

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

AIR LIQUIDE LARGE INDUSTRIES U.S. LP,
Petitioner,

v.

PRAXAIR TECHNOLOGY, INC.,
Patent Owner.

Case IPR2015-01073
Patent 7,078,011 B2

Before WILLIAM V. SAINDON, CHRISTOPHER L. CRUMBLEY, and
JEFFREY W. ABRAHAM, *Administrative Patent Judges*.

CRUMBLEY, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318 and 37 C.F.R. § 42.73

I. INTRODUCTION

In this *inter partes* review trial, instituted pursuant to 35 U.S.C. § 314, Petitioner Air Liquide Large Industries U.S. LP challenges the patentability of claims 1–3, 7, and 8 of U.S. Patent No. 7,078,011 B2 (“the ’011 patent,” Ex. 1001), owned by Praxair Technology, Inc.

We have jurisdiction under 35 U.S.C. § 6(b). This Final Written Decision, issued pursuant to 35 U.S.C. § 318(a), addresses issues and arguments raised during trial. For the reasons discussed below, we determine that Air Liquide has not proven, by a preponderance of the evidence, that any claim of the ’011 patent is unpatentable.

A. Procedural History

On April 18, 2015, Air Liquide requested an *inter partes* review of claims 1–3, 7, and 8 of the ’011 patent. Paper 1, “Pet.” Praxair filed a Patent Owner Preliminary Response. Paper 10. In a Decision on Institution of *Inter Partes* Review, we instituted trial as to claims 1–3, 7, and 8. Paper 11, “Dec. on Inst.” Trial was instituted on the following grounds of unpatentability:

1. Whether claims 1–3 and 8 are unpatentable under 35 U.S.C. § 103(a) as having been obvious over Yanagihara¹ and Pottier;²

¹ U.S. Patent 4,444,727 (Apr. 24, 1984) (Ex. 1005).

² Pottier, J.D. et al., *Mass Storage of Hydrogen*, PROCEEDINGS OF THE NATO ADVANCED STUDY INSTITUTE ON HYDROGEN ENERGY SYSTEM, UTILIZATION OF HYDROGEN AND FUTURE ASPECTS, (Jan. 1, 1995) (Ex. 1002).

2. Whether claims 1–3 and 8 are unpatentable under 35 U.S.C. § 103(a) as having been obvious over Yanagihara, Pottier, and Scott;³
3. Whether claim 7 is unpatentable under 35 U.S.C. § 103(a) as having been obvious over Yanagihara, Pottier, and Thomas;⁴ and
4. Whether claim 8 is unpatentable under 35 U.S.C. § 103(a) as having been obvious over Yanagihara, Pottier, and Funke.⁵

Dec. on Inst. 16–17.

On the same day, we also instituted two related *inter partes* review trials between Air Liquide and Praxair: in IPR2015-01071, we instituted trial as to 1, 3, and 8 of the '011 patent; and in IPR2015-01072, we instituted trial as to claims 1, 3, 7, and 8 of the '011 patent.

Following institution of trial, Praxair filed a Patent Owner Response (Paper 19, “PO Resp.”), and Air Liquide filed a Reply (Paper 20, “Pet. Reply”).

Air Liquide supported its Petition with the Declaration of Dr. Joe L. Ratigan (Ex. 1007) and the Declaration of Bhadra S. Grover⁶ (Ex. 1006),

³ U.S. Patent 4,365,978 (Dec. 28, 1982) (Ex. 1008).

⁴ U.S. Patent 4,183,369 (Jan. 15, 1980) (Ex. 1003).

⁵ Funke, H. H. et al., *Performance of Palladium Diffusers for Reliable Purification of Hydrogen*, extended abstract, presented at CS-MAX, San Jose, CA (Nov. 11–13, 2002) (Ex. 1004).

⁶ Air Liquide also filed with its Petition a second Declaration of Mr. Grover (Ex. 1012), entitled “General Background Declaration,” but did not cite to the General Background Declaration in any paper or exhibit. At oral hearing, counsel for Air Liquide conceded that it had not relied on the General Background Declaration, and it would be proper to expunge it from the record of the case. Paper 26, 28–29.

and with its Reply submitted a Supplemental Declaration of Dr. Ratigan (Ex. 1013). With its Response, Praxair submitted the Declaration of Dr. James A. Ritter (Ex. 2201) and the Declaration of Rommel Marquis Oates (Ex. 2202). Neither party submitted a deposition transcript of the cross-examination of any witness.

Oral hearing was requested by Praxair, and a consolidated hearing for all three related *inter partes* review trials was held June 23, 2016. A transcript of the oral hearing is included in the record. Paper 26, “Tr.”.

B. The '011 Patent

The '011 patent, titled “Method of Storing and Supplying Hydrogen to a Pipeline,” issued July 18, 2006, from U.S. Patent Application No. 10/812,084, filed on March 30, 2004. Ex. 1001, at (54), (45), (21), (22). The '011 patent generally relates to storage of compressed hydrogen in a salt cavern, followed by recovery and purification of the stored hydrogen prior to supplying the hydrogen to a pipeline. *Id.* at Abstract.

The patent states that while hydrogen and other gases have been stored in underground salt caverns, due to the presence of contaminants in the salt cavern such storage had previously only been undertaken when there were no purity requirements for the recovered hydrogen. *Id.* at 1:53–60. The '011 patent purports to allow salt cavern storage of hydrogen that is “under a purity specification” by purifying the recovered hydrogen to remove contaminants, in particular water vapor and carbon dioxide. *Id.* at 2:3–14. Alternatively, the storage may be dependent on the demand for hydrogen: during periods of low demand, a portion of the hydrogen produced at the production facility is diverted, without purification, into the

salt cavern for storage, but during periods of high demand, the stored hydrogen may be recovered and purified to supplement the hydrogen being produced by the facility. *Id.* at 2:31–41.

C. Illustrative Claim

Of the challenged claims, only claim 1 is independent, and is reproduced below:

1. A method of storing and supplying a gaseous hydrogen product to a pipeline under a product purity specification, having a pre-specified [sic] hydrogen purity and an impurity level of impurities comprising carbon dioxide and water vapor, said method comprising:
 - compressing a hydrogen steam [sic]⁷ made up of gaseous hydrogen to form a compressed hydrogen stream;
 - introducing the compressed hydrogen stream into a salt cavern for storage of the gaseous hydrogen;
 - recovering a crude hydrogen stream from the salt cavern;
 - purifying the crude hydrogen stream by sufficiently removing at least the carbon dioxide and the water vapor from the crude hydrogen stream to at least in part produce a hydrogen product steam [sic] having the impurity level of the carbon dioxide and water vapor at or below the product purity specification; and
 - supplying the gaseous hydrogen product to the pipeline by introducing said hydrogen product stream into said pipeline.

Ex. 1001, 6:61–7:12.

⁷ Claim 1 as written in the '011 patent recites “compressing a hydrogen steam.” We interpret this to be a typographical error, and that the patentee intended to refer to a “hydrogen stream.” See Ex. 1010, 2 (amendments to claims during prosecution that recite “hydrogen stream”).

II. ANALYSIS

A. Claim Construction

For purposes of our Decision on Institution, we analyzed each claim term in light of its broadest reasonable interpretation, as understood by one of ordinary skill in the art and consistent with the specification of the '011 patent. 37 C.F.R. § 42.100(b); *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2144–46 (2016). Under the broadest reasonable interpretation standard, and absent any special definitions, claim terms are given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech. Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). Any special definitions for claim terms or phrases must be set forth with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994).

In its Petition, Air Liquide proposed a construction for each of the following claim terms or phrases: “pipeline,” “purity specification,” “hydrogen stream,” “crude hydrogen stream,” and “hydrogen product stream.” Pet. 10–12. In the Decision on Institution, we determined that, based on the record at the time, no claim term required express construction. Dec. on Inst. 6. During the instituted trial, however, the parties continued to dispute the meaning of several terms; in its Response, Praxair addressed “crude hydrogen stream” and “pipeline.” PO Resp. 7–14. Because we decide this case on issues unrelated to any of these disputed terms, we need not construe them herein.

B. The Level of Ordinary Skill in the Art

Air Liquide's two experts provided different descriptions of the person of ordinary skill in the art. Dr. Ratigan, whose background is in civil, mechanical, and geologic engineering, testified that the person of ordinary skill would have been a degreed engineer with 5 years of experience "in the fields of planning, design, engineering analysis, and/or field testing of subsurface geologic engineering projects." Ex. 1007 ¶ 9. Meanwhile, Mr. Grover, whose background is in chemical engineering, testified that the person of ordinary skill in the art would have "experience in design, or operation of hydrogen or syngas production, or syngas purification, or transportation of hydrogen or syngas via pipeline." Ex. 1006 ¶ 9. Praxair characterizes the experts' testimony as setting forth "starkly different levels of skill" which are in conflict. PO Resp. 6. In response, Air Liquide argues that each expert's description of the person of ordinary skill is appropriate in respect to different embodiments in the '011 patent: Mr. Grover's to embodiments where impure hydrogen is stored in a salt cavern, and Dr. Ratigan's to embodiments in which high purity hydrogen is stored. Pet. Reply 1–2.

We do not consider it appropriate to split the definition of the person of ordinary skill in the art among embodiments of the '011 patent, as Air Liquide proposes. Obviousness of an invention is to be assessed from the standpoint of "a person having ordinary skill in the art to which the claimed invention pertains." 35 U.S.C. § 103. The art of the *invention* of the '011 patent does not change depending on whether impure or high-purity hydrogen is stored in the salt cavern.

Praxair cites the testimony of Dr. Ritter, and argues that a person of ordinary skill in the art “would have a minimum level of skill of a bachelor’s degree in chemical engineering, or a similar discipline, and at least 3 years of experience with storage of hydrogen gas, purification of hydrogen gas, and pipeline delivery of hydrogen gas.” PO Resp. 7 (citing Ex. 2201 ¶ 10).

The ’011 patent defines the field of the invention as “storing and supplying gaseous hydrogen product to a pipeline” wherein the hydrogen is “stored in a salt cavern” and then purified. Ex. 1001, 1:6–12. The person of ordinary skill in the art would therefore have had experience with hydrogen storage and purification, but also with salt cavern storage—“subsurface geologic engineering projects,” as Dr. Ratigan described it. For this reason, we consider Praxair’s definition to be too narrow, and that the person of ordinary skill in the art would have been a hybrid of those described by Air Liquide’s experts. The interdisciplinary nature of the person of ordinary skill in the art is supported by the prior art such as Foh,⁸ which focuses not only on subsurface geology and various types of underground storage (Ex. 2203, 6–62), but also on various issues relating to hydrogen transportation and storage (*id.* at 62–76). *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (prior art may reflect appropriate level of skill).

The parties are generally in agreement that the person of ordinary skill in the art would have had an engineering degree, and between 3–5 years of experience in the relevant field. Ex. 1007 ¶ 9; Ex. 2201 ¶ 10. We agree, and

⁸ Foh, Stephen et al., UNDERGROUND HYDROGEN STORAGE FINAL REPORT, Department of Energy and Environment, Brookhaven National Laboratory, Upton, New York, US (December 1979) (Ex. 1002).

find that the person of ordinary skill would have had experience in the fields of transportation and storage of gaseous hydrogen, as well as subsurface geologic engineering. This person would have had familiarity with the problems encountered in transporting hydrogen, such as hydrogen embrittlement (Ex. 2203, 67–68), as well as the possibility of contamination due to storage in an underground chamber (*id.* at 59–62).

C. Obviousness Over Yanagihara and Pottier

Air Liquide contends that claims 1–3 and 8 are unpatentable under 35 U.S.C. § 103(a), as they would have been obvious over the combined disclosures of Yanagihara and Pottier. Pet. 16–24, 26–31. An obviousness inquiry involves four underlying determinations: the scope and content of the prior art; the differences between the prior art and the claims at issue; the level of ordinary skill; and any objective indicia of nonobviousness.

Graham v. John Deere Co., 383 U.S. 1, 17 (1966).

According to Yanagihara, “hydrogen gas is important, for example, as a raw material, for industrial purposes, and is employed in a large quantity in various industries.” Ex. 1005, 1:13–15. Yanagihara discloses that manufactured hydrogen gas generally contains various other components, including carbon dioxide and water, and therefore “it becomes necessary to purify raw hydrogen gas according to end uses thereof.” *Id.* at 1:22–29. In particular, “removal of water content and carbon dioxide is essential as a preliminary treatment.” *Id.* at 1:67–2:2. Yanagihara proposes addressing these needs using a purification system for stored hydrogen, as shown in Figure 5 reproduced below:

Fig. 5

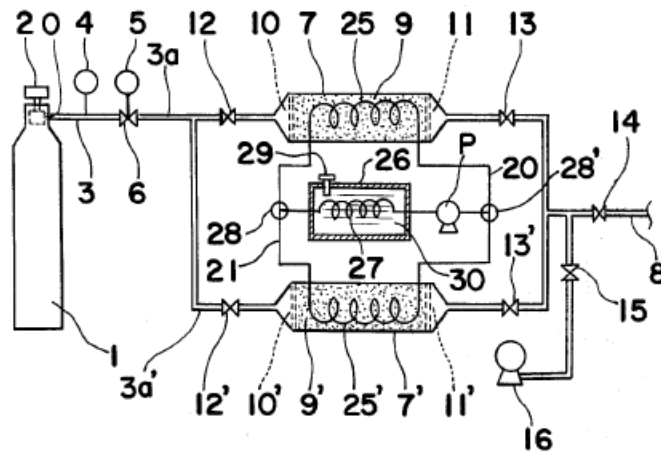


Figure 5 of Yanagihara depicts hydrogen storage container 1 connected to purification containers 7 and 7', which are in turn connected to hydrogen gas supply pipe 8. *Id.* at 3:60–4:5.

Pottier discusses the transportation and storage of hydrogen for use in chemical or energy applications. Ex. 1002, 167.⁹ In particular, Pottier notes that salt cavities have been used for the storage of hydrogen gas, including a facility at Teeside, United Kingdom in which the cavities were operated at a pressure of 44 bar by the injection or withdrawal of salt water. *Id.* at 170. Pottier discloses that frequently, the gas drawn off from salt cavities contains water vapor and hydrogen sulfide, and that purification of gas produced from storage is necessary. *Id.* at 172.

1. The Parties' Arguments

At the outset, we note that the parties agree on several facts. The '011 patent uses existing, conventional purification techniques; Praxair does not

⁹ We cite to the original pagination of the document, and not the page numbers entered by Petitioner.

contend otherwise. Ex. 1001, 5:12–24; Tr. 11:16–18, 79:18–22 (Praxair’s counsel: “there is no specific purification technique that is new to the patent.”). Nor does Praxair contend that it was nonobvious to purify gas to meet a specific purity standard, once that standard was known. Tr. 80:12–16. Finally, Praxair concedes that storage of gases, including hydrogen, in salt caverns was known, and that there was a recognized problem with contamination of the stored gas. *Id.* at 33:9–16.

The primary dispute between the parties is whether a person of ordinary skill in the art would have had reason to adapt the purification device of Yanagihara to include the salt cavern storage of Pottier. Air Liquide contends that:

It would have been obvious to one of ordinary skill in the art that the storage apparatus of Yanagihara could be substituted with the salt cavern storage in Pottier. One of skill in the art would be motivated to make such a substitution to utilize the teachings of Pottier regarding salt cavern storage for larger scale applications and/or any other applications described in Pottier (e.g. peak load balancing[]).

Pet. 28. According to Air Liquide, “it would be appreciated by one of skill in the art that a salt cavern storage device and the storage container of Yanagihara are both known methods of storage that fulfill the same functionality.” Pet. 17 (citing *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 416–418 (2007)). Therefore, Air Liquide concludes, “[u]tilization of a salt cavern storage method in place of the storage of Yanagihara would be a simple substitution of a known element with another to obtain a predictable result.” *Id.* at 18. Mr. Grover testifies that the use of a salt cavern would be motivated by Pottier, which “provides specific examples of when such uses

may be beneficial (e.g. for annual and/or daily storage, and for peak shaving).” Ex. 1006 ¶ 42. Neither Mr. Grover nor Dr. Ratigan, however, address whether any modifications to Yanagihara’s purification system may be necessary to incorporate the salt cavern of Pottier.

Praxair disputes whether a person of ordinary skill in the art would have had reason to substitute the storage container of Yanagihara with the salt cavern of Pottier. PO Resp. 17–20, 25–26. According to Praxair, Air Liquide “offers no evidence and never explains *why* it would be ‘simple’ to go from a small scale purification apparatus using a controlled, man-made environment such as a single use container to a large scale production, storage and distribution network using an uncontrolled underground salt cavern.” *Id.* at 18. Characterizing the disclosures of the two references as “incompatible,” Praxair contends that adding a salt cavern to Yanagihara would require replacing its entire purification system. *Id.*

Dr. Ritter supports Praxair’s arguments, testifying that Yanagihara’s purification system “would be slow and inefficient at purifying the amounts of hydrogen supplied from a salt cavern and necessary to supply a customer over a pipeline.” Ex. 2201 ¶ 34. According to Dr. Ritter, Yanagihara’s system uses “very expensive metal hydride” and is therefore restricted to small-scale applications. *Id.* ¶ 43. Adapting Yanagihara to incorporate a salt cavern would, in Dr. Ritter’s analysis, involve numerous challenges including “scaling up” the system to the “enormous scale” of a salt cavern, and would lead the person of ordinary skill in the art to the conclusion that “the entire purification system of Yanagihara would not be suited for this purpose and would thus have to be replaced.” *Id.* These adaptations would

include addressing changes in pressure, volume, infrastructure, and speed of purification. *Id.* Dr. Ritter also points out that Yanagihara is said to operate in the range of 300–600 psia, as opposed to the high pressures involved in salt cavern storage. *Id.* ¶ 44.

Praxair also argues that the prior art, even if combined, does not disclose certain elements of the challenged claims. We need not address these arguments, as we find the articulated reason to combine lacking as set forth below.

2. Reason to Combine and Modify

We conclude that Air Liquide has not established why it would have been obvious to a person of ordinary skill in the art to combine the purification system of Yanagihara with the salt cavern of Pottier. Air Liquide’s proffered rationale to combine—that it is a “simple substitution” to install the salt cavern of Pottier in place of the storage tank of Yanagihara—is not supported by the preponderance of the evidence.

It is true that “when a patent claims a structure already known in the prior art that is altered by the mere substitution of one element for another known in the field, the combination must do more than yield a predictable result.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007). The question, however, is whether the substitution proposed by Air Liquide is “mere,” or if it amounts to something more. When “the claimed subject matter [] involve[s] more than the simple substitution of one known element for another or the mere application of a known technique to a piece of prior art ready for the improvement,” then it is more likely the claim is nonobvious. *Id.* at 417. When “detailed inferences” as to the substitution

must be made by the factfinder, or where the substitution is a “careful and time-consuming task,” it is less likely that the substitution is “simple.” See *Brand v. Miller*, 487 F.3d 862, 870 (Fed. Cir. 2007); *Synthes USA, LLC v. Spinal Kinetics, Inc.*, 734 F.3d 1332, 1342–43 (Fed. Cir. 2013).

Praxair argues that the difference in scale between the storage canister of Yanagihara and the salt cavern of Pottier makes the substitution much more than “simple.” PO Resp. 18. Size of the storage, on its own, does not sufficiently distinguish between the alternatives, however. Rather, it is the *rate* by which hydrogen is processed in the Yanagihara system that makes it incompatible with a storage system as large as a salt cavern.

At oral hearing, counsel for Air Liquide argued that the size of the storage container does not necessarily mandate the purification rate. Tr. 16:17–25 (“Just because you have a salt cavern doesn’t mean you have to get it out fast.”). This is correct, but it is worth noting the flow rates disclosed in the examples of Yanagihara (4–10 L/min) in view of the size of the caverns disclosed in Pottier (for example, the Teeside facility has a volume of approximately 55,000 m³). Ex. 1005, 8:7–14; Ex. 1002, 170. At the flow rates disclosed in Yanagihara, it would take over *ten years* to drain the entirety of the Teeside cavern.¹⁰

More importantly, the rate of purification in the Yanagihara system is relevant because of the motivation to combine articulated by Air Liquide, namely because large-scale storage would permit Yanagihara to be used in

¹⁰ $55,000 \text{ m}^3 \left(\frac{1000 \text{ L}}{\text{m}^3} \right) \left(\frac{\text{min}}{10 \text{ L}} \right) \left(\frac{\text{hr}}{60 \text{ min}} \right) \left(\frac{\text{day}}{24 \text{ hr}} \right) \left(\frac{\text{year}}{365 \text{ days}} \right) = 10.46 \text{ years}$

applications such as peak load balancing. Pet. 28.¹¹ As stated by counsel at oral argument:

[T]he reason why we are using salt caverns in the first place are SMRs, the reformers that actually build these things, are notoriously unreliable, right, and there is peak and off-peak times.

I mean, the reason for storage is to compensate, I mean, it is a business method type of thing, right, that we need to store when we have overproduction. We need to utilize storage when we have underproduction.

So there is your motivation.

Tr. 90:3–11.

Air Liquide, therefore, is relying on the desire to use Yanagihara in peak load balancing as the reason to combine. The art of record in this proceeding, however, demonstrates that for peak load balancing, the output rate requirements of a salt cavern are high. Pottier discloses output rates of over 200,000 cubic meters per hour for daily storage in salt cavities. Ex. 1002, 174. Similarly, Foh discloses maximum hydrogen flow rates of 33.2 million cubic feet per day for output from a salt cavern. Ex. 2203, 117, Table 17. Both of these rates are several orders of magnitude greater than those disclosed in Yanagihara.

Air Liquide argues that Yanagihara is not limited to small-scale use. Tr. 14:8–9. We recognize that, in our Decision on Institution, we noted

¹¹ Nor is it persuasive that the claims of the '011 patent are not limited to large-scale use. The scale of Yanagihara is relevant because of the combination Air Liquide has proposed, and the asserted motivation to combine.

Yanagihara's mention of industrial use of hydrogen gas "in large quantities" and that this disclosure may have suggested the use of the system in large-scale applications. Dec. on Inst. 10–11. Praxair challenges this interpretation of Yanagihara in its Response. PO Resp. 20. Upon review of the entire reference, Praxair's evidence, and the testimony of its experts, we conclude that the vague statement regarding "large quantities" in the background of the invention section does not necessarily suggest suitability for massively large-scale applications such as salt caverns, especially for the peak load balancing applications Air Liquide suggests as the reason to combine.

Of course, if the mismatch in scale between Yanagihara and Pottier requires only modifications which are within the level of ordinary skill in the art, then the combination of the references may still be reasonable. But Air Liquide has provided scant evidence to that effect. Neither Dr. Ratigan nor Mr. Grover testify as to how the Yanagihara purification system might be scaled up, the technical challenges that might be faced in doing so, or whether those challenges would have solutions within the level of ordinary skill. Praxair's expert, Dr. Ritter, testifies at some length on such topics, as summarized above. Ex. 2201 ¶¶ 34, 43, 44. Though Dr. Ratigan supplied a reply declaration responding to Dr. Ritter, he never addressed these assertions regarding potential modifications to Yanagihara.

Air Liquide has not established that replacing the storage canister of Yanagihara with the salt cavern of Pottier is a "mere substitution" that would have been obvious to a person of ordinary skill in the art. The difference in scale between the two references, and in particular the low purification rate

of Yanagihara and the extremely large capacity of Pottier, negates the reason to make the modification proposed by Air Liquide. For these reasons, Air Liquide has not proven by a preponderance of the evidence that a person of ordinary skill in the art would have combined the identified teachings of Yanagihara and Pottier in the manner suggested.

3. Conclusion

We have evaluated the scope and content of the prior art, the differences between the art and the claimed invention, and the level of ordinary skill in the art, and concluded that Air Liquide has not established that a person of ordinary skill would have had reason to modify and/or combine the disclosures of Yanagihara and Pottier to arrive at the invention of claims 1–3 and 8 with a reasonable likelihood of success. As such, we need not reach Praxair’s arguments that certain elements of claims 1–3 and 8 are not disclosed in the art, or that objective indicia of nonobviousness exist. Air Liquide has not met its burden to establish by a preponderance of the evidence that claims 1–3 and 8 are unpatentable on this ground.

D. Remaining Obviousness Grounds

The remaining grounds of unpatentability each involve the combination of Yanagihara and Pottier with other references: Yanagihara, Pottier, and Scott; Yanagihara, Pottier, and Thomas; and Yanagihara, Pottier, and Funke. Our conclusion that Air Liquide has not established that a person of ordinary skill in the art would have had reason to combine the disclosures of Yanagihara and Pottier applies equally to these remaining grounds. As such, we find that Air Liquide has not met its burden of

establishing unpatentability by a preponderance of the evidence on these grounds.

III. CONCLUSION

For the foregoing reasons, based on a review of the complete record developed during trial, we conclude that Air Liquide has not proven, by a preponderance of the evidence, that claims 1–3, 7, and 8 of the '011 patent are unpatentable.¹²

IV. ORDER

Accordingly, it is:

ORDERED that claims 1–3, 7, and 8 of U.S. Patent No. 7,078,011 B2 have not been proven unpatentable; and

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

¹² We note that claims 1, 3, 7, and 8 of the '011 patent were found to be unpatentable in the companion IPR2015-01071 and IPR2015-01072 cases.

IPR2015-01073
Patent 7,078,011 B2

For PETITIONER:

Nathan Reese
Charles B. Walker, Jr.
Norton Rose Fulbright LLP
nate.rees@nortonrosefulbright.com
charles.walker@nortonrosefulbright.com

Allen White
allen.white@airliquide.com

For PATENT OWNER:

J. Steven Baughman
Steven Pepe
Christopher J. Harnett
Ropes & Gray LLP
steven.baughman@ropesgray.com
steven.pepe@ropesgray.com
christopher.harnett@ropesgray.com