363,997

PATENT OWNER'S PRELIMINARY RESPONSE.

TABLE OF CONTENTS

	Page
I. INTRODUCTION	1
II. BACKGROUND	2
A. Technology Overview of the 8,546,449 Patent Family	2
1. The 8,546,449 Patent Family	2
2. The Prior Art: Equilibrium Solutions of Peracetic Acid	3
3. The Prior Art: Prior Attempts to Create Non-Equilibrium Peracetic Acid Solutions	5
4. The Inventions of the U.S. 8,546,449 Patent Family Solved the Prior Art Problems	6
B. Prosecution History of the '449 Patent	8
C. Prosecution History of the '997 Patent	10
D. Person of Ordinary Skill in the Art	11
III. CLAIM CONSTRUCTION	12
A. Petitioner's Proposed Construction: Order of Steps	12
B. Petitioner's Proposed Construction: All Other Terms	13
IV. ALLEGED PRIOR ART ASSERTED BY PETITIONER.....	15
A. Okano (Translated).....	15
B. Oringer.....	16
C. Withenshaw	16

V.	THE PETITION FAILS TO COMPLY WITH 37 C.F.R. § 42.104(b)(3) AND, PURSUANT TO PRECEDENTIAL PTAB DECISIONS, SHOULD THEREFORE BE DISMISSED.	17
VI.	NO CLAIMS OF THE ’997 PATENT ARE OBVIOUS.....	19
A.	Claim 1 Is Not Rendered Obvious Pursuant to Grounds 1 or 2.....	19
1.	Ground 1: Claim 1 is not rendered obvious by Okano	19
a.	Okano does not teach a “solution” as defined by Petitioner.....	19
b.	Okano teaches away from the invention of the ’997 Patent.	24
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.....	25
B.	Claims 2 and 3 Are Not Rendered Obvious Pursuant to Ground 1	30
C.	Claims 4 and 5 Are Not Rendered Obvious Pursuant to Grounds 1 or 2	32
1.	Ground 1: Claims 4 and 5 are not rendered obvious by Okano	32
2.	Ground 2: Claims 4 and 5 are not rendered obvious in view of the combination of Okano and Withenshaw.....	34
D.	Claim 6 Is Not Rendered Obvious Pursuant to Ground 1	34
E.	Claim 7 Is Not Rendered Obvious Pursuant to Ground 1	34
F.	Claim 8 Is Not Rendered Obvious Pursuant to Ground 3.....	35
G.	Claim 9 Is Not Rendered Obvious Pursuant to Ground 1	37
H.	Claim 10 Is Not Rendered Obvious Pursuant to Ground 1	37

I.	Claim 11 Is Not Rendered Obvious Pursuant to Ground 1	37
J.	Claim 12 Is Not Rendered Obvious Pursuant to Ground 1	39
K.	Claim 13 Is Not Rendered Obvious Pursuant to Ground 1 or 2	41
1.	Ground 1: Claim 13 is not rendered obvious by Okano	41
2.	Ground 2: Claim 13 is not rendered obvious in view of the combination of Okano and Withenshaw	42
L.	Claim 14 Is Not Rendered Obvious Pursuant to Ground 1 or 2	43
1.	Ground 1: Claim 14 is not rendered obvious by Okano	43
2.	Ground 2: Claim 14 is not rendered obvious in view of the combination of Okano and Withenshaw	43
VII.	CONCLUSION.....	44

TABLE OF AUTHORITIES

	Page(s)
Cases	
<i>AMP Plus, Inc. v. DMF, Inc.</i> , 131 F.4th 1320 (Fed. Cir. 2025)	24, 32
<i>Arctic Cat Inc. v. Bombardier Rec. Prods.</i> , 131 F.4th 1320 (Fed. Cir. 2025)	25, 29
<i>Immunex Corp. v. Sandoz Inc.</i> , 964 F.3d 1049 (Fed. Cir. 2020)	30, 36
<i>In re Fine</i> , 837 F.2d 1071 (Fed. Cir. 1988)	30, 32, 34, 35, 37, 39, 41-43
<i>KSR Int'l Co. v. Teleflex Inc.</i> , 550 U.S. 398 (2007)	25, 26, 29
<i>Rembrandt Wireless Techs., LP v. Samsung Elecs. Co.</i> , 853 F.3d 1370 (Fed. Cir. 2017)	30
<i>Revvo Techs., Inc. v. Cerebrum Sensor Techs., Inc.</i> , IPR2025-00632, Paper 20 (Nov. 3, 2025) (precedential)	17-18, 23
<i>Tris Pharma, Inc. v. Actavis Lab'ys. FL, Inc.</i> , 2022 U.S.P.Q.2d 627 (Fed. Cir. 2022)	26
Regulations	
37 C.F.R. § 42.104(b)(3)	2, 17, 19, 21 n.4, 44
Other Authority	
M.P.E.P. § 609.02 (Ninth ed., Rev. 01.2024)	8 n.2, 10

UPDATED EXHIBIT LIST		
2001	<i>Pro Hac Vice</i> Declaration of Ann G. Fort	10/27/2025
2002	<i>Enviro Tech v. Clean Chemistry</i> Complaint (Docket No. 1)	11/3/2025
2003	<i>Enviro Tech v. Clean Chemistry</i> Scheduling Order (Docket No. 22)	11/3/2025
2004	March 24, 2025 PTAB Memo On IPR Proceedings	11/3/2025
2005	March 26, 2025 PTAB Memo on Interim Processes	11/3/2025
2006	Docket Navigator: Motion Success for Stay Pending IPR	11/3/2025
2007	Docket Navigator: Time to Trial	11/3/2025
2008	<i>Enviro Tech v. Clean Chemistry</i> Preliminary Invalidity Contentions	11/3/2025
2009	Bankofsky LinkedIn Profile	11/3/2025
2010	Declaration of Joseph Donabed	11/3/2025
2011	Wiseman LinkedIn Profile	11/3/2025
2012	WO2024108086A1	11/3/2025
2013	WO2024238884A1	11/3/2025
2014	Clean Chemistry Google Patent Search, Page 1	11/3/2025
2015	Interim Director Discretionary Process (Oct. 3, 2025)	11/3/2025
2016	FAQs for Interim Processes	11/3/2025
2017	<i>Pro Hac Vice</i> Declaration of Jennifer R. Sandlin	11/12/2025

Case IPR2025-01471
Patent 9,363,997
Patent Owner's Preliminary Response

2018	U.S. Patent No. 8,546,449 Office Action (April 1, 2013)	Presently Submitted
2019	U.S. Patent No. 8,546,449 Notice of Allowance (July 15, 2013)	Presently Submitted
2020	<i>Enviro Tech v. Clean Chemistry</i> Declaration of Gregory T. Whiteker, Ph.D. (Exhibit E to Docket No. 35)	Presently Submitted
2021	<i>Enviro Tech v. Clean Chemistry</i> Claim Construction Order (Docket No. 47)	Presently Submitted
2022	<i>Enviro Tech v. Clean Chemistry</i> Clean Chemistry's Opening Claim Construction Brief (Docket No. 34)	Presently Submitted
2023	<i>Enviro Tech v. Clean Chemistry</i> Declaration by Dr. Alexander M. Klibanov in Support of Clean Chemistry's Opening Claim Construction Brief (Exhibit 09 to Docket No. 34)	Presently Submitted
2024	Declaration of Gregory T/ Whiteker, Ph.D. Regarding the Proposed Combination of Okano and Withenshaw	Presently Submitted

I. INTRODUCTION

This Petition should be denied, both on the basis of the compelling grounds for discretionary denial briefed in Paper 9, 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).¹ 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.

Moreover, all the expert testimony in the world cannot overcome the fact that the only way that Petitioner can claim that the prior art invalidates the claims of U.S. Patent No. 9,363,997 (the “’997 Patent”) is to directly contradict this same

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

expert's testimony in the parallel district court litigation and in co-pending IPR2025-01459. As a result, Petitioner fails to show that any of the prior art teaches all of the claimed elements of the method taught by the '997 Patent. Because the Petition, therefore, does not have a "reasonable likelihood of success" of establishing that at least one of the claims of the '997 Patent is unpatentable, institution should be denied. 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

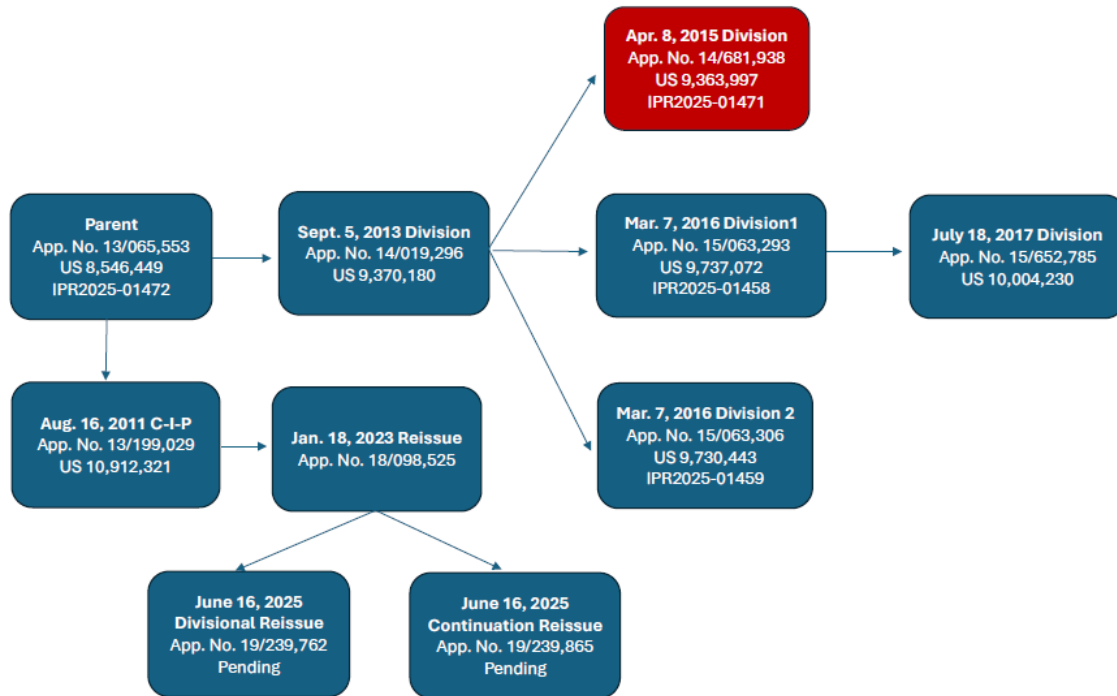
A. Technology Overview of the 8,546,449 Patent Family

1. The 8,546,449 Patent Family

The '997 Patent is a part 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. U.S. Patent No. 8,546,449 (the "'449 Patent"), the parent patent, was subject to a restriction requirement during prosecution and, as a result, multiple divisional applications and a continuation-in-part application followed. The '449 Patent is itself the subject of IPR2025-01472, and two other divisional patents, U.S. Patent No. 9,737,072 (the "'072 Patent") and U.S. Patent No. 9,730,443 (the "'443 Patent") are also presently facing their own

IPRs, IPR2025-01458 and -01459, 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, '997 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 1:34-50.) 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 1:51-57.)

Second, the vast amount of inert ingredients needed to stabilize the PAA also increases the cost of the solution. (*Id.* at 1:57-63.)

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 1:63-67.) 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 1:38-40; 1:67-2:3.) 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.* at 2:1-5.)

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 1:46-50.) 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 2:5-9). 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 2:9-16.)

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 2:21-23.) 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 2:23-38.) 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 2:39-52.) 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 2:53-3:22.) 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 3:23-4:46.)

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 5:17-27.) 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 5:27-37.) 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 6:45-63.) 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

Because the '997 Patent descends from the '449 Patent and U.S. Patent No. 9,370,180 (the "'180 Patent") and expressly "incorporates both applications by reference in their entirety," the prosecution history of both parent patents is relevant to the '997 Patent. The prosecution history of the '180 Patent, however, is largely unremarkable; it noted that the single piece of art cited by the examiner was not prior art and issued following a restriction requirement.

The '449 Patent prosecution history, however, provides greater insight as to the key aspects of the inventions of the 8,546,449 Patent Family. As an initial matter, it is important to note that the '449 Patent and, by extension, its progeny²

² M.P.E.P. § 609.02 (Ninth ed., Rev. 01.2024) states that "[t]he examiner will consider information which has been considered by the Office in a parent

peremptorily discusses thirteen prior art references in the “Background of the Invention,” and the ’449 Patent 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 2002**, *Enviro Tech v. Clean Chemistry* Complaint at Exhibit E, ’449 Patent.) 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 2018**, ’449 Patent Office Action at 7, 8.) 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.” (**Exhibit 2019**, ’449 Patent Notice of Allowance at 9.)

application [] when examining: ... (B) a divisional application filed under 37 CFR 1.53(b)... . . . A listing of the information need not be resubmitted in the continuing application unless the applicant desires the information to be printed on the patent.”

C. Prosecution History of the '997 Patent

Following the restriction requirement limiting the scope of the claims of the '449 Patent, Enviro Tech filed a divisional application that led to U.S. Patent No. 9,370,180, which then led to three additional divisional applications, including the application that matured to become the '997 Patent. The '997 Patent prosecution history is unremarkable. The only office actions raised a double patenting rejection (Exhibit 1002 at 87-92, 136-140), Enviro Tech filed a terminal disclaimer as to the '449 Patent (the basis for the double patenting rejection) (*id.* at 98-100), and the application was allowed (*id.* at 146-152), noting that “[c]laims 1-14 are 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 composition has not been found.”

Although no IDS was filed during prosecution, pursuant to standard USPTO protocol, the Examiner will consider the art that was submitted in the IDS of the parent application, which, as discussed above, includes 25 patents and five non-patent references, thirteen of which were expressly discussed in the “Background of the Invention” of the '997 Patent. *See* M.P.E.P. § 609.02 (Ninth ed., Rev. 01.2024).

D. Person of Ordinary Skill in the Art

Petitioner proposes that a person of ordinary skill in the art (“POSITA”) would be of relatively low skill level, having only a bachelor’s degree in chemistry or chemical engineering and two or more years of experience. (Petition, Paper 2 at 11.) This is inconsistent with the level of skill in the art defined by the USPTO during prosecution of the parent patent, the ’449 Patent, which defined the level of skill in the art as “high.” (**Exhibit 2018**, ’449 Patent Office Action at 7.) 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 2020, 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 Chemical Services, 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 2020**, Declaration of Dr. Whiteker at ¶ 35.) Enviro Tech's expert further supported this position with citations to the '449 and '997 Patent specifications in support of its construction, contradicting that of Petitioner. (*Id.* at ¶¶ 36-39.) The District Court found that variability in the order of the steps was permitted, as follows:

Arrangement; order of steps ('997 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 2021**, Claim Construction Order at Term #2.)

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 13.) 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 '997 Patent – other than the "Order of Steps" construction discussed above – are as follows:

“[a] nonequilibrium solution [of peracetic acid]” (Claim 1)	Indefinite; otherwise plain and ordinary meaning, but includes irreversibility.
“about [a numerical value]” (Claims 7, 10-12)	Indefinite.
“allowing the reaction medium sufficient time to maximize the conversion of the hydrogen peroxide and the 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.
“the time to maximize the conversion of the hydrogen peroxide and the triacetin into peracetic acid is about 30 seconds to about five minutes.” (Claim 10)	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.”
“The percent of triacetin that is converted into peracetic acid is about 40.9% to about 85.7% (Claim 11)	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."
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(**Exhibit 2022** at 17, 19, 22, 25, 30; **Exhibit 2021** at Term #3, 4, 7, 9, 10.³) 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 ration 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.)

³ 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.

B. Oringer

U.S. Patent No. 3,432,546 (“Oringer”) was specifically discussed in the '997 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 3:63-4:13.)

C. Withenshaw

WO 01/46519 (“Withenshaw”) was expressly discussed in the '997 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 4:28-46.) Withenshaw does not teach the use of triacetin. (*Id.*)

V. THE PETITION FAILS TO COMPLY WITH 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 Technologies*:

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.

Because Petitioner failed to comply with Rule 42.104(b)(3) when it adopted Enviro Tech's broader claim construction proposals, institution should be denied.

VI. NO CLAIMS OF THE '997 PATENT ARE OBVIOUS.

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

1. Ground 1: Claim 1 is not rendered obvious by Okano

a. Okano does not teach a "solution" as defined by Petitioner.

Petitioner contends that Okano teaches every element of Claim 1 ("Ground 1"), but, applying Petitioner's own construction from the District Court Case and other IPRs, it does not.

Claim 1 is directed to a "method of generating a non-equilibrium *solution* of peracetic acid, comprising: (a) providing water; (b) introducing triacetin and aqueous hydrogen peroxide to the water; (c) mixing the triacetin and the aqueous hydrogen peroxide with the water to form a mixture; (d) adding an aqueous source of an alkali metal or earth alkali metal hydroxide to the mixture; and (e) forming a reaction medium comprising a non-equilibrium *solution* of peracetic acid."

(Exhibit 1001 at 34:48-58 (emphasis added).) Using Petitioner's own construction, proffered elsewhere, but not here, Okano does not teach a "solution."

According to Petitioner, when construing the phrase “a non-equilibrium solution of peracetic acid,” a “solution” only exists when listed ingredients have been adequately mixed to become homogeneous:

...the term “solution” would be interpreted by a POSA, having the benefit of the specification of the '443 Patent and its file history, as a liquid in a homogeneous state, as distinct from heterogeneous mixtures of substances and from the listed components standing alone and not in an admixture with one another. Without being brought together as a combination, components a. through f. of the claim would be substances standing alone. But if brought together, they exist as a mixture that is either heterogeneous or homogeneous if in a liquid state. Once a homogeneous mixture, they would be a solution, as the claim term “solution” would be understood by a POSA reading the '443 Patent in the context of its specification and file history. To disregard the words in the preamble would be to disregard any requirement that the individual components in the list of ingredients have been brought together to form a mixture or a combination, which would be a non-sensical result. . . .

(**Exhibit 2023**, Klibanov Declaration at ¶ 78.)⁴ Similarly, in the co-pending case IPR2025-01459, Petitioner discusses “Okano 1,” U.S. Patent No. 7,919,122, which

⁴ 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

has a specification and disclosures similar to that of the presently discussed Okano. 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. Exhibit 1010, col. 30, lines 28-30, col. 48, lines 41-44.

(IPR2025-01459, Petition, Paper 2 at 36.) 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:

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.

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

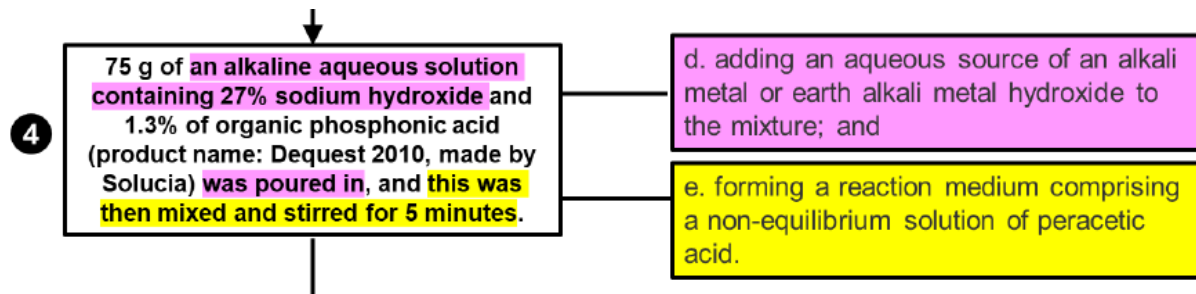
Deionized water was added to the components (A) and (B), organic phosphonic acid (trade name: Dequest 2010, manufactured by Solutia Japan Ltd.) and an alkaline pH adjusting agent in the amounts shown in Table 23, to adjust the total weight of the mixture to 100 g (first step). This mixture was mixed 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.

The blue highlighting in each of the Examples from Okano 1 identifies references to mixing the mixture prior to the point identified by Petitioner as describing when the mixture has been “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 '997 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 23.) 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 '997 Patent. This should, consistent with *Revvo Technologies*, 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.

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 ’997 Patent.

b. Okano teaches away from the invention of the ’997 Patent.

One of the novel features of the invention of the ’997 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 '997 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 '997 Patent. There must be "a reason" for a skilled artisan to "combine the elements in the way the 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 '997 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 Lab'ys. FL, Inc.*, 2022 USPQ.2d 627 (Fed. Cir. 2022). There must be “a reason” for a skilled artisan to “combine the elements in the way the new invention does.” *KSR Int'l Co.*, 550 U.S. at 418.

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 53), 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 '997 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 2024**, 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 and would likely render it inoperable. TAED is a solid, which 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 8:18, 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 2024** ¶ 16.)

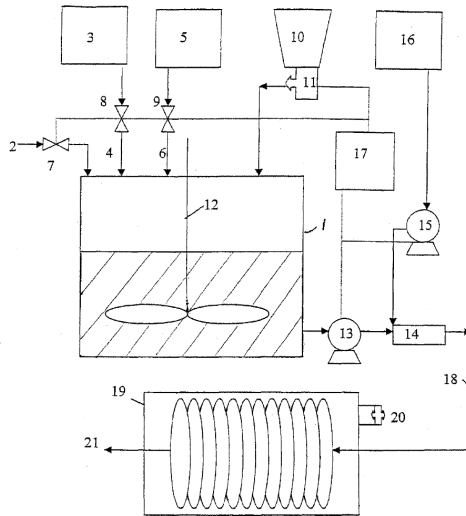


Figure 1

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 2024 ¶¶ 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 2024 ¶ 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 2024 ¶ 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 2024 ¶ 18.**) 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 ’997 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.”)

Because there is no motivation to combine Okano and Withenshaw, the combination of Okano and Withenshaw cannot render obvious the claims of the '997 Patent.

B. Claims 2 and 3 Are Not Rendered Obvious Pursuant to Ground 1

Claims 2 and 3 are not rendered obvious by Okano because Claims 2 and 3 depend 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.”).

In addition, Claims 2 and 3 are not rendered obvious by Okano because Okano does not disclose how the triacetin and aqueous hydrogen peroxide are added to water in the method taught in Claim 1. Petitioner first argues that triacetin and aqueous hydrogen peroxide are added to water simultaneously in light of the

existence of a “First Composition” mixture that includes triacetin, hydrogen peroxide, and water, as well as other possible components. (Petition, Paper 2 at 31-35.) It appears to be Petitioner’s position that the contents of the “First Composition” are added to the water in the step taught by Claim 1(b), and therefore those ingredients are added simultaneously. Petitioner’s argument is flawed because Petitioner fails to cite to any portion of Okano that teaches the addition of the First Composition to water. Moreover, because the First Composition itself includes water, it would seem that the triacetin and hydrogen peroxide are first introduced to water during the creation of the First Composition, and Petitioner provides no support to show whether the triacetin and hydrogen peroxide are first introduced to water in a simultaneous (Claim 2) or sequential (Claim 3) manner.

Similarly, Petitioner argues that it would have been clear to a POSA that the triacetin and hydrogen peroxide referenced in the Preparation of Sterilizing Cleaner Composition (I) ([57]) “could be introduced into the water sequentially, with either one first.” (Petition, Paper 2 at 36.) But Petitioner does not explain why the triacetin and hydrogen peroxide are introduced to the water sequentially, and not simultaneously.

The reality is that Okano is silent as to how the hydrogen peroxide and triacetin are introduced to water, whether it is the introduction of these components to water in the First Composition or in the Sterilizing Cleaner Composition, and Petitioner fails to show that either a sequential or a simultaneous introduction are taught. Because it has not done so, Okano cannot render Claims 2 or 3 obvious. *AMP Plus*, 131 F.4th at 1325 (“[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.”).

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

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 '997 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, however, 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 36.) 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 37.) 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 '997 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”). (*Id.* 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 discloses that element. 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 '997 Patent.

D. Claim 6 Is Not Rendered Obvious Pursuant to Ground 1

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.

E. Claim 7 Is Not Rendered Obvious Pursuant to Ground 1

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.

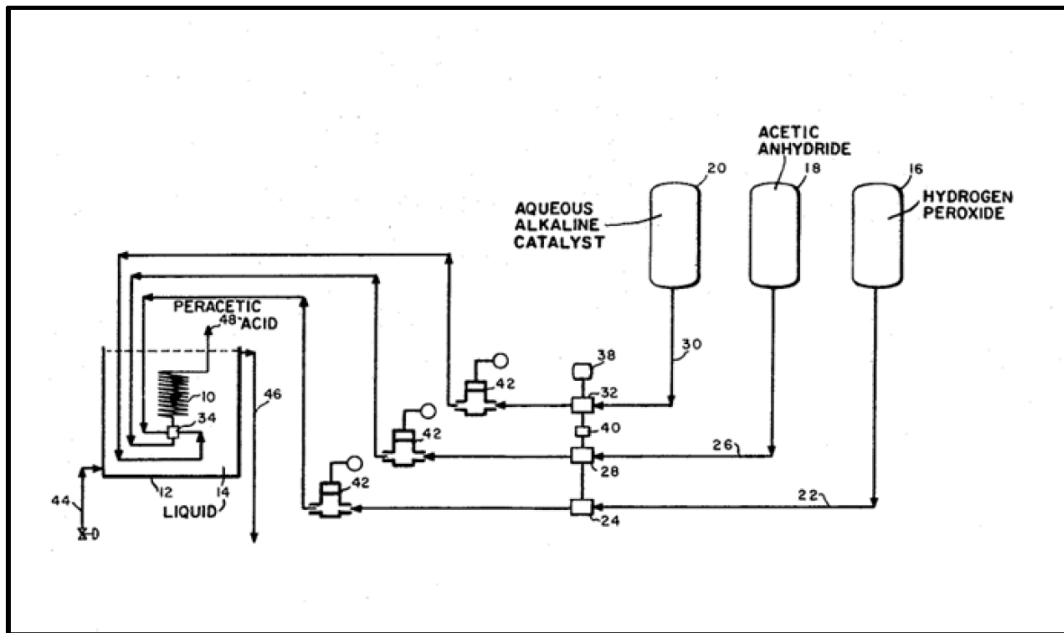
F. Claim 8 Is Not Rendered Obvious Pursuant to Ground 3

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 sodium hydroxide, hydrogen peroxide, and triacetin. 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 do

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.

G. Claim 9 Is Not Rendered Obvious Pursuant to Ground 1

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.

H. Claim 10 Is Not Rendered Obvious Pursuant to Ground 1

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.

I. Claim 11 Is Not Rendered Obvious Pursuant to Ground 1

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.

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 11, 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 11.

J. Claim 12 Is Not Rendered Obvious Pursuant to Ground 1

Claim 12 is not rendered obvious by Okano because Claim 12 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 12. Claim 12 is directed to “the method of claim 6 [wherein the aqueous source of the alkali metal or earth alkali metal hydroxide is sodium hydroxide], wherein the mole ratio of the sodium hydroxide to the hydrogen peroxide to the triacetin is about 4.2:3.8:1.” (Exhibit 1001 at 35:1-3, 17-19.) In an attempt to show that this claim is present in 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, 6, and 12 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 (75 g of 27% solution)	20.25	0.506	2.21
Hydrogen Peroxide (25 g of 60% solution)	15	0.441	1.93
Triacetin (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 12. Claim 12 requires a 3.8:1 ratio of hydrogen peroxide to triacetin. A balanced

stoichiometric reaction would have three mols of peroxide for each mol of triacetin; as such, Claim 12 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 in paragraph [0023] 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 12. As such, Claim 12 is not obvious in light of the disclosures of Okano.

K. Claim 13 Is Not Rendered Obvious Pursuant to Ground 1 or 2

1. Ground 1: Claim 13 is not rendered obvious by Okano

Claim 13 is not rendered obvious by Okano because Claim 13 depends from independent Claim 1, which is non-obvious. *In re Fine*, 837 F.2d at 1076. In addition, Claim 13, 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 7, 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.⁵ 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, this claim is not rendered obvious by Okano.

2. Ground 2: Claim 13 is not rendered obvious in view of the combination of Okano and Withenshaw

Claim 13 is not rendered obvious by Okano because Claim 13 depends from independent Claim 1, which is non-obvious. *In re Fine*, 837 F.2d at 1076. Nor is it rendered obvious because there is no motivation to combine Okano and

⁵ A point apparently conceded by Petitioner when it argues next that the same paragraph of Okano renders obvious Claim 14, which calls for the steps to be performed on an intermittent basis.

Withenshaw as discussed *supra* under Claim 1. Thus, the combination of Okano and Withenshaw cannot render obvious Claim 13 of the '997 Patent.

L. Claim 14 Is Not Rendered Obvious Pursuant to Ground 1 or 2

1. Ground 1: Claim 14 is 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.

Moreover, because Petitioner has disingenuously argued that the same claim element that purportedly teaches that Claim 1 is performed on an intermittent basis herein, also teaches that Claim 1 is performed on a continuous basis as required by Claim 13, Petitioner should not be allowed to argue that *either* of the claims are rendered obvious by Okano.

2. Ground 2: Claim 14 is not rendered obvious in view of the combination of Okano and Withenshaw

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. Nor is it 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 Claim 14 of the '997 Patent.

VII. CONCLUSION

There are two bases to deny this Petition, in addition to those outlined in the Discretionary Denial Brief (Paper 9). 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. And second, when interpreted consistently with Petitioner's proposed construction, none of the references identified by Petitioner contain all of the elements of Claim 1 of the '997 Patent, and therefore these references fail to render obvious the claims of the '997 Patent. Because Petitioner has failed to meet the "reasonable likelihood of success" standard that any of the claims of the '997 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 Claims 1-14 of the '997 Patent.

Dated: December 5, 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 8,993 words. Counsel has relied upon the word count feature provided by Microsoft Word.

Dated: December 5, 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 IPR2025-01471 on the date indicated below.

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