

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CRUSOE ENERGY SYSTEMS, LLC,
Petitioner,

v.

UPSTREAM DATA INC,
Patent Owner.

Case PGR2023-00039
Patent 11,574,372

PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE

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EXHIBIT LIST

- EX1001 U.S. Patent No. 11,574,372 to Stephen Barbour et al. (“the ‘372 Patent”)
- EX1002 Excerpts from the Prosecution History of the ‘372 Patent (“the Prosecution History”)
- EX1003 Declaration and Curriculum Vitae of Michael Nikolaou
- EX1004 Declaration and Curriculum Vitae of Vernon Kasdorf
- EX1005 WO2015123257A1 (“Dickerson”)
- EX1006 CryptoKube brochure from the WaybackMachine dated March 5, 2016 (“CryptoKube Brochure”)
- EX1007 CryptoKube Bitcoin Mining Data Center Tour(CC) (“CryptoKube Video-Part1”)
- EX1008 CryptoKube Bitcoin Mining Data Center Tour Transcript
- EX1009 Szmigielski, Albert. Bitcoin Essentials. Packt Publishing Ltd, 2016 (“Szmigielski”)
- EX1010 U.S. Patent Publication No. 2016/0125040 (“Kheterpal”)
- EX1011 PCT Patent Publication No. WO2015072989 (“Belady-989”)
- EX1012 U.S. Patent No. 9,394,770 (“Boot”)
- EX1013 Sanders, Gerald, and Johnson Space Center. "Gas Conversion Systems Reclaim Fuel for Industry." (“Sanders”)
- EX1014 US Patent Publication No. 2015/0368566 (“Young”)
- EX1015 Mining Container ~100kW by Polivka GmbH (“Bitcointalk Forum Post”)
- EX1016 Mining with free natural gas _ r _Bitcoin (“Reddit”)

- EX1017 U.S. Patent Publication No. 2014/0096837 (“Belady-837”)
- EX1018 U.S. Patent Publication No. 2018/0109541 (“GleifchauF”)
- EX1019 Polivka Mining Container Setup on Vimeo (“Polivka Video”)
- EX1020 Declaration of June Ann Munford
- EX1021 U.S. Patent No. 6,161,386 (“Lokhandwala”)
- EX1022 “Crypto you can mine from a home computer,” Brave New Coin
(bravenewcoin.com) (July 18, 2023)
- EX1023 CryptoKube Bitcoin Mining Data Center Tour(CC) (“CryptoKube
Video-Part2”)
- EX1024 U.S. Patent No. 11,659,682
- EX1025 U.S. Patent No. 11,907,029
- EX1026 Hash Generator™ - upstreamdata.com
- EX1027 Hash Hut™ - upstreamdata.com
- EX1028 Air Cooling Technology for Bitcoin Mining - upstreamdata.com
- EX1029 Water Cooling Technology for Bitcoin Mining - upstreamdata.com
- EX1030 Case Study_ Alberta producer conserves stranded gas and eliminates
flare with Ohmm datacenter - upstreamdata.com
- EX1031 Niaz, Haider, et al. “Mining bitcoins with carbon capture and
renewable energy for carbon neutrality across states in the USA.”
Energy & Environmental Science 15.9 (2022): 3551-3570.
- EX1032 U.S. Patent Publication No. 2023/0419155
- EX1033 Deposition Transcript of Stephen Barbour taken in PGR2023-00039,
June 12, 2024

- EX1034 Deposition Transcript of Fengqi You taken in PGR2023-00039, June 27, 2024
- EX1035 Second declaration of Michael Nikolaou
- EX1036 Second declaration of Vern Kasdorf
- EX1037 Free Merriam-Webster Dictionary, definition of “byproduct” (January 15, 2013)
- EX1038 Bitcoin’s Price History
- EX1039-1099 [RESERVED]
- EX1100 Complaint for Patent Infringement, *Upstream Data Inc. v. Crusoe Energy Systems LLC*, Case No. 1:23-cv-01252 (D. Colo. May 18, 2023)
- EX1101 Email from the Board dated November 15, 2023

I. INTRODUCTION

Upstream argues Petitioner’s grounds are based on impermissible hindsight, but Upstream is wrong. POR, 1. Both gas generators (e.g., Dickerson) and blockchain mining data centers (e.g., CryptoKube) were well-known before the ‘372 patent. In search of cheap electricity, a POSITA would have been motivated to combine the two with a reasonable expectation of success. EX1035, ¶11; EX1036, ¶10. For example, Belady discloses a combination of a gas generator and a data center—exactly what Upstream claims it invented. EX1011, Abstract.

Recognizing the weakness of its POPR arguments, Upstream turns to secondary consideration arguments. However, as explained below, Upstream failed to show the required nexus between the challenged claims and the alleged evidence of secondary consideration.

II. CLAIM CONSTRUCTION

A. “blockchain mining devices”

Upstream argues that (i) “mining device 12” is made up of many components, including “a controller 86, network equipment 88 such as a modem and a network switch...” and (ii) the claims require “blockchain mining devices” to include “one or more mining processors and a specialized network interface.” POR, 4. Upstream is wrong on both counts.

The claims require the “mining device 12” to contain nothing but “a mining processor.” EX1001, 15:21-22, 16:32-33, claim 1. Indeed, Upstream’s expert admitted that the claim language does not require the network interface to be located in the mining devices. EX1034, 157:12-158:14 (“it may or may not be within the network mining devices”); 177:9-178:11.

B. “mining processor”

Upstream argues the claimed “mining processor” somehow requires a specific “blockchain mining circuitry,” and further requires a certain processor speed or power, even though the claims make no mention of either. POR, 5-6. Upstream is wrong.

First, neither the specification nor the claim language requires the “mining processor” to include any specialized hardware in the form of a “blockchain mining circuitry.” In fact, the claims require nothing more than a generic personal computer CPU. EX1001, 17:9-15; EX1034, 181:4-182:13 (“A personal computer could be adapted to meet all these specifications”); EX1022, Title.

Second, too clever by half, Upstream asserts that *Crusoe*, not Upstream, is attempting to add a claim limitation, namely, “without regard to processor speed or

power.” POR, 6. To the contrary, Upstream is trying to insert a processor speed or power requirement into the claims where none exists.¹

C. “a continuous flow of combustible gas”

Upstream argues that Crusoe’s proposed construction is wrong but does not state what it believes is the correct construction. POR, 6-8. The closest Upstream comes to doing so is its assertion that “[t]he recitation of a ‘continuous flow of combustible gas’ reflects that the combustible gas is continuous (albeit at varying production rates) as a byproduct of ‘hydrocarbon production, storage, or processing.’” POR, 7. But this statement is both circular in that it includes the word “continuous” when attempting to define “continuous,” and ambiguous in that it does not explain what the term “byproduct” means or what it includes or excludes. Given that “hydrocarbon production” includes producing gas and/or oil, Upstream appears to be arguing that “combustible gas” is a byproduct² of producing gas, which of course makes no sense. *Interactive Gift Exp., Inc. v. Compuserve Inc.*, 256 F.3d 1323, 1336 (Fed. Cir. 2001) (“[s]uch a construction [wa]s illogical and [did] not accord with the plain import of the claim language.”).

¹ Exactly what that requirement would be, Upstream doesn’t say.

² The definition of “byproduct” is “something produced in a usually industrial or biological process in addition to the principal product.” EX1037, 1.

To the extent Upstream uses this term to limit claim 1 to “byproduct” gas, this construction finds no support in either the claim language or the specification, which explicitly refer both to gas produced as a byproduct (e.g., from an oil well) and gas produced as the primary product (e.g., from a gas well). EX1001, 6:51-54. The specification (including the title) repeatedly uses the term “oil **or** gas well,” and gas from a gas well is clearly not a byproduct. EX1001, 1:28-31, 1:37-40, 3:63-4:2, 4:31-45, 8:49-51, claims 3, 9, 28 and 29; EX1035; ¶6. In fact, Upstream admits that claim 1 covers primary product gas. EX1033, 162:14-24 (“any oil and gas application”); EX1034, 103:11-104:6 (“I think it covers both”), 120:5-19; 131:11-18 (“I think it should be included”), 145:20-146:14. Thus, while the specification identifies byproduct gas from an oil well as an issue to be solved, the claim scope is not limited to byproduct gas. *Id.*

While Upstream argues that this limitation requires the gas flow to be continuous for more than a few minutes (POR, 7), Upstream cannot identify a time duration for how long the gas flow needs to be continuous. EX1034, 132:17-133:20, 144:18-145:18 (“there’s no specification in this particular sentence”). This further supports Petitioner’s construction of “a flow of combustible gas that is continuous for at least a time period (e.g., an hour, a day, a week, a month, or longer).” Petition, 6.

**III. A POSITA WOULD HAVE BEEN MOTIVATED TO COMBINE
DICKERSON AND CRYPTOKUBE**

A. The motivation to combine is not based on hindsight

Upstream argues that Dickerson and CryptoKube are from disparate fields and the combination is based on hindsight bias. POR, 9-11. However, people had proposed such a combination well before the priority date. *See, e.g.*, EX2022, 18:4-18 (“I spoke to multiple clients who – who wanted to place my CryptoKube on a natural gas generator that was attached to flare gas. This was in – between 2014 and 2016”); EX1016, 1 (“mining with free natural gas”); EX1033, 246:18-247:11. In fact, Belady discloses locating a data center near an oil well and using byproduct natural gas to power the data center, and the ‘372 discloses nothing more than a specific use of Belady’s data center—mining cryptocurrency. EX1011, Title (“gas supply shock absorber for datacenter power generation”) and [0004] (“natural gas is a byproduct of oil drilling”); EX1034, 39:4-9 (admitting a data center can be used for cryptomining); EX1030, 1 (“Upstream Data Inc. specializes in the design and fabrication of ... bitcoin mining datacenters”).

Szhmigielski lists electricity cost as the first concern for industrial miners. EX1009, 88 (“Industrial miners face almost the same issues as data centers: access to relatively cheap power...”), 90 (“One of the biggest costs for Bitcoin miners is the cost for electricity.”); EX2031, 4 (“miners are rushing to Texas for cheaper electricity costs”). Thus, in search of cheap electricity, a POSITA would have been

motivated to employ the cheap or free electricity generated from a gas generator.

Petition, 20; EX1003, 96-97; EX1004, 94-95; EX1035, ¶11; EX1036, ¶10.

And, contrary to what Upstream alleges (POR, 32), in the event that minor adjustments would have been needed (e.g., adjusting the generation capacity), a POSITA would have been motivated to do so with a reasonable expectation of success, because Dickerson teaches that “[t]he modular design approach of the containerized solution allows for future **design flexibility**” and “[t]hrough the addition of future engine and membrane units, additional gas can be processed and the **generation capacity can be increased.**” Dickerson, [0034]; EX1035, ¶11; EX1036, ¶17.

Further, contrary to Upstream’s position (POR, footnote 3), no need existed for a POSITA to have been knowledgeable in both disciplines because, in cross-disciplinary cases, a POSITA “may be a composite of different types of individuals” (e.g., part of a multi-disciplinary research team). *AstraZeneca Pharm. LP v. Anchen Pharm., Inc.*, 2012 WL 1065458, at *19-*22 (D.N.J. Mar. 29, 2012), *aff’d*, 498 F. App’x 999 (Fed. Cir. 2013) (collecting cases); *Apotex Inc. v. Novartis AG*, IPR2017-00854, Paper 109 at 10–11 (PTAB July 11, 2018) (collecting cases).

B. Gas generators provide “reliable” energy

Upstream alleges that a POSITA would not have been motivated to make the proposed combination because energy generated by a gas generator is not “reliable.” POR, 34-39. Upstream is wrong.

Oil companies have long used onsite gas generators to power production facilities. EX1033, 25:9-26:16. Both Dickerson’s system and the MAGS system power oil production facilities using gas generators (EX1005, Abstract), and Belady’s system powers a data center using a gas generator (EX1011, Abstract). Upstream has identified no evidence that the energy supply in these systems is unreliable. EX1035, ¶14; EX1036, ¶14. In fact, one of Dickerson’s advantages is “high uptime,” indicating the power source is reliable. Dickerson, [0032].

Further, any power system can be modified to be reliable. EX1034, 23:11-24 (“any power source...they could eventually be reliable”). For example, while wind and solar are not commonly viewed as reliable, they can be made reliable by including things such as a battery or hydrogen storage. EX1034, 22:11-25. The prior art explicitly teaches making power from a gas generator reliable by including backup energy sources (e.g., the diesel generator in Dickerson and the gas supply shock absorber in Belady). EX1005, [0021]; EX1011, Abstract (“draw gas from storage during negative pressure spikes”).

Indeed, in comparison to prior art, the ‘372 patent offers no inventive measures to make gas generators more “reliable.” EX1035, ¶14; Kasdorf Dec, ¶14.

While boasting the importance of the “optional controller” (which is needed only when unreliable power generation is an issue), Upstream admitted that, in most cases, the “optional controller” was unnecessary because a POSITA knew how to setup the system to use only a “small chunk” of the available gas supply to ensure reliability. EX1033, 216:17-217:5 (“they were just taking a small chunk”).

IV. A POSITA WOULD HAVE HAD A REASONABLE EXPECTATION OF SUCCESS

Upstream incorrectly argues the Petition did not allege reasonable expectation of success for the combination of Dickerson and CryptoKube. POR, 39-41. The Petition explicitly addressed reasonable expectation of success. Petition, 2 (“and would have done so with a reasonable expectation of success”) and 83 (“POSITA would have had a reasonable expectation of success in the combination”). This is different from *Juniper Networks*, where “Petitioner never mentioned any reasonable expectation of success in the Petition.” *Juniper Networks*, IPR2021-000682, Paper 26 at 23. In any case, *Juniper Network* is not binding.

In contrast, binding authority establishes that, while “a factfinder’s analysis of a reason to combine known elements in the art ‘*should* be made explicit,’” “KSR does not require an explicit statement of a reasonable expectation of success in every case.” *Merck & Cie v. Gnosis S.P.A.*, 808 F.3d 829, 836 (Fed. Cir. 2015). Instead, “evidence of a reasonable expectation of success ... may flow from the

prior art references themselves, the knowledge of one of ordinary skill in the art, or, in some cases, from the nature of the problem to be solved.” *Elekta Ltd. v. ZAP Surgical Sys., Inc.*, 81 F.4th 1368, 1377-78 (Fed. Cir. 2023). In *Elekta*, even though the IPR petition did not address “a reasonable expectation of success,” the Federal Circuit nevertheless found the Board’s implicit finding on reasonable expectation of success to be “supported by substantial evidence.” *Id.*

In this case, a POSITA would have had a reasonable expectation of success in combining Dickerson and CryptoKube because Dickerson’s system is designed to power the oil production facility and to export excess electricity to the grid, and the combination would have required no more than plugging in an appliance to a power source. EX1005, [0039]; Petition, 19-20; EX1035, ¶16; EX1036, ¶17. Further, as discussed above, and contrary to what Upstream alleges, Dickerson produces “reliable” energy. *Infra* Section III.B.

V. THE LIMITATION “CONNECTED TO THE NETWORK INTERFACE AND ADAPTED TO...COMMUNICATE WITH THE BLOCKCHAIN DATABASE” IS OBVIOUS

Upstream alleges that the Dickerson+CryptoKube combination does not disclose the “connected to... communicate” limitation of claim 1, because (1) the Petition does not identify a “mining processor” and (2) the ASIC chip in the Spondoolies SP35 servers (“Spondoolies”) handles only the hashing function.

POR, 41-50. Similarly, Upstream alleges that the combination of MAGS and Polivka does not disclose this limitation. POR, 62-65.

Upstream is wrong on both points. The Petition states: “CryptoKube is built inside an ISO shipping container and is filled with spondooliestech, that is, blockchain mining devices, **each necessarily having a mining processor**” Petition, 23. Thus, the Petition explained that the “mining processor” is a subpart of the Spondoolies, and Mr. Kasdorf explained that this subpart can be an ASIC chip. EX2022, 59:9-60:16. To enable mining, the ASIC chip is necessarily connected to the network interface, and adapted to exchanges data (i.e., communicates)³ with the blockchain database. EX1033, 204:5-12 and 207:22-208:5 (“an ASIC chip needs to be controlled and have access to up-to-date information on the network.”); EX1034, 34:6-9 (“network connectivity is important and necessary”), 197:1-10 (“blockchain mining would require connections and communications with the blockchain database”), 199:23-200:1 (“exchanging with the blockchain database will be necessary”). Thus, this limitation is necessarily met by the ASIC chip in the Spondoolies.

³ The term “communicate” requires nothing more than information exchange. You transcript, 87:1-4 (“that’s what communication is all about”).

Even under Upstream’s overly narrow and incorrect view that claim 1 requires the “mining processor” to perform the communication functions, a combination of an ASIC chip and a controller would meet the “mining processor” limitation. EX1036, ¶21. Upstream’s expert admitted that the “mining processor” in Upstream’s products can be a subpart of the S9 miner. EX1034, 211:23-213:19 (“this subset, if they meet all the claim language, would be considered as a mining processor”). By the same rationale, the “mining processor” in CryptoKube can also be a subpart of the Spondoolies (e.g., the combination of the ASIC chips and the controller). EX1036, ¶21.

VI. UPSTREAM FAILS TO ESTABLISH THE REQUIRED NEXUS FOR SECONDARY CONSIDERATIONS

Regarding secondary considerations, Upstream relies on a self-serving declaration from Upstream’s owner and CEO Mr. Barbour, who is admittedly biased. EX1033, 125:10-127:2 (“I would stand to benefit”). Moreover, Mr. Barbour is not an expert witness (EX1033, 173:4-174:12 (“He is not being offered by Upstream data as – as an expert witness in this case.”)), and thus cannot offer opinion testimony on issues of invalidity, including secondary considerations and how Upstream’s products allegedly embody the claims of the ‘372 patent. *HVLPO2, LLC v. Oxygen Frog, LLC*, 949 F.3d 685, 689 (Fed. Cir. 2020) (“it is an abuse of discretion to permit a witness to testify as an expert on the issues of

noninfringement or invalidity...”); FRE § 701; *Verizon Servs. Corp. v. Cox Fibernet Virginia, Inc.*, 602 F.3d 1325, 1339 (Fed. Cir. 2010) (“the district court ... properly excluded these same witnesses from providing expert testimony on invalidity”).

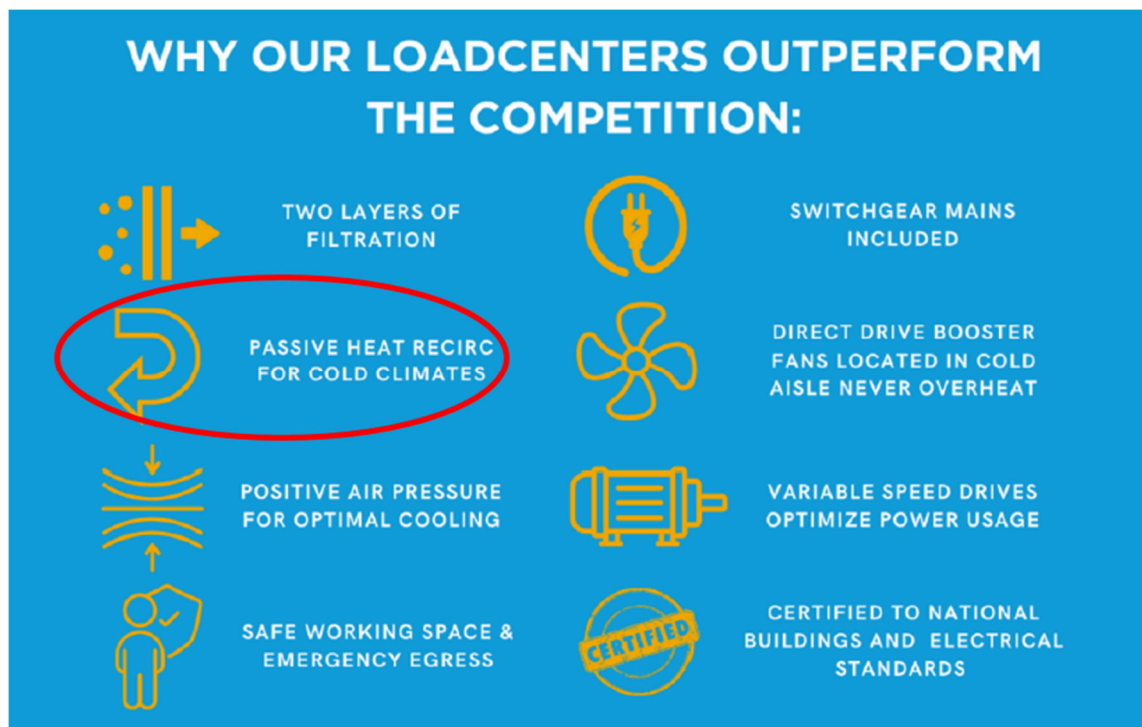
Upstream’s expert, Dr. You, fared no better. For secondary considerations, Dr. You simply relied on Mr. Barbour’s declaration and even copied Mr. Barbour’s declaration. EX2011, paragraph 74 (“For this portion of my declaration, I have relied on the declaration of Mr. Barbour... For consistency, I have copied relevant portions of Mr. Barbour’s declaration...”).

As explained below, Upstream failed to show the required nexus between the challenged claims and the alleged evidence of secondary consideration.

A. No presumption of nexus

A patent owner is entitled to a presumption of a nexus only if it can show the objective evidence is tied to a specific product that is “coextensive” with the claimed features, and a product is not coextensive with a claim if it includes a **“critical” unclaimed feature** that materially impacts the product’s functionality. *Fox Factory, Inc. v. SRAM, LLC*, 944 F.3d 1366, 1375-78 (Fed. Cir. 2019) (finding while the commercial product contained the claimed invention it also contained unclaimed features covered by another patent).

Upstream's products including the Hash Generator and the Hash Hut are not "coextensive" with the claims at issue. Upstream's own patent, US11659682, covers features in the cooling system of Upstream's products. EX1024 claim 1; EX1033, 132:11-133:6 ("many of the -- some of the early systems, like, had this kind cooling system"). Another Upstream patent, US11907029, covers the "passive heat recirc for cold climates" feature of Upstream's products. EX1025, claim 1; EX1033, 233:16-234:8 (explaining that the '029 patent covers the "passive heat recirc for cold climate" feature). As shown below in Upstream's marketing material, eight features (including heat recirc) were listed as "why our loadcenters outperform the competition," or in other words why they are critical:



EX1026, 2 (annotated). Thus, Upstream's products are not "coextensive" with the claims at issue, and the presumption of nexus does not apply.

If a patent owner does not meet the bar for a presumption of a nexus, the patent owner still has an opportunity to prove a nexus by showing that the objective evidence is the "direct result of the unique characteristics of the claimed invention." *Fox Factory, Inc. v. SRAM, LLC*, 944 F.3d 1366, 1373 (Fed. Cir. 2019). As discussed below, Upstream failed to do so.

B. Commercial success

Upstream asserts that the alleged "commercial success" of Upstream's products shows the claimed invention is not obvious. POR, 19-22. However, Upstream failed to show nexus—that the claimed invention of the '372 patent is the reason behind the alleged "commercial success." *Geo M. Martin Co. v. Alliance Machine Systems Intern. LLC*, 618 F.3d 1294, 1304 (Fed. Cir. 2010) ("The commercial success of a product is relevant to the non-obviousness of a claim only insofar as the success of the product is due to the claimed invention.").

Contrary to what Upstream alleges, Upstream's products do not embody claims 1 and 24. As evidence of commercial success, Mr. Barbour counted 284 units sold from 2021 to the date of the POR. POR, 22. However, at least one third of these 284 units were single device deployments (i.e., a system containing only a single Hash Generator or Hash hut) that do not meet claim 1, a fact admitted by

Upstream's expert. POR, 22 ("approximately 219 (~66%) were deployed in multi-system configurations"); EX1033, 156:9-161:20, 168:20-169:3; EX1034, 153:10-154:7 (explaining that a single deployment does not meet claim 1—"this photo does not meet the limitation"). Further, an unknown number of Upstream's products were deployed to utilize power from either the electric grid or sales gas lines. EX1033., 148:5-150:9 (explaining 36-100 customers connected Upstream's products to the electric grid—"I would guess we are under a hundred Hash huts sold where the customer applied it to a utility connect"), 151:5-10 (explaining "at least some customers" have connected Upstream's products to sales gas lines). According to Upstream, these electric grid and sales gas line based deployments do not embody claim 1 either. EX1034, 104:21-106:8 ("a commercial sales line, which is not a hydrocarbon production, storage, or processing facility"), 107:16-109:7 ("A power grid is different from a power generation facility"); EX1033., 96:15-98:2 ("probably does not embody claim 1").

Moreover, the alleged "commercial success" is attributable to either non-patented features or features patented in other patents. As discussed above, Upstream's website lists eight features as "why our loadcenters outperform the competition." EX1026, 2 and EX1027, 2. At least one of them, the "passive heat recirc for cold climates" feature, was patented in Upstream's patent US11907029. EX1033, 233:16-234:8. By comparison, the claimed invention of the '372 patent

(e.g., the combination of a gas generator and a blockchain data center) is found nowhere in Upstream’s marketing materials. *Tokai Corp. v. Easton Enterprises, Inc.*, 2011 WL 308370, *8–*9 (Fed. Cir. 2011) (“In discussing the marketing and sales of Tokai’s utility lighters, Tokai’s corporate representative not once referred to the automatic locking feature of Tokai’s lighters”).

Further, Upstream’s alleged commercial success may be attributable to numerous other reasons such as marketing efforts, increasing electricity costs, increasing computational efforts required for bitcoin mining, and increasing bitcoin price. EX1035, ¶21; EX1036, ¶26. Indeed, Upstream’s alleged commercial success may well be attributable to increasing electricity costs because the computation efforts required for bitcoin mining increases year-over-year and mining one bitcoin using the same device requires more and more electricity. EX1034, 57:14-58:6. Also, while Upstream asserts, without evidence, that the alleged “commercial success” was not driven by bitcoin price, its sales appear to have increased dramatically with the bitcoin price surge in 2021. POR, 21-22 (explaining 1 unit sold in 2017, 2 units sold in 2018, 10 units sold in 2019, 32 units sold in 2020, and 284 systems sold from 2021 to the date of the POR); EX1038, 3. *Prometheus Laboratories, Inc. v. Roxane Laboratories, Inc.*, 805 F.3d 1092, 1101-02 (Fed. Cir. 2015) (finding that the patentee had failed to show that the alleged increase in sales was due to the merits of the invention as opposed to “other changing variables.”).

C. Long-felt unmet need

Upstream alleges that there was a long-felt unmet need in the industry regarding how to utilize byproduct gas from oil wells, and this need supports a finding of non-obviousness. POR, 22-25. Upstream is wrong because, as explained below, (1) there was no unmet need; and (2) the alleged unmet need is not tied to the claims at issue (i.e., no nexus).

First, there was no unmet need in utilizing byproduct gas from oil wells because it was common practice for oil and gas companies to employ on-site gas generators to utilize byproduct gas from oil wells to power the oil pump and other equipment. EX1033, 25:9-26:16. Further, before the priority date, multiple other solutions existed to utilize byproduct gas from oil wells, including Dickerson, Belady, and MAGS. EX1034, 244:4-250:24. In fact, Belady discloses using byproduct gas to power a data center, and the '372 discloses nothing more than a specific use of Belady's data center—mining cryptocurrency. EX1011, Abstract; EX1034, 39:4-9 (admitting a data center can be used for cryptomining); EX1030, 1.

Further, the alleged unmet need of utilizing byproduct gas from oil wells is not tied to the claims at issue because the claims broadly cover not only systems drawing power from byproduct gas from oil wells, but also systems drawing power from primary product gas from gas wells, and even gas from sales gas lines.

EX1033, 162:14-24 (“any oil and gas application”); EX1034, 103:11-104:6 (“I think it covers both”); EX1033, 146:10-17 (“It might.”). In fact, the claims even cover systems drawing power from the electric grid. EX1033, 96:15-97:2 (“unless the electrical grid is comprised of a generator with source combustible gas, then perhaps”); *MeadWestVaco Corp. v. Rexam Beauty and Closures, Inc.*, 731 F.3d 1258, 1264-65 (Fed. Cir. 2013) (the specific claims under consideration were not limited to fragrance-specific uses); *Therasense, Inc. v. Becton, Dickinson and Co.*, 593 F.3d 1325, 1336 (Fed. Cir. 2010) (“Because the claims are broad enough to cover devices that either do or do not solve the ‘short fill’ problem, Abbott’s objective evidence of non-obviousness fails because it is not ‘commensurate in scope with the claims which the evidence is offered to support.’”).

D. Industry skepticism

Most of the evidence of alleged industry skepticism is self-serving testimony from either Upstream’s sales manager (Mr. Ortolf) or Upstream’s CEO (Mr. Barbour) based on his personal knowledge. POR, 25-28 (citing EX2016, 6); EX1033, 243:12-245:25 (“I don’t know what authority I could cite.”).

As with commercial success and unmet need, no nexus exists between the claimed invention and the alleged industry skepticism because, as discussed above, the claims of the ‘372 patent broadly cover not only systems drawing power from byproduct gas from oil wells, but also systems drawing power from primary

product gas from gas wells, gas from sales gas lines, and even systems drawing power from the electric grid. *Muniauction, Inc. v. Thomson Corp.*, 532 F.3d 1318, 1328 (Fed. Cir. 2008) (rejecting secondary considerations of skepticism where the nexus appeared directed to one specific embodiment within the scope of the claim as opposed to the entire scope of the claim).

E. Industry praise

As evidence of industry praise, Upstream cites to a K33 report that describes Upstream as a “leading company” that “pioneered the concept in 2017.” POR, 28-30. But this non-specific, so-called “industry praise” is legally insufficient to establish a nexus because it could be attributable to numerous reasons (i.e., other than the ‘372 patent) such as Upstream’s marketing efforts and market share. In other words, no nexus exists between the praise and the claimed invention. *In re Kavanagh*, 851 F. App’x 1028, 1033 (Fed. Cir. 2021) (“Nor did Kavanagh make any showing of a nexus between the enthusiastic reactions in the articles and the claimed subject matter”).

VII. THE LOAD CONTROL CLAIMS (CLAIMS 10-13, 35-37 and 40) ARE OBVIOUS

Upstream alleges that the ‘372 patent is nonobvious because it solves the byproduct gas problem by “modulating the mining power load.” POR, 4. However, this load control feature is found nowhere in the independent claims and is admittedly not required in most practical implementations. POR, 22 (“101 systems

(~30%) were deployed with an optional controller”); EX1033, 216:17-217:5 (“they were just taking a small chunk”). Moreover, this feature is rendered obvious by Belady, which discloses adjusting the load based on available gas supply. Petition, 54-55; EX1011, Abstract (“If the gas storage has insufficient gas, and a negative pressure spike occurs, the data center throttles down or offloads processing.”).

Regarding the load control claims (10-13, 35-37 and 40), Upstream argues no motivation existed to modify CryptoKube to achieve load control because, among other reasons, (1) the modification would involve significant changes, (2) a POSITA would have been motivated to shut off all mining servers considering the servers may be damaged by voltage and frequency drop in the power supply,⁴ and cooling may fail when no power is present, and (3) CryptoKube differed from Belady’s datacenter in that CryptoKube cannot offload processing to other data centers; (4) CryptoKube’s DCIM cannot control individual ASIC chips within Spondoolies; and (5) no POSITA was knowledgeable in both disciplines (oil and gas and crypto mining). POR, 51-55.

Upstream is wrong. First, as explained by Mr. Kasdorf, a POSITA would have been motivated to modify CryptoKube with a reasonable expectation of

⁴ There is no evidence of any “voltage and frequency drop” in either Dickerson or Belady.

success because CryptoKube was highly customizable and included PLC/DCIM software that could be programmed (1) to selectively shut off a subset of the Spondoolies based on power supply and (2) to ensure the cooling system is prioritized over the Spondoolies. EX1035, ¶30; EX1036, ¶35.

Second, the load control claims broadly cover both (1) shutting off a subset of Spondoolies and (2) shutting off all Spondoolies. EX1033, 211:5-14 (“The mining activity can be adjusted, I guess, a number of ways. Obviously, well, cutting power to it is one”); EX1034, 225:15-23 (turning on and off meets the limitation), 228:16-25; EX1035, ¶31; EX1036, ¶36.

Third, unlike some traditional data centers (e.g., a 911 call center), one advantage of bitcoin mining is that it can be paused and resumed at will—there is no need to actively offload the processing from CryptoKube because the processing is automatically offloaded to other miners in the blockchain network. EX1035, ¶32; EX1036, ¶37.

Fourth, the “increasing or decreasing” limitation in claim 10 requires nothing more than switching on or off the Spondoolies (e.g., all or a subset of Spondoolies). EX1033, 211:5-14; EX1034, 225:15-23 (turning on and off meets the limitation), 228:16-25; EX1035, ¶33; EX1036, ¶38.

Finally, as discussed above, a POSITA may be a composite of different types of individuals. *Infra* Section III.A. CryptoKube is highly customizable, and

an oil/gas POSITA could have easily worked with the CryptoKube supplier to modify the DCIM software. EX1035, ¶34; EX1036, ¶39.

VIII. OTHER GROUND-SPECIFIC ARGUMENTS

A. Ground 1 (Dickerson+CryptoKube)

Most of Upstream's Ground 1 arguments have been addressed above. Infra Sections III-VI.

Regarding the Dickerson+CryptoKube combination, Upstream also argues no motivation to combine existed because Dickerson does not provide “free excess electricity” considering its equipment cost. POR, 31. Upstream is wrong. In the proposed combination, Dickerson's system is already implemented to power the oil production facility, and there is no additional equipment cost needed. Petition, 19-20; EX1035, ¶35; EX1036, ¶42. Dickerson teaches that its system generates excess electricity and teaches selling the excess electricity to the grid. EX1005, [0039]. When no grid was available, a POSITA would have regarded CryptoKube as a great solution. EX1005, [0039] and [0024]. Further, Dickerson teaches “[t]he modular design approach of the containerized solution allows for future **design flexibility**” and “[t]hrough the addition of future engine and membrane units, additional gas can be processed and the **generation capacity can be increased.**” Dickerson, [0034]. Thus, to the extent that more power is needed, a POSITA would have been motivated to modify Dickerson as needed to increase the

generation capacity, taking into consideration the equipment cost and the potential profit generated by CryptoKube. EX1035, ¶35; EX1036, ¶42. A POSITA would have done so with a reasonable expectation of success considering Dickerson’s modular design. *Id.*

B. Ground 2 (Dickerson+CryptoKube+Belady)

Upstream repeats the Ground 1 arguments, which have been addressed above. Infra Sections III-VI. Regarding the load control claims, Upstream’s arguments also fail for reasons discussed above. Infra Section VII.

C. Ground 3 (Dickerson+CryptoKube+Belady+Boot)

Upstream argues, incorrectly, that the Petition did not identify with particularity whether Boot’s engine or Dickerson’s engine is used in this combination. POR, 55-56. In Ground 3, the Petition explicitly referenced Ground 2’s Dickerson-CryptoKube-Belady989 combination. Petition, 67 (“A POSITA would have found it obvious to improve **the Dickerson-CryptoKube-Belady-989 combination** by further including Boot’s teachings including using Boot’s load bank to absorb excess power”). Thus, it is clear that Ground 3’s combination uses Dickerson’s engine, adding Boot’s load bank.

Upstream attacks the motivation to combine, arguing (1) while Dickerson is a “full-facility generator,” Boot is a “pump-related generator,” and (2) Dickerson uses a chiller, which eliminates the need for a loadbank. POR, 56-58. First, similar

to Dickerson, Boot is also a full-facility generator. EX1012, 2:35-39 (listing loads including “electric motors, computers, motor controllers, lighting, heating and other electrical equipment”), claim 2 (listing loads including “auxiliary electrical equipment”).

Second, rather than soaking up excess electricity, Dickerson uses the chiller to produce natural gas liquids (NGLs) for economic and environmental purposes. EX1005, [0022]. Upstream identified no evidence that Dickerson’s chiller can soak up all the excess electricity. EX1035, ¶39; EX1036, ¶47. A POSITA would have been motivated to include Boot’s load bank to be safe because, similar to Boot, Dickerson’s power supply and demand may also fluctuate. EX1005, [0021]; EX1035, ¶39; EX1036, ¶47.

D. Ground 4 (MAGS+Polivka)

Upstream largely repeats the Ground 1 arguments, which have been addressed above. *Infra* Sections III-VI. The same motivation to combine in Section III applies equally to MAGS and Polivka.

Regarding the MAGS+Polivka combination, Upstream argues no motivation to combine existed because, unlike Dickerson, MAGS does not produce excess power even occasionally because all the energy produced by MAGS was already spoken for, according to Upstream. POR, 59.

Upstream is wrong. Similar to Dickerson, MAGS can power the oil production facility and can transmit excess electricity to the grid. EX1014, [0023] (“to power various oil field equipment 812, or transmitted to the grid 814.”), [0134] (“for either local use or sale to the grid.”), [0148] and [0161]-[0162] (“sale to the grid”). Thus, similar to Dickerson, a POSITA would have been motivated to utilize the free excess electricity when there was no grid access. Petition, 19, 81-82.

Upstream further argues no motivation to combine existed because MAGS only produces 450kWh, which is not enough to satisfy Polivka’s requirement of 120.3kW. POR, 60. Upstream is wrong. The 450kWh embodiment is just one example based on one MAGS-200. EX1014, [0144]. The output of MAGS can be adjusted when the gas supply is abundant and multiple MAGS-200 can be used. EX1035; ¶42; EX1036, ¶51. Young teaches “[f]lexible capacity scaling with multiple deployments on a single site.” Young, [0298]. Further, CryptoKube is customizable, and a POSITA can install as many Spondoolies as desirable. EX2022, 28:21-24. The same goes for Polivka—a POSITA would have known how to customize the system based on power supply. EX1035; ¶42; EX1036, ¶51.

Upstream also argues no motivation to combine existed because, in Young, the engine is rated for 150kW, but only “about 100kW” is required and thus 50kW would be left over for this engine. POR, 61. Upstream is wrong. As discussed

above, this disclosure is just one example based on one MAGS-200, and multiple MAGS-200 can be used. A POSITA would have known to adjust the capacity of the system based on demand. EX1035; ¶43; EX1036, ¶53.

E. Ground 5 (MAGS+Plivka+Belady)

Upstream argues, incorrectly, that it is unclear how Belady's gas shock absorber is combined with MAGS, and there is no reasonable expectation of success because Belady-989 taught shutting off gas flow to the generator when supply gas pressure rises. POR, 65-67. Belady's "pressure regulating valve" is just a safety feature, and under normal conditions, it should never be triggered, because excess gas can be diverted into storage during positive pressure spikes. EX1011, Abstract; EX1035; ¶45; EX1036, ¶57.

F. Ground 6 (101)

The '372 Patent centers around the abstract idea of using natural gas to power a blockchain mine, and the claims recite nothing more than "generic processes and machinery." Petition, 114. As discussed above, the claims of the '372 patent broadly cover not only systems drawing power from byproduct gas from oil wells, but also systems drawing power from primary product gas from gas wells, gas from sales gas lines, and even systems drawing power from the electric grid.

Upstream tries to use the specification to re-write and narrow the scope of the claims. For example, Upstream reads the limitation of “flare gas” from the specification into the claims to rewrite the claims to require a “generator running on a continuous flow **of flare gas** to produce electricity powering bitcoin mining computers connected to a network”. POR, 71. Contrary to what Upstream alleges, none of the claims are limited to use of “flare gas.”

Upstream also reads a negative limitation into the claims that is not there, arguing “the source of combustible gas for the recited generator in the ’372 patent **is not a residential gas line.**” POR, 71. Contrary to what Upstream alleges, none of claim have any limitation excluding residential gas lines.

IX. CONCLUSION

The Board should invalidate the ’372 patent.

Respectfully submitted,

Dated: July 16, 2024

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CERTIFICATION UNDER 37 CFR § 42.24

Under the provisions of 37 CFR § 42.24(d), the undersigned hereby certifies that the word count for the foregoing Petitioner's Reply to Patent Owner's Response totals 5,599 words, which is fewer than the 5,600 allowed under 37 CFR § 42.24(c)(1).

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CERTIFICATE OF SERVICE

Pursuant to 37 CFR § 42.6(e), the undersigned certifies that on July 16, 2024, a complete and entire copy of this Petitioner's Reply to Patent Owner's Response and accompanying exhibits were provided by email, to the Patent Owner, by serving the correspondence addresses of record as follows:

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