

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

HALLIBURTON ENERGY SERVICES, INC.,
Petitioner,

v.

U.S. WELL SERVICES, LLC,
Patent Owner

IPR2023-00558
U.S. PATENT NO. 11,136,870

PATENT OWNER'S SUR-REPLY

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PATENT OWNER'S EXHIBIT LIST

Exhibit No.	Description
2001	Excerpt from Webster's New World College Dictionary, 5th ed. (2016)
2002	Declaration of Dr. Michael Nikolaou
2003	Deposition of Dr. Robert Durham
2004	C.V. of Dr. Michael Nikolaou

Petitioner has failed to show the challenged claims of the '870 Patent are obvious.

I. Claims 7–16 Are Not Obvious.

The Petition advanced two obviousness theories for claims 7–16 of the '870 Patent based on the combination of *Coli* and *Toshiba* or *Coli* and *Loucks*. Each theory has fatal defects.

Regarding *Toshiba*, the Board correctly determined at Institution that “Petitioner’s assertion that *Toshiba* inherently associates its heat sinks with its thermal sensors is not supported by the evidence,” and noted that Petitioner’s expert did “not offer any additional explanation that might support a finding of inherency.” Institution Decision (“ID”), 26. In its Reply, Petitioner offers no further explanation demonstrating inherency, but instead asserts that new evidence supports its argument, which the Board should reject as untimely.

Regarding *Loucks*, the Reply fails to advance new testimony showing *Loucks* is analogous prior art, only relying on attorney argument. Petitioner could have, for example, introduced a new expert declaration. Nothing in Petitioner’s original expert declaration provided such testimony. *See* POR, 29–32. Accordingly, Petitioner’s expert Dr. Nikolaou’s testimony that *Loucks* is non-analogous art remains unrebutted. *Gemtron Corp. v. Saint-Gobain Corp.*, 572 F.3d 1371, 1380 (Fed. Cir. 2009) (“[U]nsworn attorney argument . . . is not evidence and cannot rebut . . . other

admitted evidence[.]”); *see also Icon Health & Fitness, Inc. v. Strava, Inc.*, 849 F.3d 1034, 1043 (Fed. Cir. 2017) (“Attorney argument is not evidence.”).

Accordingly, the Board should find Petitioner failed to demonstrate claims 7–16 are obvious.

A. The Board Correctly Rejected Petitioner’s Theory *Coli* and *Toshiba* Render Claims 7–16 Obvious.

1. The Petition Failed to Demonstrate Inherency.

The Petition’s only argument why *Coli* and *Toshiba* disclose the claimed “heat sinks having thermal sensors” was an inherency argument based on *Toshiba*’s general disclosures of a thermistor and heat sink. *See* Pet., 37–38 (citing EX-1002, ¶186).

Petition	Expert Declaration
A POSITA would have understood that the heat sink would necessarily have sensors (e.g., thermistors) to report the temperature measurements to the CPU (i.e., microprocessor). EX-1002, ¶186.	¶186: A POSITA would further understand that in order to protect against overheating, the heatsink would necessarily have sensors which would report to the CPU (microprocessor) temperature data.

The Board correctly found Petitioner failed to support its argument by evidence, rejecting its theory. ID, 26; *see In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999) (“[I]nheren[cy] . . . cannot be established by probabilities or possibilities.”); *see also Howmedica Osteonics Corp. v. Zimmer, Inc.*, 640 F. App’x 951, 957 (Fed. Cir. 2016) (“Inevitability is at the heart of inherency; ‘that a certain

thing may result from a given set of circumstances is not sufficient.”) (quoting *In re Robertson*, 169 F.3d at 745).

2. Petitioner’s New Argument *Toshiba* Discloses a Heat Sink Thermistor Is Improper.

Petitioner’s Reply improperly introduces a new invalidity argument based on new evidence—uncited in either the Petition or the Expert Declaration—to show *Toshiba* discloses this feature (Reply, 14–16) or renders such feature obvious (*id.*, 16), i.e., two invalidity theories it advances for the first time. See *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1370 (Fed. Cir. 2016). Neither theory is proper argument on reply. *Apple Inc. v. Andrea Elecs. Corp.*, 949 F.3d 697, 705–06 (Fed. Cir. 2020) (describing two categories of appropriate reply argument as “[1] whether the petitioner’s reply brief is responsive to arguments originally raised in its petition; or [2] whether the reply arguments are responsive to arguments raised in the patent owner’s response brief.”)

Regarding Category One, Petitioner’s Reply arguments (*see* Reply, 14–16) were not “originally raised in the petition.” The Petition only asserts the claimed “*heat sinks having thermal sensors*” was **inherent** based on *Toshiba*, not disclosure or obviousness. Petitioner cites new evidence in Exhibit 1007¹ neither analyzed nor

¹ Patent Owner improperly relies on page 251 of Exhibit 1007, an Internet Archive declaration including numerous documents and not a page included in the *Toshiba* Manual (Exhibit 1006) used in the summary of Grounds, *see* Pet. 16.

cited in either the Petition or Petitioner's Expert Declaration. Petitioner's new invalidity theories deprive Patent Owner the opportunity to cross-examine Petitioner's expert on such theories, at great prejudice to Patent Owner. *See Intelligent Bio-Sys.*, 821 F.3d at 1370.

Regarding Category Two, Petitioner's Reply arguments are not "responsive to arguments raised in the patent owner's response." Specifically, PO's Response disputes that Petitioner demonstrated inherency because it cited "only Dr. Durham's conclusory testimony" but no evidentiary support. POR, 13–15. Pursuant to *Andrea*, the appropriate reply arguments are limited to showing how the Petition's identified evidence demonstrates that *Toshiba* inherently discloses "*heat sinks having thermal sensors.*" Petitioner did not do so, abandoning its inherency argument. Reply, 14–16.

3. Petitioner's New Evidence Fails to Show *Toshiba*'s Heat Sink Having a Thermal Sensor.

Petitioner's new arguments still fail. The disputed claim element provides "*heat sinks **having** thermal sensors monitored by a microprocessor to prevent damage caused by excessive heat.*" EX-1001, claim 7 (emphasis added). Petitioner contends this limitation does not require sensors contacting heat sinks, but thermal sensors only must be **associated** with the heat sinks because the Board stated that *Toshiba* did not "inherently associate[] its heat sinks with its thermal sensors." Reply, 14 (citing ID, 26).

Petitioner’s new theory that *Toshiba*’s heat sink has a thermal sensor rises from a new claim construction only requiring a heat sink **associated** with a thermal sensor, rather than “*having*” one as is claimed. *Id.*, 14. “[C]laims [must be] interpreted with an eye toward giving effect to all terms in the claim,” *Bicon Inc. v. Straumann Co.*, 441 F.3d 945, 950 (Fed. Cir. 2006), so ignoring or replacing the requirement that the heat sink “*hav[e]*” a thermal sensor must simply fail.²

Petitioner’s new evidence, a citation to EX-1007pt2, 251,³ should be disregarded as untimely. Regardless, this new evidence still does not show the heat sink of *Toshiba* having a thermal sensor. At most, it only shows *Toshiba*’s heat sink is **associated** with the thermistor, which is not the claim’s requirement.

Petitioner’s attempts to show *Toshiba*’s heat sinks “*hav[e]*” rather than are “associated” with a thermal sensor also fail. Petitioner relies on unrelated testimony based on “general engineering knowledge” and asserts the heat sink is one of several locations “where the thermistor **could be** located.” Reply, 16 (citing EX-1002, ¶124) (emphasis added). As the PTAB explained, “[a]n assertion that something **could be done** does not articulate a reason **why** something would be done . . . rais[ing] a

² Petitioner mischaracterizes Dr. Nikolaou’s testimony, asserting he did not consider whether claim 7 requires the thermal sensor to be located on the heat sink. Reply 14 n.5 (citing EX-1054, 44:13–19). When asked, “Does the thermal sensor have to be located on the heat sink?,” Dr. Nikolaou responded, “That particular configuration is what the claim . . . limitation suggests” and “that particular claim is about that specific location.” EX-1054, 39:7–18.

³ See *supra* n. 1.

specter of impermissible hindsight bias in an obviousness analysis.” *Nautilus Hyosung Inc. v. Diebold Self-Service Systems Division of Diebold*, IPR2016-00633, Paper 9, 21 (PTAB Aug. 22, 2016) (emphasis added).

B. A POSITA Would Not Combine *Coli* and *Loucks*.

A POSITA would not combine *Coli* and *Loucks*. First, *Loucks* is non-analogous art according to Dr. Nikolaou’s unrebutted testimony. Second, *Coli* teaches away from combining *Coli* and *Loucks*, which is also unrebutted. Finally, in a related proceeding, the Board correctly determined that a POSITA would not combine *Coli* with a cooling technique such as the one in *Loucks*.

1. Patent Owner’s Expert Testimony That *Loucks* Is Non-Analogous Is Unrebutted.

The Board correctly determined *Loucks* fails the first prong of the *In re Bigio* test by not being in the same field of endeavor as the challenged patent. ID, 41; *see* POR, 29. Petitioner does not dispute that finding. *See* Reply, 17–19. Instead, Petitioner contends *Loucks* is analogous under the second prong: “whether the reference still is reasonably pertinent to the particular problem with which the inventor is involved.” *In re Bigio*, 381 F. 3d 1320, 1325 (Fed. Cir. 2004); *see* Reply, 17–19. Petitioner identified one problem addressed by the ’870 Patent, but it failed to provide expert testimony of *Loucks* addressing this problem. *See* Pet., 14–15, 51–

57; *see also* EX-1002, ¶40. The Reply⁴ advances only “unsworn attorney argument,” which “is not evidence” and “cannot rebut . . . other admitted evidence,” such as that of Petitioner’s expert Dr. Nikolaou. *Gemtron*, 572 F.3d at 1380.

Dr. Nikolaou shows *Loucks* is non-analogous art, explaining *Loucks* is not pertinent to the problem addressed by the ’870 Patent. Both experts agree that one problem the ’870 Patent is drawn to is overcoming “problems associated with diesel pumps” by “using pumps powered by electric motors.” EX-1002, ¶40; EX-2002, ¶101. Dr. Nikolaou addresses all other problems the ’870 Patent faces, explaining “additional problem[s] would be limited to those problems when implementing a portable VFD.” EX-2002, ¶101 (citing EX-1001, Fig. 1, 1:40–51, 3:38–63). As Dr. Nikolaou explains, *Loucks* does not address this problem but “[r]ather, *Loucks* addresses the problem of detecting cooling problems in the environment in room and/or data centers.” *Id.*, ¶102 (citing EX-1009, [0018]; [0024]; [0026]). These passages are the only arguments supported by expert testimony. None demonstrate *Loucks* is pertinent to any problem addressed by the ’870 Patent.

⁴ Petitioner relies on *Corephotonics LTD v. Apple Inc.*, 84 F.4th 990 (Fed. Cir. 2023), which is inapposite. Reply, 17 n. 6. Unlike this case, the Petitioner in *Corephotonics* included an additional expert declaration with its reply which explained how the prior art qualified as analogous art. 84 F.4th at 1006 (“Corephotonics filed a sur-reply, complaining that Apple’s reply ‘raises completely new arguments, supported by Dr. Durand’s new reply declaration opinions, that Golan and Martin are “analogous art” to the . . . patent for purposes of its challenge.’”) (emphasis added). Here, Petitioner chose not to submit any declaration opinions showing *Loucks* is analogous art, leaving Dr. Nikolaou’s testimony un rebutted.

The Board identified another problem that was not supported by expert testimony. ID, 34. Specifically, the Board found “[t]he overall problem faced by the inventors of the ’870 patent was how to implement a hydraulic fracturing operation using electric motors to drive the fracturing fluid pumps, rather than diesel pumps. . . . One particular aspect of that problem was how to use a VFD to drive the electric motors.” *Id.* (citations omitted). Neither Dr. Nikolaou nor Dr. Durham reached the same conclusion as the Board. To the contrary, Dr. Durham opines that VFDs were already ubiquitous by the early 2000s. EX-1002, ¶73 (“By the early 2000s, installations of large ASDs in petroleum and chemical operations became so ubiquitous that industry recognized a need for standardization.”). Thus, the Board’s alleged problem facing inventors of the ’870 Patent is unsupported by expert testimony and cannot fix Petitioner’s failure to satisfy its burden.

Petitioner’s remaining arguments and evidence also fail to show *Loucks* is analogous. First, Petitioner argues⁵ that implementing VFDs and electric motors in the field of hydraulic fracturing is the problem addressed by the ’870 patent. Reply, 17 (citing EX-1002, ¶¶40–41). Its expert declaration defines the problems differently: “The ’870 Patent acknowledges the well-understood ‘problems associated with diesel pumps’ and re-states what was already known in the art—i.e.,

⁵ Petitioner mentions a prior art reference used in prosecution supports its argument. This evidence is irrelevant as to whether Petitioner satisfied its burden to show *Loucks* is analogous prior art.

the problems associated with diesel pumps can be overcome by ‘using pumps powered by electric motors.’” EX-1002, ¶40. Thus, the Reply relies on a defined problem unsupported by its expert declaration.

Further, the Reply concludes that prior-art techniques for implementing VFDs and electric motors in other fields would have been pertinent to this problem. Reply, 17 (citing EX-1002, ¶¶132, 234–235). Even if one were to assume that were true, *Loucks* discloses a cooling technique (i.e., a “method for preventing damage to electrical equipment due to overheat” (EX-1002, ¶132)), not a technique for implementing VFDs and electric motors. This is apparent given that every paragraph cited in the Reply (i.e., Ex-1002, ¶¶132, 234–235) fails to show Dr. Durham has any testimony to support that *Loucks* discloses any “technique[] for implementing VFDs and electric motors” as Petitioner contends. Reply, 17. Rather, *Loucks* discloses a cooling technique to be implemented in electrical equipment, which can include VFDs. *See* EX-1002, ¶¶132, 234–235. Petitioner’s argument mischaracterizes Dr. Durham’s opinion to improperly support attorney argument that *Loucks* is pertinent to the ’870 Patent’s addressed problem. Dr. Durham’s declaration provides no such support.

Petitioner also asserts *Loucks* is relevant to “any device that consumes electrical energy and exhausts waste heat.” Reply, 17 (citing EX-1009, [0060]). This broadens the scope *Loucks* can be applied to without addressing the actual factor at

issue: whether *Loucks* is “reasonably pertinent” to the problem faced by the inventor of the ’870 Patent, a problem which Petitioner still has not defined. Patent Owner does dispute the assertion *Loucks* is “reasonably pertinent” to the problem addressed in the ’870 Patent, and Petitioner has not cited expert testimony to support its assertion.

Petitioner next takes issue with Patent Owner arguments that the ’870 Patent only addresses problems pertaining to “a portable VFD.” *Id.*, 18 (citing POR, 30). Dr. Nikolaou’s opinion is unrebutted by the Petitioner’s expert. In his deposition Dr. Nikolaou explained, “having ways to move things around is essential in this patent.” EX-1054, 120:1–2. *Loucks*, by contrast, according to Dr. Nikolaou, “is not something that is easily portable. . . . Mainly, this is not designed for portability.” *Id.*, 179:14–19.

Petitioner contends a POSITA would have understood VFDs, including those in the ’870 Patent and *Coli*, give off heat and should be cooled, and “nothing in *Coli* departs from this widely accepted principle or suggests that its VFD does not need cooling.” Reply, 19. Petitioner misunderstands Patent Owner’s argument regarding *Loucks*. See Reply, 18. *Loucks* does not monitor **temperature** (i.e., against excessive heat) but rather a **cooling efficiency**, which itself is not derived from temperature but rather a **temperature differential**. Petitioner misses the point that *Loucks* discusses “indirectly measuring cooling performance by way of a cooling efficiency

indicator” where “[a]n operating cooling efficiency indicator is **calculated** as a ratio between equipment electrical power consumption and a temperature differential between the equipment and an ambient temperature.” EX-1009, Abstract (emphasis added). Because *Loucks* is directed toward the temperature differential, it does not teach “*heat sinks having thermal sensors . . . to prevent damage caused by excessive heat*” as required by the claim. See EX-1001, 8:35–37. Accordingly, Dr. Nikolaou’s testimony that *Loucks* is non-analogous art stands unrebutted. See EX-2002, ¶¶63–66.

Petitioner fails to show that the preponderance of the evidence supports that *Loucks* is analogous, especially given Petitioner relies on unsupported attorney argument.

2. Petitioner’s Argument That *Coli* Teaches Away Is Unrebutted.

Patent Owner explains that *Coli* teaches away from “need[ing] [a] cooling system[,]” (EX-1005, [0039]), like the one described in *Loucks*, in its own system. POR, 32 (citing EX-2002, ¶¶94–95). Dr. Nikolaou provided expert testimony that this disclosure discourages POSITAs from modifying *Coli* to incorporate *Loucks*’s cooling efficiency monitoring system because the combination would require a larger on-site footprint and more infrastructure, which *Coli* warns against. EX-2002, ¶95.

Petitioner has not rebutted this expert testimony from Dr. Nikolaou. Petitioner provides no expert declaration support for its argument *Coli* does not suggest cooling system elimination, making it only unsupported attorney argument, which should be given no weight. *See Gemtron*, 572 F.3d at 1380.

Petitioner argues that Patent Owner conflates “cooling” with “forced cooling.” Reply, 20 n.7. The method in *Loucks* is within the context of “forced cooling,” and says nothing about other cooling. *See* EX-1009, [0002], [0024], [0025], [0027]. Petitioner also contends that its Grounds did not add a cooling system in *Coli*’s VFD. Reply, 30. The Petition explicitly states: “*Loucks* teaches techniques for improved ‘cooling efficiency’ and applies those techniques to ‘any device that consumes electrical energy and exhausts waste heat,’” that is, a cooling system, “including ‘variable or adjustable frequency drives.’ A POSITA would have found these techniques readily applicable to the VFD of *Coli*.” Pet., 52. Petitioner’s proposed combinations employed the thermal management techniques of *Loucks* in the VFD of *Coli*. *Id.*, 51–55 (citing EX-1002, ¶¶232–237). Given *Loucks*’s thermal management technique involved forced cooling, Petitioner’s proposed modification adds the cooling system of *Loucks* into *Coli*’s VFD despite *Coli*’s express warning to the contrary.

Petitioner’s Reply cites Dr. Durham’s declaration which does not support its argument *Coli* does not teach away from all cooling systems. Reply, 20. Paragraph

82 opines an ASD is required to perform diagnostics to comply with “PDS Integration Requirements,” paragraphs 87–95 opine on the history of power semiconductor heat sinks, and paragraphs 233–237 opine *Coli* discloses VFDs and electric motors and *Loucks*, not *Coli*, has a cooling system. EX-1002, ¶¶82, 87–95, 233–237. These citations do not relate to *Coli* teaching away from combination with *Loucks* by explaining that a benefit of *Coli*’s system is the reduced need for cooling systems.

Accordingly, Petitioner’s argument that *Coli* teaches away from the Petition’s combination of *Coli* and *Loucks* stands unrebutted.

3. The Board’s Prior Decision Confirms a POSITA Would Not Combine *Coli* with *Loucks*.

The Board’s Final Written Decision in a related proceeding (EX-1048) (pending appeal) supports how claim 7 is not obvious over *Coli* and *Loucks*. See EX-1048. The Board there found Petitioner failed to show claim 16, which recited the same limitation as here, was unpatentable over *Coli*, stating, “Petitioner [did] not explain how such coolers necessarily include the use of a refrigerant or how any such refrigerant would be used with the variable frequency drives.” *Id.*, 48. Petitioner itself admits *Stark*, the other art Petitioner sought to combine *Coli* with, involved a VFD including a heat sink cooled by fluid refrigerant, the same teaching from *Loucks*. See Reply, 21. Accordingly, the Board should reach the same decision in

this case: the Petition insufficiently showed why a POSITA would have combined *Coli* and *Loucks*.

4. Petitioner Pursues A New Theory Regarding “*Monitored by a Microprocessor to Prevent Damage Caused by Excessive Heat.*”

The Board’s institution decision relies on *Loucks*’s disclosure “protecting monitored electrical equipment from malfunctions that result from overheating,” as necessarily detected using *Loucks*’s high temperature limits and alarms. ID, 44 (citing EX-1009, [0018]). Petitioner admits that the relevant grounds in the Petition do not rely on these high temperature limits and alarms. Reply, 12.

Petitioner’s Reply raises another improper new theory: *Loucks* teaches this limitation by describing a triggered notification if the cooling efficiency indicator is outside a range to help avoid excessive heat. *Id.*, 13 (citing EX-1009, [0049], [0063], Fig. 2 and EX-1002, ¶¶132, 133, 241–242). This new theory is improper. See *Intelligent Bio-Sys.*, 821 F.3d at 1370. The Petition never makes this argument, cites this evidence, nor explains how the notification and range help “*prevent damage caused by excessive heat.*” The notification and range keep its system at a “baseline cooling efficiency,” not “*prevent damage caused by excessive heat.*” EX-1009, [0049].

II. Claims 1–6 Are Not Obvious.

A. Horikoshi

1. Petitioner Advances a New Unpatentability Theory Regarding “*Electric Motor Diagnostics*.”

Petitioner contends for the first time in its Reply *Horikoshi* teaches “*electric motor diagnostics*” because it performs a single “fault diagnostic **more than once over the life of the VFD.**” Reply, 5 (emphasis added). Petitioner also asserts for the first time that the claims are satisfied by capability alone. *Id.* Petitioner’s arguments are improper—they were not present in the Petition, (*compare* Pet. 45–50, with Reply, 5), nor are they in response to Patent Owner’s arguments addressing *Horikoshi*. POR, 44; *See Intelligent Bio-Sys.*, 821 F.3d at 1370. They are therefore improper and should not be considered. *Netflix, Inc. v. DivX, LLC*, 84 F.4th 1371, 1381 (Fed. Cir. 2023) (“Petitioner never raised this potential argument in its petition, and the Board correctly declined to assume that such an argument had been raised.”).

2. Horikoshi Does Not Disclose Multiple “Electric Motor Diagnostics” as Required by the Claims.

Petitioner does not dispute Dr. Nikolaou’s testimony that *Horikoshi* discloses a single “diagnostic.” Indeed, Petitioner’s Reply admits *Horikoshi* teaches only one diagnostic: “[*Horikoshi*] discloses performing its **electric motor diagnostic** multiple times.” Reply, 5 (emphasis added). Given this admission, it is undisputed that *Horikoshi* does not disclose the multiple “*electric motor diagnostics*,” as claimed.

To support this new argument, Petitioner proposes a new claim construction: the claimed “*diagnostics*” do not require different types of diagnostics, but rather performing the same diagnostic multiple times. *Id.*, 4–5. Petitioners “cannot raise new claim construction issues that were not previously raised in its petition.” *See Intelligent Bio-Sys.*, 821 F.3d at 1370. The Board should maintain that “*diagnostics*” requires more than one diagnostic. *See* ID, 21 (“electric motor diagnostics (plural) as recited in claim 1”).

Petitioner’s new construction is also inconsistent with the intrinsic record, which refers to multiple “*diagnostics*” that can be performed or disabled. EX-1001, 4:20–23 (“[M]otor diagnostics can be performed frequently The electric motor diagnostics can be disabled[.]”). The specification cannot be reconciled with Petitioner’s construction and theory⁶ a single diagnostic performed multiple times satisfies the claimed “*diagnostics*.”

⁶ Petitioner’s theory that the claimed “diagnostic” is satisfied by a single diagnostic being performed repeatedly is unsupported by its expert declaration and Dr. Nikolaou’s testimony. Petitioner cites to Durham Declaration at paragraphs 86, 129, and 215–217 to argue “Horikoshi must perform the fault diagnostic more than once over the life of the VFD.” Reply, 5. Those paragraphs opine the *Horikoshi* system monitors for a momentary fault—not more than once—and paragraphs 215–217 discuss the history of IPR2021-01033. None of these citations show Horikoshi’s diagnostic performed more than once, but rather the fault diagnostic continuously monitors the system. Dr. Nikolaou’s deposition testimony does not support that the claim “diagnostics” can be satisfied by the same fault diagnostic occurring multiple times. EX-1054, 255:21–258:9.

Petitioner also argues because the Board found *Horikoshi* discloses “*electric motor diagnostics*” in IPR2021-01033, it should do the same here. Reply, 5. But the Board there never considered the argument that *Horikoshi* does not disclose the claim “*diagnostics*” (plural) because Patent Owner never made the argument. *See* EX-1048, 23–29.

Given Petitioner’s arguments effectively concede *Horikoshi* teaches a single electric motor diagnostic (*see* Reply, 4–5 n.3), *Horikoshi*’s single diagnostics cannot satisfy the claimed, plural, “*electric motor diagnostics*.”

B. *Toshiba*

1. Petitioner Advanced a New Unpatentability Theory Regarding “*Electric Motor Diagnostics*.”

Petitioner’s Reply advances a new theory, based on improper claim construction, to salvage its previously unexplained theory that pointed to nine VFD faults to satisfy the claimed “*electric motor diagnostics*.” The new theory contends Overload, Overcurrent, and Earth Fault satisfy the claimed “*diagnostics*” because each may have possible “causes that are related to the motor” out of other possible causes. *Id.*, 6–7; *see also* POR., 41–42. Neither the Petition nor Dr. Durham’s declaration provide this explanation. The Board should disregard the Reply’s untimely explanations of new theories of unpatentability and find that Petitioner failed to meet its burden to present a clear argument. *Netflix*, 84 F.4th at 1380; *see Parus Holdings, Inc. v. Google LLC*, 70 F.4th 1365, 1371–72 (Fed. Cir. 2023)

(condemning strategy of “throwing mountains of evidence at the Board without explanation or identification of the relevant portions of that evidence” and stating judges “are not like pigs, hunting for truffles buried in briefs”).

2. Petitioner’s Arguments Are Predicated on an Improper Claim Construction.

Petitioner’s new argument is also meritless—it asserts that the *Toshiba* VFD’s (1) overload protection and (2) overcurrent protection are “*electric motor diagnostics*” because “the Toshiba VFD ‘monitors the electric current being delivered to a motor by the VFD, to determine whether that current exceeds a pre-set percentage of the current rating of the motor, in order to protect the motor from overload.’” Reply, 7 (quoting ID, 19).

Petitioner’s arguments are predicated on an incorrect claim construction that fails to give “effect to” the prefix “*electric motor*” for the claimed “*diagnostics*.” *Bicon*, 441 F.3d at 950. The Board should find Petitioner failed to satisfy its burden to show *Toshiba*’s faults satisfy “*diagnostics*” for the “*electric motor*.”

Petitioner challenges Patent Owner’s assertions that “*electric motor*” must be “the sole target of the [claimed] diagnostics.” Reply, 2. But its own construction of the claimed “*diagnostics*” improperly includes “diagnostics of other components” besides the electric motor which fails to give effect to the claimed prefix “*electric motor*.” See *Bicon*, 441 F.3d at 950. The Board should reject Petitioner’s construction as a matter of law. *Id.*

The Board’s understanding of the disputed term in a previous IPR does not support that diagnostics are not limited to those for an electric motor. EX-1048, 26–27 (finding “*electric motor diagnostics*” includes “monitoring **the motor’s electrical components.**”) (emphasis added). The cited testimony in Petitioner’s Reply (*see* Reply 3–4) shows only that Dr. Durham’s opinions about the challenged claim would be satisfied⁷ if they include both “diagnostics on the electric motor” and “doing something else.” *Id.*, 4 (citing EX-2003, 34:8–35:22). Consequently, Petitioner and its expert apply an improper construction of “*electric motor diagnostics*,” which is fatal to Petitioner’s arguments that *Toshiba*’s faults satisfy such “*diagnostics*.”

C. *Coli* and *Toshiba* Combination

1. Petitioner Advanced a New Theory for How a POSITA Would Have Combined *Coli* and *Toshiba*.

Petitioner improperly advances a new theory using multiple *Toshiba* VFDs, in parallel, to substitute the VFD in *Coli*. *See id.*, 8–10. In the Petition, *Coli*’s VFD is substituted for *Toshiba*’s VFD without any discussion of multiple VFDs. *See* Pet., 25 (“[A] POSITA would have been motivated to simply substitute **the** VFD of *Coli* for **the** VFD of *Toshiba* . . . without affecting the other functionalities of *Coli*.”);

⁷Patent Owner does not dispute that Dr. Durham is correct given the claims are “comprising” claims and he says that, at a minimum, the claims require “diagnostics on the electric motor.”

EX-1002, ¶155 (emphases added). The Petition and the Durham Declaration refer only to the singular term “the” when addressing the *Toshiba*’s VFD, and never use a plural. *See* Pet., 23; EX-1002, ¶155.

Petitioner’s new theory, which Dr. Durham’s declaration does not support, argues “a POSITA would understand how to run multiple *Toshiba* VFDs in parallel to achieve a desired horsepower.” Reply, 9. This “entirely new rationale” how one of skill in the art would have combined *Coli* and *Toshiba* is an improper new theory. *Intelligent Bio-Sys.*, 821 F.3d at 1370. This theory is not responsive to arguments raised in Patent Owner’s response brief either, *see* POR, 22–25, so it is improper. *Andrea*, 949 F.3d at 705–06.

Petitioner also abandons its VFD substitution argument for an untimely new VFD parallel stack argument. The original substitution did not work because a POSITA would have realized the horsepower output of the VFD in *Toshiba* is insufficient for the purposes in *Coli*, rendering *Coli* inoperable. EX-2002, ¶¶79, 84; *Plas-Pak Indus., Inc. v. Sulzer Mixpac AG*, 600 F. App’x 755, 760 (Fed. Cir. 2015) (affirming the Board for finding Petitioner’s proposed combination would render reference “‘inoperable for its intended purpose,’ and a person of ordinary skill would thus not have been motivated to pursue the combination”). Further, *Toshiba* explicitly warns against using the *Toshiba* VFD for higher-horsepower purposes:

“[d]o not use an ASD with a motor that has a power rating that is higher than the rated output of the ASD.” EX-1006, 24.

Petitioner argues *Coli*’s horsepower disclosure is exemplary. Reply, 9–10. *Coli* does not use exemplary language, but states “the present system can deliver a true 2500 hp directly to each pump” to compare *Coli*’s invention with “conventional diesel power fluid pumps.” EX-1005, [0049]; *see also id.*, [0083] (referring to the entire “present system” implicitly as the invention). Petitioner provides no disclosure from *Coli* to show this passage refers to an exemplary embodiment or shows embodiments with a different horsepower. Given the passage describes horsepower requirements of “the present system,” *Coli*’s statement is definitive for all embodiments using its system. *Unwired Planet, LLC v. Apple Inc.*, 829 F.3d 1353, 1358 (Fed. Cir. 2016) (explaining that sentences reciting “the present invention includes” and “the present invention is” are treated as disavowal or disclaimers rather than exemplary statements).

Accordingly, the Board should disregard Patent Owner’s new argument that a POSITA would have combined *Toshiba* and *Coli* because it is both improper and incorrect. *See Intelligent Bio-Sys.*, 821 F.3d at 1370.

2. Petitioner Attempts to Shift The Burden to Patent Owner for Showing Why a POSITA Would Not Have Combined Coli and Toshiba.

Patent Owner demonstrated in its Response that Dr. Durham’s conclusory testimony about enhancing *Coli*’s VFD with *Toshiba*’s supposed diagnostic functionalities is an insufficient rationale to combine the references. In reply, Petitioner attempts rebuttal by asserting Patent Owner does not meaningfully engage with its argument, Reply, 10, which is both wrong and an impermissible shift of the burden to Patent Owner to show the claims are non-obvious. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (“the burden of persuasion is on the petitioner to prove ‘unpatentability by a preponderance of the evidence,’ 35 U.S.C. § 316(e), and that burden never shifts to the patentee.”).

The Petition does not demonstrate that *Coli*’s VFD would be enhanced or prevent damage to the electric motor by using *Toshiba*’s diagnostic functionality. Compare Pet., 25, 31, with POR, 25–27. Dr. Durham’s *ipse dixit* testimony on the point is without evidentiary support. *TQ Delta, LLC v. CISCO Sys., Inc.*, 942 F.3d 1352, 1359 (Fed. Cir. 2019). Petitioner never satisfied its burden in its Petition to that a POSITA would be motivated to combine *Toshiba* with *Coli*, and it still does not in Reply. *Dynamic Drinkware*, 800 F.3d at 1378–79 (“Failure to prove the matter . . . means that the party with the burden of persuasion loses on that point—thus, if

the fact trier of the issue is left uncertain, the party with the burden loses.”) (internal quotes omitted).

III. Dependent Claims 13–16 Are Not Obvious.

A. Claim 13.

Petitioner argues a POSITA would understand *Coli*’s truck-trailer falls within the plain and ordinary meaning of a truck. Reply, 22. This understanding runs contrary to the plain language of claims 1 and 13, each of which recites a “truck.” EX-1001, 7:51, 8:51–52. In claim 1, a “trailer” is attached to a “truck,” demonstrating those two terms recite two distinct claim elements. *See id.*, 7:51. And Dr. Nikolaou explains, “truck” has the same meaning in claims 1 and 13. EX-2002, ¶¶104, 107. Petitioner’s argument therefore necessitates “truck” being construed differently in claim 1 and claim 13, *see* Reply, 22–23, but the plain and ordinary meaning of a term does not arbitrarily change from claim to claim.

B. Claims 15–16.

Petitioner argues *Coli* does not need to disclose the limitations of a required “maximum continuous power output” (claim 15) and “maximum continuous torque” (claim 16), but rather only a system that *could* achieve these benchmarks. Reply, 24. Petitioner is incorrect: it is the Petitioner’s burden to show each limitation is disclosed, not that there is a mere possibility that a system could meet the limitations. *See Nautilus*, IPR2016-00633, Paper 9, 21; *see also Dynamic Drinkware*, 800 F.3d at 1378–79.

Even if Petitioner were correct, Petitioner has not shown the system of *Coli* can achieve “*maximum continuous power output*” or “*maximum continuous torque*.” Nor has Petitioner rebutted Patent Owner’s argument that because of the relationship between a “*maximum continuous*” and a “maximum” value, the system in *Coli* cannot reach “*maximum continuous*” values. See POR, 50–53. Critically, Dr. Nikolaou described the difference between a maximum value and a “*maximum continuous*” value, EX-2002, ¶109, which Dr. Durham agreed with. EX-2003, 42:4–14, 44:9–12, 42:17–43:1 (objection omitted), 44:15–18, 46:8–18. Petitioner has thus failed to show *Coli* discloses “*maximum continuous power output*” as recited in claim 15 and “*maximum continuous torque*” as recited in claim 16.

IV. Conclusion

The Board should find that Petitioner failed to show the challenged claims are obvious by a preponderance of the evidence.

Date: March 22, 2024

Respectfully submitted,

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CERTIFICATE OF COMPLIANCE

The undersigned certifies that this response complies with the word count limitations of 37 C.F.R. § 42.24(b)(1). This response contains 5,379 words as calculated by the Word Count feature of Microsoft Word, the word processing program used to create it.

The undersigned further certifies that this petition complies with the typeface requirements of 37 C.F.R. § 42.6(a)(2)(ii) and typestyle requirements of 37 C.F.R. § 42.6(a)(2)(iii). This petition has been prepared in a proportionally spaced typeface using Microsoft Word in Times New Roman 14-point font.

Dated: March 22, 2024

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that the foregoing PATENT OWNER'S SUR-REPLY were served electronically via email on March 22, 2024, in their entirety on the following counsel of record:

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