Volume II of V, Appx1848 to Appx6653
No. 23-1922

In the
United States Court of Appeals
for the Federal Circuit

BEARBOX LLC, AUSTIN STORMS,

Plaintiffs-Appellants,

v.

LANCIUM LLC, MICHAEL T. McNAMARA, RAYMOND E. CLINE, JR.,

Defendants-Appellees.

Appeal from the United States District Court
for the District of Delaware, No. 1:21-cv-00534-GBW-CJB
The Honorable Gregory B. Williams

JOINT APPENDIX

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(ii) economic dispatch revenue through arbitrage. *See*, *e.g.*, LANCIUM00028482, LANCIUM00033064, LANCIUM00033065, LANCIUM00030838, LANCIUM00028485, LANCIUM00033062, LANCIUM00024122, LANCIUM00033055, LANCIUM00033240, LANCIUM00030839 (spreadsheet attachments LANCIUM00030840, LANCIUM00030841, LANCIUM00030842), LANCIUM00030782, LANCIUM00033215, LANCIUM00024173, LANCIUM00029321, LANCIUM00018672. Lancium also continued to innovate its software-controlled fast ramping (*e.g.*, operations control), overall system design (*e.g.*, site layouts), and high-heat tolerance modular containers (e.g., scope changes; panel design; structural design; 2MW module designs issued for construction; 4MW V-box iterations; miner density designs; demo box reconfiguration plans; removal of evaporative cooler). *See*, *e.g.*, LANCIUM00019208, LANCIUM00019212, LANCIUM00019217, LANCIUM00019222, LANCIUM00019227, LANCIUM00019125, LANCIUM00019130, LANCIUM00019139, LANCIUM00019143, LANCIUM00019151, LANCIUM00019155, LANCIUM00018898, LANCIUM00018904, LANCIUM00025517, LANCIUM00025518, LANCIUM00025419, LANCIUM00025420, LANCIUM00025496 LANCIUM00019105, LANCIUM00019109, LANCIUM00019116, LANCIUM00019124. Additionally, Lancium worked with stakeholders and hired a consultant to analyze, develop, and advance the regulatory and protocol exemptions and changes that would be necessary to integrate its fast-ramping load technology into the ERCOT power grid. *See*, *e.g.*, LANCIUM00034586, LANCIUM00034587, LANCIUM00033660, LANCIUM00033662, LANCIUM00033672, LANCIUM00033656, LANCIUM00034755, LANCIUM00033645, LANCIUM00033648, LANCIUM00033628, LANCIUM00033632, LANCIUM00033629, LANCIUM00033617. Lancium also continued discussions with GlidePath for operation of a third-party datacenter container at a GlidePath site served by Lancium power skids and under

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

BEARBOX LLC and AUSTIN STORMS, Plaintiffs, v. LANCIUM LLC, MICHAEL T. MCNAMARA, and RAYMOND E. CLINE, JR., Defendants.	)	C.A. No. 21-534-MN-CJB

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Dated: March 16, 2022

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I. INTRODUCTION

Despite having a second bite at the apple, Plaintiffs BearBox LLC ("BearBox") and Austin Storms' ("Storms") (collectively, "Plaintiffs") re-pleaded conversion claim (Count V) and unjust enrichment claim (Count VI) both still fail as a matter of law. Indeed, Plaintiffs' unjust enrichment claim is still precluded by the availability of other remedies for the alleged conduct. And Plaintiffs' conversion claim does not—and cannot—allege a necessary element of conversion: that Plaintiffs were deprived of use or possession of tangible, movable property. Accordingly, the Court should dismiss Counts V and VI of Plaintiffs' Second Amended Complaint, with prejudice.

II. PROCEDURAL HISTORY

On April 14, 2021, Plaintiffs filed their original Complaint against Defendants, which included seven counts asserting claims for: (1) correction of inventorship for U.S. Patent No. 10,608,433 ("the '433 patent") to list Austin Storms as the sole inventor; (2) an alternative claim for correction of inventorship for the '433 patent to list Storms as a co-inventor; (3) conversion; (4) unjust enrichment; (5) trade secret misappropriation under the federal Defend Trade Secrets Act; (6) trade secret misappropriation under Texas state law; and (7) negligent misrepresentation. *See* D.I. 1. On May 3, 2021, Defendants filed their Answer and Counterclaims disputing each of Plaintiffs' claims and asserting several affirmative defenses and counterclaims, including that Plaintiffs failed to state a claim for trade secret misappropriation. *See* D.I. 13.

On May 24, 2021, in lieu of answering Defendants' Counterclaims, Plaintiffs filed an Amended Complaint ("First Amended Complaint"). D.I. 19. The First Amended Complaint withdrew Plaintiffs' trade secret counts, but maintained Plaintiffs' other claims. On June 28, 2021, Defendants filed their Motion for Judgment on the Pleadings seeking dismissal of Plaintiffs' claims for conversion, unjust enrichment, and negligent misrepresentation. D.I. 32. On January 18, 2022,

Your Honor issued his Report and Recommendation ("R&R") recommending granting Defendants' Motion, but allowing Plaintiffs leave to attempt to re-plead their unjust enrichment and conversion claims. D.I. 92. On February 2, 2022, Judge Noreika adopted the R&R. D.I. 97. On February 16, 2022, Plaintiffs then filed their Second Amended Complaint, which not only attempts to re-plead conversion and unjust enrichment but also attempts to reintroduce the Trade Secret Counts. *See* D.I. 103. On March 3, 2022, Lancium filed its Motion to Strike the Trade Secret Misappropriation Counts in the Second Amended Complaint ("Motion to Strike," D.I. 111). Briefing on the Motion to Strike is now complete and that motion is pending.

III. SUMMARY OF ARGUMENT

1. Plaintiffs' unjust enrichment claim should be dismissed because other remedies are available for the alleged conduct, which precludes this claim.

2. To the extent Plaintiffs' unjust enrichment claim is based on Defendants' alleged use of non-confidential information, it is preempted by federal patent law and should be dismissed.

3. Plaintiffs' conversion claim should be dismissed because Plaintiffs have not alleged—and cannot allege—that they were deprived of use or possession of tangible, movable property, which is a necessary element of conversion under Louisiana law.

IV. CONCISE STATEMENT OF THE FACTS

On February 13, 2018, Lancium filed a patent application, for which McNamara and Cline are inventors, that published as WO 2019/139632 A1 (the "'632 application"). D.I. 23 at Counterclaims ¶¶ 9-10; D.I. 26 ¶ 10. The '632 application is titled "Method and System for Dynamic Power Delivery to a Flexible Datacenter Using Unutilized Energy Sources" and explains that, for example, its inventions are useful for "[b]lockchain miners" because "[t]he intensive computational demand of blockchain applications makes the widespread adoption of blockchain

technology inefficient and unsustainable from an energy and environmental perspective. D.I. 23-1 at Cover, ¶¶ 19-20.

In May 2019, more than 14 months after filing the '632 application, McNamara attended an industry conference where he met Storms. D.I. 103, ¶¶ 33-34; D.I. 23, at Answer ¶ 32. Plaintiffs allege that Storms then told McNamara about "BearBox's technology" that purportedly "generally relates to an energy-efficient cryptocurrency mining system and related methods that reduce the inefficiency and environmental impact of energy-intensive mining operations by better utilizing available energy resources to increase the stability of the energy grid, minimize a mining operation's impact on peak-demand, and also alleviate energy oversupply and undersupply conditions." D.I. 103, ¶ 2. Storms alleges that he communicated with McNamara about "BearBox's technology" through "conversations, emails, and text messages," including a conversation at a dinner (D.I. 103, ¶ 33) and alleges that "Storms last communicated with McNamara on May 9, 2019." D.I. 103, ¶ 36.

Months later, in October 2019, Lancium filed a provisional patent application that matured into U.S. Patent No. 10,608,433 (the "'433 patent") for which McNamara and Cline are also the named inventors. See D.I. 103-1 at 1. In August 2020, Lancium filed a patent infringement suit against a company called Layer1 Technologies, Inc. ("Layer1") asserting infringement of the '433 patent. D.I. 103, ¶ 52; D.I. 23 Answer ¶ 44. Plaintiffs acknowledge that they became aware of the Layer1 lawsuit "on or about August 17, 2020" but did not contact Lancium at this time or make any claim to have invented the patented technology. D.I. 103, ¶ 54. Then, around March 8, 2021, Plaintiffs read a press release announcing that "Layer 1 has licensed Lancium's intellectual property and Lancium will provide Smart Response™ software and services to Layer1." D.I. 103, ¶ 57.

A few weeks later, on April 14, 2021, Plaintiffs initiated this lawsuit alleging Storms should have been listed as an inventor on the '433 patent. D.I. 1. Plaintiffs' Second Amended Complaint, the operative complaint, alleges that "[t]his is an action seeking correction of the named inventors of a United States patent under 35 U.S.C. § 256," and "[a]s such, this action arises under the laws of the United States." D.I. 103, ¶ 13. Likewise, Plaintiffs' claims for correction of inventorship assert that "[t]hrough omission, inadvertence, and/or error Storms was not listed as an inventor on the '433 patent and the currently listed inventors on the '433 patent were improperly listed." *Id.*, ¶ 60. Count I further asserts that "Storms is the sole inventor of the subject matter claimed in the '433 Patent," and Count II asserts that "[i]n the alternative, Storms is a joint inventor of the subject matter claims in the '433 Patent and should be added to the individuals currently named as inventors on the '433 Patent." D.I. 103, ¶¶ 59, 63. Additional allegations that Defendants McNamara and Cline were wrongly identified as the inventors of the '433 patent are found throughout the Second Amended Complaint. *See, e.g.*, D.I. 103, ¶¶ 1, 5, 7, 46, 48, 53.

Plaintiffs' original claims for conversion and unjust enrichment were likewise based on the allegedly incorrect inventorship of the '433 patent. As such, the Court concluded that these claims were preempted by federal patent law. *See* D.I. 92, at 7, 9; *see also* D.I. 97. Plaintiffs have re-pleaded these claims, which are now based on Defendants' alleged use of "BearBox's technology, including system designs, documents, data, and know-how" to "modify their Smart Response™ software." *See* D.I. 103, ¶¶ 85, 87, 92, 96.

V. ARGUMENT

A. Legal Standards

"When presented with a motion to dismiss for failure to state a claim pursuant to Rule 12(b)(6), district courts conduct a two-part analysis. First, the Court separates the factual and legal elements of a claim, accepting all of the complaint's well-pleaded facts as true, but disregarding

any legal conclusions. Second, the Court determines whether the facts alleged in the complaint are sufficient to show a . . . plausible claim for relief." *Eaton Corp. v. Geisenberger,* 486 F. Supp. 3d 770 (D. Del. 2020), *aff'd in part, vacated in part on other grounds, remanded sub nom. Siemens USA Holdings Inc v. Geisenberger*, 17 F. 4th 393 (3d Cir. 2021) (internal citations omitted).

A legally sufficient complaint must establish more than a "sheer possibility" that Plaintiffs' claim is true. *Ashcroft v. Iqbal*, 556 U.S. 662, 678 (2009). It need not contain detailed factual allegations, but it must go beyond labels, legal conclusions, or formulaic recitations of the elements of a cause of action. *Bell Atl. Corp. v. Twombly*, 550 U.S. 544, 555 (2007). "Where a complaint pleads facts that are 'merely consistent with' a defendant's liability, it 'stops short of the line between possibility and plausibility of entitlement to relief.'" *Iqbal*, 556 U.S. at, 678 (quoting *Twombly*, 550 U.S. at 557). If there are insufficient factual allegations to raise a right to relief above the speculative level, the claim must be dismissed. *Twombly*, 550 U.S. at 555.

B. Plaintiffs' State Law Claims Should Be Dismissed Because They Fail As A Matter Of Law

As with their First Amended Complaint, Plaintiffs' Second Amended Complaint does not specify under which state's law Plaintiffs assert their claims for conversion and unjust enrichment. *See* D.I. 103. However, Plaintiffs have affirmatively asserted a claim for trade secret misappropriation under Louisiana law. *See id.* at Count IV ("Trade Secret Misappropriation Under Louisiana Civil Practice and Remedies Code, Title 51, Section 13-A"). In addition, as the Court noted in its Report and Recommendation on Defendants' previous Motion for Judgment on the Pleadings, "both parties agree[d] that Louisiana law applies to the state law claims at issue here," which included claims for conversion and unjust enrichment. D.I. 92 at 5 n.4.

Moreover, under the "most significant relationship" test applied in Delaware to resolve conflict of laws issues, Louisiana law applies to the extent a conflict of laws exists. *Pennsylvania*

Emp., Benefit Tr. Fund v. Zeneca, Inc., 710 F. Supp. 2d 458, 466 (D. Del. 2010) (Delaware applies the "most significant relationship" test for conflicts of law); *see also Bavarian Nordic A/S v. Acambis Inc.*, 486 F. Supp. 2d 354, 361 (D. Del. 2007). This is because both BearBox and Storms are located in Louisiana, D.I. 103, ¶¶ 8-9, and any harm they allegedly suffered also would have occurred in Louisiana.[1] *See Selective Ins. Co. v. Phila. Indem. Ins. Co.*, No. N17C-08-325, 2018 WL 2215885, at *3 (Del. Super. Ct. May 15, 2018) ("[T]he Delaware Supreme Court held 'the law of the state where the injury occurred should apply unless, with respect to the particular issue, some other state has a more significant relationship … .'" (quoting *State Farm Mut. Auto. Ins. Co. v. Patterson*, 7 A.3d 454, 457 (Del. 2010)); *see also Abbott Lab. v. NutraMax Prod., Inc.*, 844 F. Supp. 443, 446 (N.D. Ill. 1994) ("The place of injury usually defines the locus of a cause of action" involving intellectual property, "and the damage to intellectual property rights is usually realized where the owner of the protected rights suffers the damage"); *Jeffers v. Kerzner Int'l Hotels Ltd.*, 319 F. Supp. 3d 1267, 1271 (S.D. Fla. 2018) ("Generally, in tort cases, the location where the injury occurred is the decisive consideration in determining the applicable choice of law."). Accordingly, Louisiana law governs Plaintiffs' unjust enrichment and conversion claims.

But as set forth below, Plaintiffs' unjust enrichment and conversion claims each fail as a matter of law and should be dismissed with prejudice.[2]

[1] Moreover, no other state has a more significant relationship to Plaintiffs' claims as Defendants are located in both Texas and California, *see* D.I. 23, ¶¶ 8-10, and there is no single state where the alleged conduct causing Plaintiffs' purported injury occurred or where any relationship between the parties is centered. *Pennsylvania Emp., Benefit Tr. Fund*, 710 F. Supp. 2d at 467-68.

[2] As set forth in Defendants' Letter to the Honorable Christopher J. Burke (D.I. 112) and their reply letter (D.I. 114) in support of the Motion to Strike the Trade Secret Misappropriation Counts in the Second Amended Complaint (D.I. 111), Plaintiffs trade secret claims should also be stricken.

1. ***Plaintiffs' Unjust Enrichment Claim Fails As a Matter of Law Because Other Remedies Are Available For the Alleged Conduct***

Despite Plaintiffs' attempt to re-plead their unjust enrichment claim, this claim fails as a matter of law because it is still based on the same conduct as their other claims. One of the elements of unjust enrichment under Louisiana law is that "there must be no other remedy at law available to plaintiff." *Baker v. Maclay Properties Co.*, 94-1529 (La. 1/17/95), 648 So. 2d 888, 897. Accordingly, the Supreme Court of Louisiana has explained that "the remedy of unjust enrichment is subsidiary in nature, and shall not be available if the law provides another remedy. The unjust enrichment remedy is only applicable to fill a gap in the law where no express remedy is provided." *Walters v. MedSouth Rec. Mgmt., LLC*, 2010-0353 (La. 6/4/10), 38 So. 3d 243, 244 (internal quotations and citations omitted).

Significantly, the court in *Walters* made clear that the relevant inquiry is not whether a plaintiff can actually prevail on an alternative claim, but rather whether there is a "gap in the law" such that no other legal framework governs the conduct alleged. Thus, it is "of no moment that plaintiff's tort claims have been held to be prescribed. The mere fact that a plaintiff does not successfully pursue another available remedy does not give the plaintiff the right to recover under the theory of unjust enrichment." *Id.* "In other words, even though a plaintiff may not succeed when it pursues its other available remedies, there is no cause of action in unjust enrichment if such a remedy exists." *Shaw v. Restoration Hardware, Inc.*, No. 21-1540, 2022 WL 343458, at *6 (E.D. La. Feb. 4, 2022) (granting motion to dismiss unjust enrichment claim); *see also Zaveri v. Condor Petroleum Corp.*, 27 F. Supp. 3d 695, 701–02 (W.D. La. 2014) ("As correctly held by Judge Feldman of the Eastern District, under Louisiana law, an unjust enrichment claim is a 'subsidiary' claim, not an alternative claim, which cannot be pursued when Louisiana law affords any other legal remedy.") (citing *JP Mack Indus. LLC v. Mosaic Fertilizer, LLC*, 970 F. Supp. 2d

516, 521 (E.D. La. 2013) ("[T]he availability of another remedy bars a plaintiff's claim for unjust enrichment, regardless of whether the plaintiff prevails in his pursuit of those other remedies.")); *Constance v. Austral Oil Expl. Co.*, No. 2:12-CV-1252, 2013 WL 6578178, at *9 (W.D. La. Dec. 13, 2013) ("Unjust enrichment is a specific cause of action that may not be asserted against a defendant as a mere catchall or safety net in the event that a plaintiff fails to succeed on the merits of his or her other claims.").

Indeed, unjust enrichment is considered "a ***remedy of last resort*** under Louisiana law." *Zaveri*, 27 F. Supp. 3d at 702 (W.D. La. 2014) (internal quotations omitted). Thus, as the Fifth Circuit held in *Ferrara Fire Apparatus, Inc. v. JLG Indus., Inc.*, "[t]he important question is whether another remedy is available, not whether the party seeking a remedy will be successful." 581 Fed. App'x 440, 443–44 (5th Cir. 2014) (applying Louisiana law). Moreover, unjust enrichment may not be asserted against a defendant "as a mere catchall or safety net in the event that a plaintiff fails to succeed on the merits of his or her other claims." *Id.* (citation omitted).

Here, Plaintiffs unjust enrichment claim is clearly based on the same alleged conduct as its conversion and trade secret misappropriation claims: the alleged use of "BearBox's technology" to improperly modify Lancium's Smart Response™ software. Indeed, Plaintiffs' unjust enrichment claim alleges that they "conferred a benefit on Defendants by providing them valuable technology, specifically BearBox's technology, including system designs, documents, data, and know-how" and "Defendants used Plaintiffs' system designs, documents, data, and know-how to modify their Smart Response™ software to function as BearBox's technology did, [and] [a]s a result, Defendants are deriving an unjust benefit from exploiting BearBox's property." D.I. 103, ¶¶ 92, 96. This is the same basis as their conversion claim, which alleges that "Defendants intentionally and willfully assumed dominion and control over BearBox's technology, including

system designs, documents, data, and know-how and improperly used it to modify their Smart Response™ software." D.I. 103, ¶ 87. Plaintiffs' conversion claim additionally alleges that "[d]espite providing Defendants with system designs, documents, data, and know-how that allowed Defendants to modify their Smart Response™ software, and corresponding system designs, Defendants have not compensated or recognized Plaintiffs for the use of BearBox's technology," which "constitute[s] an improper and unauthorized use of Plaintiffs' property." D.I. 103, ¶ 89.

Likewise, Plaintiffs' trade secret misappropriation claims allege that "Defendants misappropriated Plaintiffs' trade secrets when they used BearBox technology, without Plaintiffs' authorization, in at least its Smart Response™ software." D.I. 103, ¶¶ 72, 81. And Plaintiffs' trade secret misappropriation claims even allege that they have been harmed by "financial loss for any ***unjust enrichment*** caused by the misappropriation of the trade secrets." D.I. 103, ¶¶ 73, 82 (emphasis added).

Because there are other remedies available to address Defendants' allegedly wrongful conduct (*e.g.*, conversion and trade secret misappropriation), unjust enrichment is not an available claim, regardless of whether Plaintiffs can successfully proceed on its other claims. *See Walters v. MedSouth Rec. Mgmt., LLC*, 2010-0352 (La. 6/4/10), 38 So. 3d 241, 242. *Shaw v. Restoration Hardware, Inc.*, No. CV 21-1540, 2022 WL 343458 (E.D. La. Feb. 4, 2022). In *Shaw*, the court explained that the plaintiffs' unjust enrichment claim was based on "[t]he same alleged conduct [that] is the basis of plaintiffs' other claims in this litigation." *Id.* at *6. As such, the court held that "plaintiffs cannot succeed in proving the fifth element of the unjust enrichment claim: absence of another remedy" and therefore dismissed the unjust enrichment claim. *Id.* The court further explained that even though the plaintiffs' other claims that were based on the same conduct also

failed as a matter of law and were dismissed, "the failure on those claims would not lead to recovery under an unjust enrichment theory." *Id.*

Thus, because here BearBox's unjust enrichment claim is based on the same conduct as its conversion and trade secret claims, the unjust enrichment claim (Count VI) should be dismissed with prejudice.

2. ***To The Extent Plaintiffs' Unjust Enrichment Claim Is Premised On The Use of Non-Confidential Information, It Is Preempted By Federal Patent Law***

It is well-established that "[f]ederal law preempts state law that offers patent-like protection to discoveries unprotected under federal patent law." *Ultra-Precision Mfg., Ltd v. Ford Motor Co.*, 411 F.3d 1369, 1377-78 (Fed. Cir. 2005) (noting that "Federal Circuit law governs whether federal patent law preempts a state law claim") (internal quotations and citation omitted). The Supreme Court has also noted that "[a] state law that substantially interferes with the enjoyment of an unpatented utilitarian or design conception which has been freely disclosed by its author to the public at large impermissibly contravenes the ultimate goal of public disclosure and use which is the centerpiece of federal patent policy." *Bonito Boats, Inc. v. Thunder Craft Boats, Inc.*, 489 U.S. 141, 156-57 (1989). Thus, "[a]bsent secrecy, state law cannot create a collateral set of rights available as an adjunct or expansion to patent rights." *Ultra- Precision*, 411 F.3d at 1379 (quoting *Waner v. Ford Motor Co.*, 331 F.3d 851, 856 (Fed. Cir. 2003)).

Here, as addressed above, Plaintiffs' unjust enrichment claim is premised upon Defendants' alleged use of "BearBox's technology" to modify their Smart Response™ software—the same conduct that forms the basis of Plaintiffs' conversion and trade secret misappropriation claims. However, although Plaintiffs' conversion and trade secret misappropriation claims are explicitly limited to Defendants' alleged use of "confidential"

information (*see, e.g.*, D.I. 103, ¶¶ 68-72, 77-81, 88), Plaintiffs' unjust enrichment claim is silent regarding whether "BearBox's technology" at-issue was confidential. *See* D.I. 103, ¶¶ 91-101. Nonetheless, to the extent Plaintiffs base their unjust enrichment claim on Defendants' alleged use of non-confidential technology or information (or attempt to distinguish their unjust enrichment claims from their conversion and trade secret misappropriation claims on this basis), the claim is preempted by federal patent law. Under federal patent law, an idea is considered publicly available if "given to a member of the public without restriction." *See Pronova Biopharma Norge AS v. Teva Pharms. USA, Inc.*, 549 F. App'x 934, 940 (Fed. Cir. 2013); *see also Bonito Boats*, 489 U.S. at 149 (under the one year statutory bar of federal patent law's 35 U.S.C. § 102, "[o]nce an inventor has decided to lift the veil of secrecy from his work, he must choose the protection of a federal patent or the dedication of his idea to the public at large"). Thus, if Plaintiffs are permitted to pursue non-patent claims for use of an idea or technology that was publicly known, the Court would be allowing Plaintiffs to encroach impermissibly on the exclusive domain of federal patent law.

Indeed, the Federal Circuit, which "governs whether federal patent law preempts a state law claim," has repeatedly held similar unjust enrichment claims based on the use of non-confidential information to be preempted. For example, in *Ultra-Precision*, the court held plaintiff's unjust enrichment claim, which was premised upon the defendant's "using, manufacturing, and selling vehicles equipped with [Ultra-Precision's] technology" was preempted because the idea/technology was not kept confidential and was therefore "free for all the world to enjoy." *Id.* at 1380-82. Additionally, in *Waner* the court affirmed dismissal of the plaintiff's unjust enrichment claim premised upon the use of his non-confidential idea because such "ideas can only be protected under intellectual property law by the patent system." *Waner*, 331 F.3d at 856–57. Accordingly, to the extent Plaintiffs' unjust enrichment claim is premised upon the alleged use of

non-confidential technology, information, or ideas, this claim is preempted and should be dismissed with prejudice.

3. ***Plaintiffs' Conversion Claim Fails Because They Were Not Deprived Of Tangible Property***

Plaintiffs' conversion claim fails as a matter of law because their allegations do not—and cannot—state a claim for conversion. Under Louisiana law, "[a] conversion is an act in derogation of the plaintiff's ***possessory*** rights and any wrongful exercise or assumption of authority over another's goods, ***depriving him of the possession***, permanently or for an indefinite time." *Quealy v. Paine, Webber, Jackson & Curtis, Inc.*, 475 So. 2d 756, 760 (La. 1985) (emphasis added); *see also Bihm v. Deca Sys., Inc.*, 2016-0356 (La. App. 1 Cir. 8/8/17), 226 So. 3d 466, 478 (citing *Quealy*, 475 So. 2d at 760). Thus, conversion "is grounded on the unlawful interference with the ownership or possession of a movable." *CamSoft Data Systems, Inc. v. Southern Electronics Supply, Inc.*, 2019 CA 0731, 2019 WL 2865359, at *2 (La. Ct. App. July 2, 2019), *writ denied*, 282 So. 3d 1071 (La. 2019).

Here, Plaintiffs' conversion claim fails because Plaintiffs were not deprived, and do not allege that they were deprived, of ownership or possession of any tangible, movable property. As an initial matter, the only things that Plaintiffs allege that Defendants converted were "BearBox's technology, including system designs, documents, data, and know-how." D.I. 103, ¶ 87. Moreover, Plaintiffs only allege that they provided Defendants with information about "BearBox's technology" via "conversations, emails, and text messages." *See, e.g.*, *id.*, ¶¶ 33-34. Importantly, Plaintiffs do not allege that Defendants converted any paper or hard copy documents, and they do not allege that they were ever deprived of copies of or access to the allegedly converted "system designs, documents, data, and know-how." *See id.*, ¶¶ 84-90. Indeed, they do not allege that Defendants took or converted the only copies of their "system designs, documents, data, and know-

how." *Id.* They make no allegation that they were deprived of ownership or possession of their "system designs, documents, data, and know-how." *Id.* Nor could they because in order to email or text message any information to Defendants, Plaintiffs must have had their own copies. Thus, Plaintiffs fail to allege a cause of action for conversion.

CamSoft is instructive. 2019 WL 2865359, at *2-3. Similar to this case, in *CamSoft*, the plaintiff alleged the defendants were liable for conversion based on the alleged "ongoing use of CamSoft's confidential technical and business information" that included "device compilations, software code, know-how, networking designs, installation process, business methods, marketing plans, pricing information, and strategic wireless network integrator business plans." *Id*. The *CamSoft* court, however, granted summary judgment on the conversion claim for two reasons. One, the claim was based on "immovable, intangible information." *Id.* at *3. Two, despite the defendants' alleged use of CamSoft's information, "CamSoft was not deprived of its confidential business information," and "a conversion requires a deprivation of possession." *Id.* This same reasoning applies here because Plaintiffs have not alleged—and cannot allege—that they were deprived of their allegedly converted technology or information because they retained copies of this information. Indeed, just as in *CamSoft*, Plaintiffs do not allege that "their business information was taken from them in physical form or that they no longer had the use of their confidential information." *Id.* at 3 n.3.

Accordingly, the Court should dismiss Plaintiffs' conversion claim (Count V) with prejudice.

VI. CONCLUSION

For the reasons stated above, the Court should dismiss Count V (conversion) and Count VI (unjust enrichment) in the Second Amended Complaint, with prejudice.

Dated: March 16, 2022

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U.S. District Court

District of Delaware

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Docket Text:
REPORT AND RECOMMENDATION: The Court, having reviewed Defendants' motion seeking dismissal, pursuant to Fed. R. Civ. P 12(b)(6), of Plaintiffs' Count V (conversion) and Count VI (unjust enrichment) in the operative Second Amended Complaint ("Motion"), (D.I. 120), the briefing related thereto, (D.I. 121; D.I. 128; D.I. 133), and having heard argument on May 23, 2022, hereby recommends as follows: (1) With regard to Count V, the Court recommends that the Motion be DENIED. Defendants' argument is that Plaintiffs' conversion claim must fail as a matter of law because under Louisiana law (which both sides agree applies to these claims) there can be no conversion of electronic files (the type of documents allegedly converted in Count V) where the owner retains a copy of those files (as Plaintiffs acknowledge it did), since in such a case, the owner is not completely deprived of the property at issue. (D.I. 133 at 2-6) This is a difficult issue, and Defendants do cite to some Louisiana state court precedent that provides some support for their position. See CamSoft Data Sys., Inc. v. S. Elecs. Supply, Inc., 2019 CA 0731, 2019 CW 0514, 2019 WL 2865359, at *2-3 & n. 3 (La. Ct. App. July 2, 2019) (concluding that a claim for conversion could not stand because "a conversion requires a deprivation of possession" and the plaintiff retained a copy of the allegedly converted electronic materials at issue); but see Mabile v. BP, p.l.c., CIVIL ACTION NO. 11-1783, 2016 WL 5231839, at *1, *23 (E.D. La. Sept. 22, 2016) (permitting a conversion claim under Louisiana law that was premised on the defendant's obtaining of the plaintiff's schematic, where the plaintiff e-mailed a digital copy of the schematic but also retained a copy); cf. Total Safety, U.S., Inc. v.

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

BEARBOX LLC and AUSTIN STORMS, Plaintiffs, v. LANCIUM LLC, MICHAEL T. MCNAMARA, and RAYMOND E. CLINE, JR., Defendants.	C.A. No. 21-534-MN

DEFENDANTS' OBJECTIONS TO THE REPORT AND RECOMMENDATION (D.I. 143) REGARDING DEFENDANTS' MOTION TO DISMISS COUNTS V AND VI OF THE SECOND AMENDED COMPLAINT

Dated: June 9, 2022

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I. INTRODUCTION

Pursuant to Federal Rule of Civil Procedure 72(b)(2), Defendants object to the portion of the Report and Recommendation of Magistrate Judge Burke (D.I. 143, the "R&R") on Defendants' Motion To Dismiss Counts V and VI of the Second Amended Complaint (D.I. 120, the "Motion to Dismiss"), recommending that the Motion to Dismiss be denied as to Count V (Plaintiffs' claim for conversion). Plaintiffs' conversion clam is premised on the alleged conversion of electronic documents that Plaintiffs provided to Defendants, but for which they retained copies. Thus, Plaintiffs were not deprived of the allegedly converted property. Under applicable Louisiana law, however, conversion requires that the owner of property be deprived of possession of that property. Although the R&R acknowledges that "[t]his is a difficult issue," it mistakenly recommends against granting the Motion to Dismiss as to Plaintiffs' claim for conversion based on a misunderstanding that such a claim can arise if Defendants interfered with Plaintiffs' "ownership" of the allegedly converted property even if Plaintiffs were not deprived of possession of the property. But this is incorrect. Deprivation of possession is a necessary element of a claim for conversion under Louisiana law. Accordingly, the Court should grant Defendants' Motion to Dismiss in its entirety and dismiss Plaintiffs' claims for conversion and unjust enrichment.

II. BACKGROUND

Defendant Lancium LLC ("Lancium") is a technology company that since its founding in 2017 has been a leading innovator in the field of flexible datacenters to perform blockchain hashing operations, such as mining for cryptocurrency, with little to no energy costs using clean and renewable energy that would otherwise be wasted. D.I. 23 at 20. Lancium's technology and intellectual property, including its Smart Response™ software, enables more renewable energy on

the nation's power grid, and Lancium's innovations have led to numerous pending and issued patents on its technology. D.I. 23 at 23.

Plaintiff Austin Storms' only interaction with any of Defendants occurred in May 2019, when Mr. Storms met Defendant Michael McNamara and they attended a group dinner, along with several other people, after a one-day industry conference. In the days that followed, Mr. Storms and Mr. McNamara exchanged a handful of text messages and Mr. Storms sent Mr. McNamara a single email. *See* D.I. 103 at ¶¶ 32-36; *see also* D.I. 23 at Exhibits C and D (the exchanged text messages and email). Based on these interactions, Plaintiffs have asserted a series of meritless and legally flawed claims against Defendants seeking damages for the alleged improper use of information Mr. Storms allegedly provided to Defendants. *See* D.I. 19 (First Amended Complaint dropping Plaintiffs' originally pled trade secret misappropriation claims); D.I. 97 (dismissing Plaintiffs' conversion and unjust claims pled in the First Amended Complaint); 4/22/22 Minute Entry (striking the trade secret misappropriation claims pled in the Second Amended Complaint). Plaintiffs' currently pled conversion claim (aside from its unjust enrichment claim, which the R&R recommends dismissing) is the last of these claims, but it is equally meritless and legally flawed.[1]

Plaintiffs' operative Second Amended Complaint ("SAC," D.I. 103) alleges that Defendants converted "BearBox's technology, including system designs, documents, data, and know-how, and improperly used it to modify their Smart Response™ software … ." D.I. 103 at ¶ 87. Importantly, however, Plaintiffs only allege that they provided Defendants with information about "BearBox's technology" via "conversations, emails, and text messages." *See, e.g.*, *id.*, ¶¶

[1] If the Court grants Defendants' Motion to Dismiss in its entirety, Plaintiffs' only remaining claims will be their claims regarding the allegedly incorrect inventorship of U.S. Patent No. 10,608,433 (*i.e.*, Counts I and II of the Second Amended Complaint, D.I. 103), but these claims do not seek monetary damages.

33-34. Plaintiffs do not allege that Defendants converted any paper or hard copy documents, and they do not allege that they were ever deprived of copies of or access to the allegedly converted "system designs, documents, data, and know-how." *See id.*, ¶¶ 84-90. Plaintiffs also do not and cannot allege that Defendants took or converted the only copies of their "system designs, documents, data, and know- how." *Id.* They make no allegation that they were deprived of possession of their "system designs, documents, data, and know-how." *Id.*

Defendants moved to dismiss Plaintiffs' claim for conversion because under Louisiana law conversion requires that the owner of the allegedly converted property be deprived of that property.[2] *See* D.I. 121 at 12-13; D.I. 133 at 1-6. Indeed, as set forth in Defendants' opening brief in support of the Motion to Dismiss, under Louisiana law, "[a] conversion consists of an act in derogation of the plaintiff's ***possessory*** rights, and any wrongful exercise or assumption of authority over another's goods, ***depriving him of the possession***, permanently or for an indefinite time, is a conversion." *Quealy v. Paine, Webber, Jackson & Curtis, Inc.*, 475 So.2d 756, 760 (La. 1985)[3]; *see also Bihm v. Deca Sys., Inc*., 2016-0356 (La. App. 1 Cir. 8/8/17), 226 So.3d 466, 478 (citing *Quealy,* 475 So.2d at 760). Despite recognizing that "[t]his is a difficult issue," the R&R recommends denying the portion of Defendants' Motion to Dismiss regarding the claim for conversion. D.I. 143. Defendants object to that recommendation.

III. ARGUMENT

A. Legal Standards

"For reports and recommendations issued regarding dispositive motions, Rule 72(b)(3) of the Federal Rules of Civil Procedure instructs that 'a party may serve and file specific written

[2] The R&R correctly notes that Louisiana law applies to Plaintiffs' conversion claim and "both sides agree" on this point. *See* D.I. 143.

[3] All emphases added unless otherwise noted.

objections to the proposed findings and recommendations' '[w]ithin 14 days' and '[t]he district judge must determine de novo any part of the magistrate judge's disposition that has been properly objected to.'" *Speakman v. Williams*, No. 18-1252-MN, 2019 WL 4751939, at *2 (D. Del. Sept. 30, 2019) (quoting Fed. R. Civ. P. 72); *see also* 28 U.S.C. § 636(b)(1); *Brown v. Astrue*, 649 F.3d 193, 195 (3d Cir. 2011).

B. Plaintiffs' Conversion Claim Should Be Dismissed Because Conversion Under Louisiana Law Requires That The Plaintiff Be Deprived Of Its Property And There Is No Dispute That Plaintiffs Were Not Deprived Of The Allegedly Converted Property

Count V of Plaintiffs' SAC asserts a claim for conversion under Louisiana law based on Defendants allegedly converting Plaintiffs' electronic files. This claim fails as a matter of law, however, because conversion under Louisiana law requires that the owner be deprived of its property. Here, Plaintiffs only allege that they provided the allegedly converted files via email or text message, and as such, Plaintiffs could not have been deprived of the allegedly converted. This is because in order to email or text message any information to Defendants, Plaintiffs must have had their own copies. D.I. 103 at ¶¶ 33-34. Indeed, the R&R recognizes that "Plaintiffs acknowledge [they] did" retain copies of the allegedly converted property. *See* D.I. 143. Nonetheless, the R&R recommends that the Motion to Dismiss be denied as to Plaintiffs' conversion claim because although "[t]his is a difficult issue, and Defendants do cite some Louisiana state court precedent that provides some support for their position," it concludes that "regardless of whether Defendants are correct on that point," conversion can occur "when a defendant unlawfully interferes with the plaintiffs 'ownership' of a movable" and "Plaintiffs' conversion claim can be read to allege that this is what occurred here." D.I. 143. The R&R, however, is incorrect and conversion under Louisiana law requires that the owner of property be deprived of possession of that property in order for a claim for conversion to arise. In other words,

deprivation of possession is a necessary element of a conversion claim.

As an initial matter, there is more than "some support" for the requirement that a property owner be deprived of possession of its property in order for a conversion claim to arise. Indeed, the Louisiana Supreme Court has explained that "[t]he gist of a conversion has been declared to be not the ***acquisition*** of the property by the wrongdoer, but the ***wrongful deprivation*** of a person of property to the possession of which he is entitled." *Importsales, Inc. v. Lindeman*, 231 La. 663, 668, 92 So.2d 574, 575–76 (1957) (citations omitted). The Louisiana Supreme Court has also repeatedly noted the deprivation requirement for conversion when addressing conversion claims. *See Dual Drilling Co. v. Mills Equip, Invs., Inc.*, 721 So.2d 853, 857 (La. 1998) (explaining that the cause of action of conversion "is available to an owner ***dispossessed*** as a result of an offense or quasi-offense or, in other words, a 'tort'"); *Quealy*, 475 So.2d at 760 ("A conversion consists of an act in derogation of the plaintiff's ***possessory*** rights, and any wrongful exercise or assumption of authority over another's goods, ***depriving him of the possession***, permanently or for an indefinite time, is a conversion."); *Edward Levy Metals, Inc. v. New Orleans Public Belt R.R.*, 148 So.2d 580, 582 (La. 1963) ("It is well settled under concepts of conversion forming the basis for any tort action herein, that it is not the erroneous accumulation of the property by the wrongdoer which gives rise to delictual responsibility, but the wrongful ***deprivation*** of a person of property ***to the possession*** of which he is entitled once the possessor has knowledge that the property is under his control."). Intermediate appellate courts in Louisiana have also recently emphasized the deprivation requirement. *See, e.g. Bihm v. Deca Sys., Inc.*, 2016-0356 (La. App. 1 Cir. 8/8/17), 226 So.3d 466, 478 ("A conversion is an act ***in derogation of the plaintiff's possessory rights*** and any wrongful exercise or assumption of authority over another's goods, ***depriving him of the possession***, permanently or for an indefinite time."); *Glod v. Baker*, 998 So.2d 308, 317 (La. App.

3d Cir. 2008) (citing *Angelo and Son, Inc. v. Rapides Bank & Trust Co.,* 95–992 (La.App. 3 Cir. 4/10/96), 671 So.2d 1283, *writs denied,* 96–1173, 96–1204 (La. 6/21/96), 675 So.2d 1083) (same). Thus, it is well-established by controlling authority that conversion under Louisiana law requires a deprivation of possession, which Plaintiffs do not and cannot allege.

Although the Louisiana Supreme Court has not addressed a case where, as here, the conversion claim was based on the alleged conversion of electronic documents where the owner retained a copy, this situation has been addressed by the Court of Appeal of Louisiana for the First Circuit in *CamSoft Data Sys., Inc. v. S. Elecs. Supply, Inc.*, 2019 CA 0731, 2019 WL 2865359 (La. Ct. App. July 2, 2019), *writ denied*, 282 So.3d 1071 (La. 2019).[4] Indeed, *CamSoft* addressed a nearly identical situation where the conversion claim was based on the alleged "ongoing use of CamSoft's confidential technical and business information" that included "device compilations, software code, know-how, networking designs, installation process, business methods, marketing plans, pricing information, and strategic wireless network integrator business plans." 2019 WL 2865359, at *2-3. The *CamSoft* court, however, found that there could be no conversion because the claim was based on use of electronic files and "immovable, intangible information" and "CamSoft was not deprived of this information" but "***a conversion requires a deprivation of possession***." *Id.* at *3. Furthermore, the *CamSoft* plaintiff sought to appeal this decision to the Louisiana Supreme Court arguing that "[t]he First Circuit erred in holding as a *matter of law* that there can be no *deprivation* for purposes of conversion unless the subject property is completely removed by the plaintiff's possession and use" because in Louisiana "the law of conversion seeks to address the defendant's repudiation of plaintiff's ownership rights to the subject property." *See*

[4] Where a state's highest court has not spoken, a federal court applying state law has a duty to decide a case as it believes the state's highest court would have done. *Valley Forge Ins. Co. v. Jefferson*, 628 F. Supp. 502, 510 (D. Del. 1986).

Exhibit 2 (*CamSoft* plaintiff's application for writ of certiorari) at 5-8 (emphasis in original). But the Supreme Court ***denied*** the application for writ of certiorari. *CamSoft Data Sys., Inc. v. S. Elecs. Supply, Inc.*, 282 So.3d 1071 (La. 2019). Thus, beyond providing "some support" for Defendants' Motion to Dismiss, *CamSoft* establishes that Plaintiffs' conversion claim fails as a matter of law because they were not deprived of possession of the allegedly converted property.

Although the R&R cites *Mabile v. BP, P.L.C.*, No. 11-1783, 2016 WL 5231839, at *1, *23 (E.D. La. Sept. 22, 2016) and *Total Safety, U.S., Inc. v. Code Red Safety & Rental, LLC*, No. 19-12953, 2019 WL 5964971, at *1, *4-5 (E.D. La. Nov. 13, 2019) as contrary authority to *CamSoft*, both of these cases are federal district court decisions that are not controlling authority. *See* D.I. 143. In addition, *Mabile* was decided before *CamSoft* and thus did not have the benefit of its guidance on Louisiana law. Furthermore, *Total Safety* is inapposite because it did not address the deprivation requirement for a conversion claim. *See* 2019 WL 5964971, at *4-5. Rather, *Total Safety* only held that a conversion claim was not preempted by the Louisiana Uniform Trade Secrets Act.[5] *Id.*

The R&R cites to *CamSoft* in support of its conclusion that interference with "ownership" is an independent basis that can give rise to a conversion claim, but *CamSoft* does not support this conclusion. *See* D.I. 143. Rather, *CamSoft* is explicit that "conversion requires a deprivation of possession." 2019 WL 2865359, at *3. Moreover, similar to Plaintiffs' claims here, the *CamSoft* plaintiffs' conversion claim was based on the alleged "use of CamSoft's confidential technical and

[5] *Total Safety* was also raised by Plaintiffs for the first time during the hearing on the Motion to Dismiss. *See* Ex. 1 (5/23/22 Hr'g Tr.) at 27:18-23; *see also* D.I. 128 (Plaintiffs' opposition to Motion to Dismiss). Although the R&R cites to *Total Safety*, when counsel pointed out that *Total Safety* was not raised in the parties' briefing and was not appropriate authority to raise for the first time during oral argument, Magistrate Judge Burke responded that "I agree." *See* Ex. 1 at 29:2-17.

business information." *Id.* at *2. Thus, the conclusion that such use can give rise to a claim for conversion where there is no deprivation of possession is directly contrary to *CamSoft*'s holding.

The R&R also cites to Plaintiffs' opposition to the Motion to Dismiss in support of its conclusion that interference with ownership can give rise to a claim for conversion where there is no deprivation of possession. *See* D.I. 143. But as set forth in Defendants' reply brief, Plaintiffs' case law is all distinguishable, does not support this proposition, is not controlling, and/or predates *CamSoft*. *See* D.I. 133 at 2-5.

The Fifth Circuit has also made clear that interference with ownership is not an independent basis for a conversion claim under Louisiana law. In *Chrysler Credit Corp. v. Perry Chrysler Plymouth, Inc.*, where the plaintiff asserted a claim for conversion of funds, the Fifth Circuit explained that "to prevail against [defendant], [plaintiff] ***must prove*** that (1) it owned funds misused by him; (2) the misuse was inconsistent with its rights of ownership; ***and (3) the misuse constituted a wrongful taking*** of the funds." 783 F.2d 480, 484 (5th Cir. 1986); *see also Tri-state Bancshares, Inc. v. Scott*, No. CV 15-2053, 2016 WL 4098604, at *4 (W.D. La. July 28, 2016) (quoting *Chrysler Credit* and explaining that "[t]he Fifth Circuit articulates three elements to be proven by the plaintiff for the tortious conversion of funds under Louisiana law."). In other words, interference with ownership rights is an ***additional requirement*** for a conversion claim beyond the requirement for a "taking" (*i.e.*, a deprivation of possession). And here, Plaintiffs have not and cannot allege that they were deprived of the allegedly converted property. *See* D.I. 143. As such, the R&R's recommendation that dismissal of Plaintiffs' conversion claim be denied because interference with "ownership" is an alternative basis for such a claim is legally flawed. Plaintiffs' the conversion claim fails as a matter of law because they were not deprived of possession of the allegedly converted property.

IV. CONCLUSION

For the reasons stated above, the R&R's conclusion that interference with ownership is an independent basis for a conversion claim is mistaken. The Court should sustain Defendants' objections to the R&R and grant Defendants' Motion to Dismiss in its entirety.

Dated: June 9, 2022

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IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

BEARBOX LLC and AUSTIN STORMS, Plaintiffs, v. LANCIUM LLC, MICHAEL T. MCNAMARA, and RAYMOND E. CLINE, JR., Defendants.	C.A. No. 21-534-MN

CERTIFICATION PURSUANT TO DISTRICT OF DELAWARE STANDING ORDER FOR OBJECTIONS FILED UNDER FED. R. CIV. P. 72

Defendants Lancium LLC, Michael T. McNamara and Raymond E. Cline ("Defendants") hereby certify that the foregoing objections do not raise any legal or factual arguments that were not previously raised before Magistrate Judge Burke.

Dated: June 9, 2022

BARNES & THORNBURG LLP

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EXHIBIT 1

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

BEARBOX LLC, et al.,)
)
Plaintiffs,) C.A. No. 21-534-MN-CJB
)
v.)
)
LANCIUM LLC, et al.,)
)
Defendants.)

Monday, May 23, 2022
1:00 p.m.

BEFORE: THE HONORABLE CHRISTOPHER J. BURKE
United States District Court Judge

APPEARANCES:

ASHBY & GEDDES
BY: ANDREW MAYO, ESQ.

-and-

MARSHALL, GERSTEIN & BORUN
BY: JOHN LABBE, ESQ.
BY: BENJAMIN HORTON, ESQ.

Counsel for the Plaintiff

APPEARANCES CONTINUED:

BARNES & THORNBURG
BY: CHAD STOVER, ESQ.
BY: ADAM KAUFMANN, ESQ.
BY: MARK NELSON, ESQ.

Counsel for the Defendant

THE COURT: Good afternoon, everyone. It's Judge Burke here. Can everyone hear me okay?

COUNSEL: Yes, Your Honor.

THE COURT: All right. I know our court reporter is with us and we thank our court reporter for their service and let's go on the record in light of that and as we do let me just say a few things for the record. The first is that we're here this afternoon by way of teleconference in the matter of BearBox LLC, et al, versus Lancium LLC, et al. It's civil action number 21-534-MN-CJB here in our court. And we're here for a teleconference to hear brief argument on the pending motion to dismiss filed by the defendant's side.

Before we go further, let's have counsel for each side identify themselves for the record. We'll start first with counsel for the plaintiff's side and we'll begin there with Delaware counsel.

MR. MAYO: Good afternoon, Your Honor. This is Andrew Mayo from Ashby & Geddes on behalf of the plaintiff, BearBox and Austin

Storms. I am joined this afternoon by my co-counsel from Marshall, Gerstein & Borun, you have Benjamin Horton and John Labbe on the line.

THE COURT: All right. And Mr. Mayo, who will be addressing the issues today?

MR. MAYO: Mr. Horton, Your Honor.

THE COURT: Okay. Great. And similarly, we'll ask defendant's to identify themselves, again beginning with Delaware counsel and to let us know who will be addressing the issues for their side.

MR. STOVER: Good afternoon, Your Honor. Chad Stover from Barnes & Thornburg for defendants and with me are my partners Adam Kaufmann and Mark Nelson and Mr. Kaufmann will be addressing the Court this afternoon on this motion.

THE COURT: Okay. Thank you. Thanks to all. All right. Counsel, as you know, the motion to dismiss implicates two claims that are in the current iteration of the operative complaint. One is a conversion claim and then the second is the unjust enrichment claim. There is one argument for dismissal of

the conversion claim and for the unjust enrichment claim, there are a few different arguments. There, the arguments are related to the fifth element of the claim on the one hand and they will relate to the federal preemption argument on the other. Why don't we first deal with the arguments about the conversion claim and after we hear argument on that, we can move on to the unjust enrichment claim. On that front, let me then turn first to defendant's counsel and, Mr. Kaufmann, I'll turn to you and I'll just have a few questions and I'll certainly let you add anything else that you wish to add from your briefing if it's not something we get into via my questions.

And so with regard to the conversion issue, you know, a lot of this comes down to your argument that when it comes to Louisiana law, what has to be pleaded and established is that in some way what's alleged here is an instance of a party depriving the owner of possession of information or the ability to use the property or the information. And here your basic assertion is that the

complaint doesn't plead that because the information at issue was transferred electronically and it's clear from the allegations that the plaintiff retained a copy of it and so the plaintiff never lost -- was never deprived of possession of the information or the ability to use it.

Have I set out the gist of your argument at least by way of kind of framing it?

MR. KAUFMANN: Yes, Your Honor, I think you have. I guess maybe one point of clarification I would make is you're correct that the primary basis for our claim is that there's been no alleged deprivation of the converted property. I will say I think there's two aspects to the allegation of what the converted property is. The second amended complaint refers to conversion of some actual electronic documents, but also know-how is one of the things that is allegedly converted. And to the extent that know-how is not tied to physical things, physical documents or electronic documents, our position is that would also be, you know, not the proper subject matter

of a conversion claim because it's intangible. Know-how divorced from any physical document is intangible and can't be converted and then of course for the electronic documents, there was no deprivation and so there can also been no conversion.

THE COURT: I don't remember this know-how issue coming up from the briefing. My memory of the briefing, what the parties were arguing about there, it seemed to be understood that yes, the information that is alleged to have been converted was information that was sent electronically and obtained electronically and that presumably stored electronically at defendant's side. Did the parties get into this -- do you disagree? Did the parties talk about what you were just talking about now in the briefs?

MR. KAUFMANN: Well, Your Honor, I'd just point out that in our brief the way the claim has been alleged refers to know-how as we've noted in our briefing as well. But you're correct, I don't believe there's any dispute that what was converted was electronic

documents.

THE COURT: Okay. And then I guess, you know, there was some back and forth about whether under the Louisiana law electronic information or documents can be the type of property that could be converted. And at some point I guess certainly about the time of the reply brief you acknowledged, yes, that's true, we're not saying on the defendant's side that electronic information can't be converted. And I guess my question there to you was, in your view is the only way that electronic information can be converted is if a party either literally kind of takes the electronic information physically, you know, say, for example, like in one of the cases is information on a hard drive, and takes that hard drive and takes it away from the plaintiff or if the defendant's side, you know, deletes or gets rid of the electronic information? Put differently, in your view, is there any way that you can convert electronic information simply by receiving it, you know, via like an e-mail or a text or something like that?

MR. KAUFMANN: Well, Your Honor, I think that the conversion does require a deprivation of the property and so just by receiving a copy of electronic documents via e-mail or some other electronic conveyance, no, I don't believe there is a way that that could be converted as long as the owner of that property retained a copy of it. I think you correctly summarized that instances of conversion of electronic documents could occur in instances like where the documents are stored on a physical hard drive and the hard drive is taken or, yeah, the files were withheld from the owner, I believe is one of the cases. What was discussed in the briefing dealt with a situation where a party developed software that was, you know, stored on a computer hard drive and then didn't turn it over to the party that had paid for it.

THE COURT: Right. Like if two parties entered into a contract and the defendant is supposed to develop and create software for the plaintiff, but the allegation is defendant never gave this software to the

plaintiff, you know, that's if you have electronic information or software that can be properly said to be alleged to be converted, but you would say it's an example where the entirety of that information is in the defendant's possession?

MR. KAUFMANN: Correct.

THE COURT: Okay. And then I guess just thinking about it, how come there can't be a deprivation of property regarding electronic documents when an owner or plaintiff retains a copy? Isn't it -- couldn't it be said that the owner is deprived of sole possession of the electronic documents in that situation, even if they're not deprived of total possession of the information?

MR. KAUFMANN: No, Your Honor, I don't believe there could be. You know, the only, I think, potential scenario I could see where there could be a deprivation where the owner of the files retained a copy could be in the scenario where the information was the basis of a patent. But as Your Honor knows, the original conversion claim in this case was based

on that, that Lancium converted BearBox's property by patenting it. And Your Honor, you know, correctly found that that claim was not viable and dismissed that claim. And so now the basis of this conversion claim is something different than that. Right? I mean, the allegations are no longer that the property was converted into a patent whereby Lancium would have the ability to prevent, you know, someone else from using their patented technology. As long as BearBox had a copy of their electronic files, they can do whatever they want with it. And again, that property, the basis of the conversion claim is something different than what is the subject matter of the patent that their enrichment claims relate to.

THE COURT: I think what you're saying is, tell me if I'm wrong, but under the Louisiana law when it comes to conversion, there isn't the idea -- you can't have a scenario where, you know, there's a piece of property, say electronic information, or any kind of property really, and the plaintiff holds onto one copy of it, but the defendant gets another

copy of it and the plaintiff can claim that the defendant converted their property. Isn't that right? Isn't that -- isn't that, from what you're arguing, you can't have a conversion claim under Louisiana law in your view if each side keeps a copy, if each side ends up with a copy of the allegedly converted electronic material, is that right?

MR. KAUFMANN: I think that is correct, Your Honor. And that, you know, I think what the CamSoft case found, you know, explicitly, that, you know, they quoted the Louisiana supreme court Binn case, cited to the Binn, says that a conversion requires a case of possession. And, for example, in CamSosft there was no deprivation because the owner of the property retained copies of their information and so there could not be a conversion.

THE COURT: And then last question for you that I had, the Louisiana law, as both sides note, lists out the seven kind of possible examples of conversion. And in describing what those things are, again, you say that they each involve depriving the owner of possession or the

ability to use its property. I guess my question is how is that true with example number seven, which is referred to as ownership is asserted over the channel. Can't you have a scenario where you have a conversion claim where a party claims that they own certain property but nevertheless, it physically remains -- also remains in the hands of the plaintiff?

MR. KAUFMANN: Well, Your Honor, I don't believe you could have that scenario where there would be a situation other than, you know, the scenario I mentioned before, where the -- you know, we're talking about the subject of a patent. You know, the Louisiana supreme court has been clear that, you know, the basis of a conversion claim, in the Import Sales case the supreme court was explicit that the gist of a conversion has been declared not to be the acquisition of the property by the wrong does, but the wrongful deprivation of a person of the property to the possession to which he is entitled. And the only way to assert ownership over property that would deprive the owner of that ownership would be to have physical

possession of it, unless there was some legal mechanism to preclude them from using that property. And I think the only legal mechanism that could be would be a patent. And Your Honor has already found that that can't be the basis of a conversion claim.

THE COURT: Taking it out of the electronic information context, though, let's say think about just a physical item, like a car. Let's say a plaintiff on its property has a car and a defendant says, hey, that's my car. I don't have the physical car, but I think that's my car. And the defendant maybe goes and files some type of legal claim in Louisiana trying to convince somebody that the car is the defendant's, but the plaintiff says, that's totally false, this is my car. The defendant is asserting ownership of this physical thing that I still possess, but I think defendant's converted it or maybe defendant is successful with their legal challenge if they converted it. Can't you have -- in the physical realm, can't you have a physical conversion claim where you assert ownership of something even though the

thing is still in the possession of the plaintiff?

MR. KAUFMANN: Well, I don't think in that scenario that could be a conversion, because if there was a legal claim that was filed, you know, asserted against ownership of the claim and it was successful, then, you know, then the claimant prevailed and there would be no wrongful taking or you know, and if they -- if they were unsuccessful, then there was no interference with the property either. So there, Your Honor, I don't believe there's any mechanism. I guess the one example of depriving the property owner of ownership would be in a situation like what we discussed earlier where, you know, developing the software and not turning it over to the owner could be an example of interfering with ownership, but there there's still a deprivation.

THE COURT: Okay. Mr. Kaufmann, is there anything more you want to say about this conversion issue before I turn to your colleague on the other side?

MR. KAUFMANN: Your honor, the

only final point I would make on that is I think the CamSoft case is wholly precedent here and dealt with this issue, you know, nearly identical issue and concluded that there could be no conversion of electronic documents where there is no deprivation of the property owner. And under CamSoft, I think BearBox's claim necessarily fails for identical reasoning that there is simply no deprivation here because BearBox at all times retained a copy of the allegedly converted property and the ability to use it.

THE COURT: Okay. All right. Thank you. Let me turn to plaintiff's counsel. And Mr. Horton I know is going to take this issue. And Mr. Horton, I'll start out where the defendant's side left off. If they say hey, look, we have a Louisiana state court case that we think pretty clearly addresses this issue and, you know, of course no case is a hundred percent the same facts, but basically pretty clearly says that, you know, when it comes to electronic information, you know, can electronic information be converted? Yeah, but what we

would have to see is someone physically taking possession of that electronic information of the plaintiff's and depriving them of it. And if you simply had a scenario where the electronic information was transmitted from a plaintiff to a defendant, but the plaintiff kept a copy, defendant says that CamSoft kind of indicates that that wouldn't cut it. In your brief you cited some cases in support of your conversion claim, but do you have a Louisiana state court case that's about a conversion claim that really strongly supports your position?

MR. HORTON: Yes, Your Honor. Well, first, if I could address quickly the CamSoft decision.

THE COURT: Sure.

MR. HORTON: The CamSoft decision was a summary judgment decision, Your Honor. And what the court found was there wasn't sufficient evidence and denied summary judgment on that basis. It did not contemplate the pleading standard for conversion under Louisiana law, which is what we're talking about here in the instant motion, Your Honor.

The other thing I'd say about CamSoft is the CamSoft court also held that software was not protectable under Louisiana conversion law, which is something that has been rejected by the Louisiana supreme court and Lancium itself acknowledges is incorrect in its reply brief. And so if we're debating the correctness or applicability of CamSoft, I think both of those points are important and worth noting. In terms of --

THE COURT: I guess, Mr. Horton, just to stop you briefly on the first point, you said it in your brief to, but of course it's correct that CamSoft's summary judgment decision you say wasn't addressing the pleading standard, but what it was addressing, plaintiff says was addressing what the law requires as to these claims. You know, all the time we have instances where like in a summary judgment scenario you have to take a look at like what is required for this claim, you know, whether to plead or prove it. And, you know, you can get a lot of level information from courts about what does a claim require and what just doesn't cut

it. In a summary judgment decision that can be useful for a motion to dismiss. I guess if everything I'm saying is correct and I think it is, how come, you know, you may disagree with CamSoft for other reasons, but why is it the fact that the summary judgment decision is irrelevant here?

MR. HORTON: I think some of the facts that the CamSoft court relied on was lack of evidence on certain things. And so, Your Honor, to the extent, your point is well taken that a summary judgment opinion can inform, you know, what might be required under a pleading standard, but here the Court's discussion of those issues was focused on what the plaintiff did not do in terms of introducing evidence and sort of roundabout reached its conclusion on that basis. So I'm just suggesting that I think that's an important context that we have for CamSoft. And the other important point is, you know, the fact that there was another very wrong portion of the decision that I think Lancium's own positions are inconsistent with CamSoft and so we should note that.

THE COURT: Okay. All right. And then back to the question about, you know, the case law that you cite. Do you have a Louisiana state court case regarding conversion that you think is pretty applicable on the facts?

MR. HORTON: Well, I think first, Your Honor, I would go to the Louisiana supreme court decision in their discussion as to what constitutes conversion. We've been talking about the Dual Drilling case, the Dilio case where the supreme court lace out the seven acts that would constitute conversion. I think Your Honor is exactly right in pointing to, for example, the seventh action where the Louisiana supreme court I think very intentionally chooses the word ownership, you know, for instance, separate from possession to illustrate that concept. I also think it's important to note that act number four, possession of, withheld from the owner or possessor. That's exactly the one act of conversion that I think Lancium is trying to expand or I guess consolidate all acts of conversion into, just number four, when the others are much broader, including number one,

Your Honor, where it says possession is acquired in an unauthorized manner.

THE COURT: Just to jump in. You know, when I read the seven examples, you know, I saw it in your brief that you were trying to say like, well, four is an example of when you physically take something from another person, you know, and they don't have it anymore, but look at all these others. But when I read them, I don't know, it seems like all or almost all of them are meant to be talking about examples of just that. You know, like number one, possession is acquired in an unauthorized manner. Well, I acquired possession, I took the thing, you don't have it anymore. Number two, the channel is removed from one place to another, with the idea that you're going to exercise control over it. I took the thing. I have it. You don't have it anymore. Number three possession of the channel is transferred without authority. It's transferred, now I've got it. You don't have it anymore. You know what I mean? So I don't understand why -- why is fourth only one of the possible conversion

scenarios that deals with the physical obtaining of an item without the other side having it?

MR. HORTON: I think, Your Honor, the fact that it is explicit I think is acknowledgement that each of those other scenarios could have a situation where there's a dual possession or a partial possession. And so the fact that it is laid out explicitly, I think, acknowledges that those other possibilities exist. For example, number six, the channel was used improperly. Well, that doesn't say who is possessing the channel at the time, just that it's being used improperly. Your Honor had the example about a car where someone is making the argument that that's my car. The plaintiff says no, it isn't. I can imagine other scenarios where someone is trying to take out a loan as collateral on someone else's house. They say it's their house. Well, the plaintiff at all times had possession of their house. So there's all kinds of these examples that we think up and I think the Louisiana supreme court was explicit when articulating number four and saying that that

alone is an act, but it's not necessarily required for any of the others. And I think it's also important, Your Honor, to look at, you know, what the supreme court says when it summarizes those seven acts. You know, I think in defendant's brief they used the word deprivation in an argument today. Deprivation is the word that's used, but the full quote from the Louisiana supreme court is conversion consists of an act of deprivation of the plaintiff's possessory rights, comma, and deprivation is impairment or interference. But it goes on to say and any wrongful exercise of assumption of authority over another's goods depriving him of a possession permanently or an indefinite time is a conversion. What you've got there, Your Honor, is sort of that first statement of an act of deprivation as a conversion and them where it gives an example of a conversion. And I think that's more consistent with how the supreme court has laid out these seven types of conversion, an act of deprivation, interference with the plaintiff's possessory rights and I think that it makes

sense that in the electronic context an interference with the plaintiff's possessory rights would be interference or elimination of exclusive possession of electronic information, right? It seems to flow that it would be actionable or should be actionable under conversion if a defendant has, for example, taken a customer list or a schematic on how to build a product and then used that information to compete unfairly with the plaintiff who possessed those things and still would possess those things, you know, unlawfully taking profits and sales away from that plaintiff. I think that's exactly the type of act where there's dual possession that would be actionable under conversion. And in fact, there are decisions that we've cited to in the briefing that contemplate exactly that. The Mayville decision, Your Honor, and explicit when it talks about copied the schematic and used it to compete unfairly and illegally with the plaintiff.

THE COURT: Do you think in Mayville it's clear from the case that the owner

retained a copy of the information?

MR. HORTON: I do, Your Honor.

THE COURT: Okay. And then in terms of the -- just one more question about the way the supreme court explains the tort. I talked about number seven with the other side. Are you asserting -- are you saying in your complaint that in some way the defendants asserted ownership over the channel, which I guess here is the electronic information that passed between -- from plaintiff's side to defendant's side? And if you are, in what way did they assert ownership of it?

MR. HORTON: I think we are, Your Honor. I think there's -- I think we articulated in the briefing there's at least four acts under Louisiana supreme court law that we pled as actionable. Ownership I think is one of them and that would be in the way in which the defendants have taken the electronic information and asserted ownership in terms of modifying their business practices, soliciting and obtaining investments in their business based on their ability to practice the methods

and really making money off of it, Your Honor. They've asserted ownership over the information that way.

And if I could direct the court to a specific cite from Mayville to answer that question, Your Honor. It's to page 1 actually of the decision. And the quote is, the plaintiff left a schematic drawing with the defendant and later e-mailed a digital copy of the drawing. So that case actually contemplates exactly what we are a talking about here, e-mails the schematic and of course necessarily retaining a copy.

THE COURT: Okay. And I guess lastly and more broadly, you know, how can it be said that the defendant impaired the plaintiff's possessory rights to the electronic information if in the end the plaintiff still possessed the electronic information? Is the answer that, well, the definition of conversion is broader than impairing possessory rights or is the answer, well, they impaired our possessory rights because we no longer had sole possession of the information?

MR. HORTON: Yeah, I think that's one important articulation, Your Honor. By impairment by impairing the exclusive possession of that information, going back to the example I gave of a competitor acquiring a schematic. Now both competitors have the schematic, but previously the second competitor didn't have it, now they have it, they're making a competing product and now the market is split in purchases of that product where otherwise it wouldn't have that.

THE COURT: Okay. Anything further you wanted to add, Mr. Kaufmann on this conversion issue? Apologize. Mr. Kaufmann, before I turn to you, I should give Mr. Horton a chance to tell me if he had anything else. Mr. Horton, did you have anything else before I turn back to Mr. Kaufmann?

MR. HORTON: There are other decisions, Your Honor, that contemplate dual possession of electronic information that I'd be happy to draw the Court's attention to. One is called Total Safety. It's 2019 WL 5964971. And of course they also cited Buena Vista is another

case that's in the briefing, Your Honor. I think that was defendant's took issue with that in the reply brief saying that the allegations actually were that the electronic information was copied but then the original version was deleted. But that's actually not what happened in Buena Vista. The conversion allegation was that information was copied put in archive and then a separate allegation of conversion was that different information was deleted from the plaintiff's server, so I wanted to make that clarification for the Court.

THE COURT: I think you're talking about Euro Veritas, am I right?

MR. HORTON: I'm sorry, yes.

THE COURT: Okay. Got it. Let me go back to Mr. Kaufmann. Anything you want to say by way of brief rebuttal on the conversion issue?

MR. KAUFMANN: Yes, Your Honor. One, I'd point out that the Mayville case predates CamSoft by three years maybe. It was a 2016 decision, CamSoft was from 2019. And of course Mayville was an Eastern District of

Louisiana case which is not controlling authority where of course CamSoft is. And Your Honor, the total safety case Mr. Horton just mentioned I don't believe is cited in the briefing, so I don't believe that's an appropriate authority to assert for the first time in this argument.

THE COURT: I agree. If there are cases that the parties find after they submitted the briefing that they think are particularly helpful, we have a way to do that which is to file another supplemental brief if it's something that, that's new. And if it's not, you know, there should at least be a way to try to give the other side a fair chance to respond to it if they haven't heard it before, so I understand your point there.

Okay. Let's move on to the unjust enrichment issue. And again, I'll turn to defendant's side first. And I guess, Mr. Kaufmann, there there are two arguments you're making, if I'm seeing it correctly, as to why this claim should be dismissed. One is that the plaintiff can't satisfy the fifth element, that

there be no other adequate remedy in law and the second is the preemption claim. If you are correct on either one of them, you prevail, am I right about that?

MR. KAUFMANN: Yes, Your Honor. Although actually I believe the first point that BearBox can't establish the fifth element applies no matter what. The preemption issue is really just to -- we included that to address I think a potential argument or an ambiguity that I don't believe BearBox has actually asserted, which is if they were to assert that their unjust enrichment claim was based on non-confidential information, the briefing doesn't state that, doesn't make that assertion.

THE COURT: The presumption affirmative defense only relates to the extent that the claim is meant to refer to non-confidential information that was passed along and I think right now you're saying you don't actually think that's what the plaintiff is alleging, but just in case they are, if they were, you would have a preemption argument?

MR. KAUFMANN: That's correct.

THE COURT: Okay. I guess on the preemption issue, just briefly since we're talking about it, how come this -- you know, and the briefing basically, just for the record the briefing basically kind of is a dispute about whether federal circuit law permits an unjust enrichment claim outside of the alleged, you know, enrichment with regard to confidential information that may have been shared in a quasi contract way. And I think you acknowledge that federal circuit has said that, look, there can be some circumstances if a plaintiff is alleging that the defendant was unjustly enriched, even in the patent world when it comes to information that was provided based on the promise of confidentiality, there can be ways in which that kind of a claim can survive. But you say otherwise in a circumstance like this where we're dealing with a case of this nature, if it's non-confidential information that's transferred, federal circuit law just would not let you make an unjust enrichment claim. Is that right??

MR. KAUFMANN: That's correct,

Your Honor. There may be scenarios where an unjust enrichment claim could be based on confidential information, but not -- there can not be a situation where a conversion claim or I'm sorry, an unjust enrichment claim is based on use of non-confidential information, that wouldn't be preempted.

THE COURT: And how come this confidential/non-confidential distinction didn't come up the last time when we were having the motion to dismiss arguments about this kind of a claim?

MR. KAUFMANN: Well, Your Honor, because I think the nature of the allegations were just different previously. In the first amended complaint the allegations were that the patent, you know, what was patented was BearBox's technology and that the unjust enrichment was the incorporation of that technology into the patent. And that is -- a claim of that nature is preempted separately from the confidentiality issue. The claim is directly tied to whether the patent is the, is the basis of the unjust enrichment.

THE COURT: Okay. I mean, going back and re-reading the briefing and the decision last time, it seems like the issue there just really solely turned on, you know, was the allegation in the complaint, one, as to this unjust enrichment claim, that it turned on an assertion of inventorship and if it was, in my decision I highlighted a bunch of paragraphs where it seems like that's exactly what the plaintiff was saying, saying in my unjust enrichment claim, it's all about the real inventor. They're not. And if so, that implicated defense's preemption. Isn't that what was going on last time? And I guess, if it was or if it wasn't. Okay. Go ahead.

MR. KAUFMANN: And the preemption issue there was federal patent law governs inventorship and so that was the basis of the preemption of the prior alleged claim.

THE COURT: Okay. But maybe the alleged thing is slightly differently now and so we're getting a different argument for a motion to dismiss the claim on preemption grounds, is that right?

MR. KAUFMANN: That's correct.

THE COURT: Okay. And then you also pointed -- on the preemption issue, you pointed to the third circuit case Warinski and I know you distinguish it in in part by saying you don't think the case dealt with whether the information at issue was allegedly confidential or not. But otherwise, do you think the case just got it wrong? Do you think that the third circuit just kind of misinterpreted federal circuit precedence?

MR. KAUFMANN: Your Honor, I think they did. In fact, the Warinski case doesn't even mention the Walter's case that dealt with -- I'm sorry, not the Walter's case, the federal circuit precedent on preemption. Ultra Precision.

THE COURT: Okay. And then just on the other issue, which would I guess be entirely dispositive of the claim no matter what confidential or non-confidential information is at issue, there's no -- you know, dispute really turns on like a case like Walters where the supreme court has made it clear that, that when

it comes to this development, if there is an adequate remedy at law, even one that the plaintiff ultimately is successful on, you can't make an unjust enrichment claim. And I guess, is the way that, you know, that there is an adequate remedy of law otherwise that the plaintiff pleads such a remedy in a complaint? Is that how you know that one exists or are there other ways that you would know?

MR. KAUFMANN: Well, Your Honor, I think there are potentially other ways that you could know. I suppose you could, even if there was an unpled claim, the allegations in the complaint satisfied the elements of an unpled claim, that could be a situation again where the unjust enrichment claim couldn't proceed. Although, you know, here the trade secret claims that were stricken, you know, again, are based on the same conduct as the unjust enrichment claim. And, in fact, the trade secret claim pled unjust enrichment as alleged harm from the trade secret misappropriation. And so, you know, those claims are clearly based on the same conduct and the same with the conversion claim.

And, Your Honor, courts that have dealt with this issue like the Shaw case have found that, you know, it's not whether -- even if the claim fails as a matter of law, you know, the Shaw case found that two other claims based on the same conduct should also be dismissed as a matter of law, but the allegation of those claims based on the same conduct as the unjust enrichment still precluded the unjust enrichment claim.

THE COURT: And just to parse that, you know, like what it means to have an alternative remedy at law. Let's say I had a complaint and there was like five claims and the last of which was unjust enrichment and they were all about the same conduct. You know, like, number one was breach of contract, number two was conversion, three, four, whatever, and then five is unjust enrichment and the defendant moves to dismiss -- and they're all under Louisiana law -- and defendant moves to dismiss all five and the Court looks at them and says, you know what, not one is dismissed. The plaintiff can't make out a plausible claim.

Count two, dismissed as well. Plaintiff just simply cannot make out a plausible claim. Same with count three, same with count four and then you get to count five and you ask yourself, does the plaintiff have a, you know, an alternative remedy at law? Well, from the one hand the plaintiff pleaded that they did. You know, they pleaded four other claims based on the same basic conduct, but that the Court that's deciding whether they do just got through saying they don't. You know, they -- like the court looked at it and plaintiff can't make out a claim under count one, breach of contract or count two conversion. If you have a scenario like that, how can it be said that there is an adequate remedy at law if the Court says, as to all the other things the plaintiff tried, no.

MR. KAUFMANN: Well, Your Honor, that's the guidance that the Louisiana supreme court has given and that's the scenario that the Court found in Shaw. Although here, I think we don't even need to get to that question, because the trade secret claim, you know, as Your Honor knows, those claims were not dismissed because

they failed to plead an adequate trade secret claim. They were stricken because they were untimely, so there's not an issue of whether other claims could be pled that set forth a viable claim. And in fact, in their briefing on the motion to strike I believe BearBox was adamant that they had adequately alleged the elements of a trade secret claim and so because, you know, that claim could have been available to them, we don't -- we don't even need to get to the issue of, you know, if the conversion claim is stricken could that -- is there still a claim they could have availed themselves of. There is and it was the trade secret claims, at least.

THE COURT: Okay. Anything further you want to say on this unjust enrichment issue, Mr. Kaufmann?

MR. KAUFMANN: No, Your Honor.

THE COURT: Okay. Let me then turn to Mr. Horton on plaintiff's side with these issues and why don't we start with the fifth element issue. There I guess, you know, why doesn't Walter's just settle the issue? The

supreme court case from Louisiana supreme court. The other side says it pretty clearly, in their view, says that, look, if you plead another type of claim based on the same basic content as an unjust enrichment claim, even if that other claim gets dismissed, you had an alternative essential remedy. And so you can't plead the fifth element. And the defendant would say, heck, even in the recent case, federal cases recognize that too like Andretti or Cytogel Pharma. How comes Walters doesn't just settle the issue?

MR. HORTON: Yes, Your Honor. I think we recognize in the briefing there seems to be a split in authority here. We recognize the Walters decision, but there are decisions subsequent to Walters and the Hall case addresses Walters and distinguishes it. And the split seems to be, Your Honor, federal court versus state court and we think that makes sense here because in federal court, now federal rule civil procedure 8 which allows for pleading in the alternative. And so we think because we're in federal court with this case that the split

in authority should give, allow the unjust enrichment claim to go forward.

THE COURT: I guess just to stop you there, Mr. Horton. You mentioned Hall as distinguishing Walters, but the way it distinguished Walters, not even sure this is a correct reading of Walters, but the way it distinguished it was by saying well, Walters was only talking about a scenario where the alternative relief was a tort claim. And then it went on to talk about how that wasn't the case in Hall. Here, even if the way that Hall was distinguishing Walters wouldn't help you, right, because you've got alternative tort claims that you're pleading, isn't that right?

MR. HORTON: That was said in the Hall case, Your Honor, that's correct. The Hall case also went on to say that the liberality of rule 8 should be recognized and the Hall case cites to the Richard versus Wal-mart case which again relies on rule 8 which allows for pleading in the alternative in federal court.

THE COURT: And on the rule 8 issue a number of cases that you cite reference

rule 8. But I mean, you know, there are cases that the other side points to that say, and I'm not sure why this is wrong, whether rule 8 or rule 9 is a matter of federal procedure allows a party to plead in the alternative, that doesn't have much to do with what's the substance of the elements of the claim under state law. And if the substance of an element of the claim was that you can't have another form of potential relief, it wouldn't matter what rule 8 or 9 lets you do because the actual substantive claim wouldn't permit a scenario like this. How does rule 8 or 9 get you out of this problem?

MR. HORTON: Yeah, so I think, Your Honor, you alluded to this earlier, which is to say that, you know, how do you know which cause of action is going to provide for the remedy the plaintiff seeks until you know? And at the pleading stage we don't know. And so I think, you know, for conversion I think we feel that the remedy is a disgorgement of the defendants ill gotten gains and we think we're entitled to that under conversion. But if it turns out that that's not right, then unjust

enrichment is meant to plug a gap in the law in terms of remedies in what the plaintiff might recover. And so until we know that for sure, I think our positions is that unjust enrichment should stay in the case to continue to plug that potential gap, until we know for certain whether there's a gap or not. And I think that's what rule 8 contemplates in the federal procedure context.

THE COURT: All right. And with regard to the preemption issue, I guess one question I have for you is the other side is only making that argument to the extent that your unjust enrichment claim is even alleged to implicate information that is non-confidential. You could tell me that the answer to that is no, actually no, the whole claim is about information that is asserted to have been confidential on the plaintiff's side. Is that what's going on or does your unjust enrichment claim also implicate some information that wasn't confidential?

MR. HORTON: Well, Your Honor, I think the claim certainly does contemplate

information that is confidential. I think we've said that in the pleading. I think we said that in the briefing. At the pleading stage I would be hesitant to make a representation whether it's all constitutes confidential or not. And I don't think the Court needs to reach that conclusion, because the Rosinski case is on point and it doesn't contemplate confidentiality at all, it's simply saying that in order to avoid preemption you simply just cannot seek a patent-like remedy based on patent infringement. And we don't have that here. We're not seeking patent infringement damages. We don't even have a patent. I think we're contending that we should have the patent, but we don't yet. And in Warinski the facts are even less favorable to the plaintiff there because there the plaintiff did have the patent and the third circuit said as long as you're not asking for patent infringement damages then unjust enrichment cannot and will not be preempted. So I think that's really the only issue that the Court needs to address.

THE COURT: And so I guess you're

saying -- is what you are saying to me, yes, Judge, you should understand the unjust enrichment claim to be alleging the unjust enrichment of the defendants with regard to both confidential and non-confidential information, is that right?

MR. HORTON: I guess what I'm saying, Your Honor, is I think the Court's decision doesn't need to parse things that finely. It can simply be a decision based on the fact that the plaintiff is not seeking at like remedies under unjust enrichment and on that basis cannot be preempted by patent law.

THE COURT: I'm asking partly from an efficiency perspective because if you told me the only thing you're alleging was used and generated unjust enrichment was confidential information, then, you know, I don't have to make a decision on a whole big part of the briefing here. But if you're telling me the opposite, then I might, so that's why I'm asking.

MR. HORTON: Understood, Your Honor.

THE COURT: So humor me, which one is it?

MR. HORTON: Fair enough, Your Honor. Confidential information.

THE COURT: So only confidential information is being alleged to have been used in a way that unjustly enriched the other side?

MR. HORTON: I think the pleading is broader than that, Your Honor, but that's the claim I see going forward, is unjust enrichment based on confidential information.

THE COURT: Okay. All right. Anything further you wanted to add, Mr. Horton?

MR. HORTON: No, Your Honor.

THE COURT: Okay. All right. Mr. Kaufmann, anything more you want to say about the unjust enrichment issue?

MR. KAUFMANN: Your Honor, I'd just reiterate the point Your Honor noted that controlling precedent here, Walters in the Louisiana supreme court and the fifth circuit precedent have established that unjust enrichment can not be pled in the alternative. Here, rule 8, federal rule 8 does not save the

claim as you noted. It is a substantive element of the claim that there can be no other remedy at law and here BearBox's own allegations show that there was other claims they could have availed themselves of and so here the unjust enrichment claim just can't be sustained.

THE COURT: Okay. All right. Thanks, counsel. Appreciate your arguments. I'll take a short time to think about it and then I'll intend to issue a short report and recommendation in the very near future so that the parties will have an answer here. Appreciate everyone's time today. Wish everyone continued health and safety. Unless there's anything further, we can end our teleconference today and go off the record. Take care, everybody.

(End at 1:58 p.m.)

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

BEARBOX LLC and AUSTIN STORMS, Plaintiffs, v. LANCIUM LLC, MICHAEL T. MCNAMARA, and RAYMOND E. CLINE, JR. Defendants.	)	C.A. No. 21-534-MN-CJB **FILED UNDER SEAL**

DEFENDANTS' OPENING BRIEF IN SUPPORT OF THEIR
MOTION FOR SUMMARY JUDGMENT

Dated: June 15, 2022

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4	Reply Expert Report of Dr. Stan McClellan, dated May 20, 2022
5	Excerpts from Deposition Transcript of Stanley A. McClellan
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7	Excerpts from Deposition Transcript of Austin Storms
8	Confidentiality Agreement between BearBox, LLC and Glidepath Development LLC dated December 10, 2018, produced by BearBox in this case with Bates numbers BB10000736 – BB10000741
9	Email from Austin Storms to Todd @buysellads attaching files, produced by BearBox in this case with Bates numbers BB00000911 – BB00000923
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17	U.S. Patent No. 10,608,433
18	Text message report between Austin Storms and Michael McNamara dated between 5/4/2019 – 5/9/2019, produced by BearBox in this case with Bates numbers BB10004959 – BB10004961

19	Complaint filed by Lancium against Layer1 Technologies in the Western District of Texas on August 14, 2020, produced by Lancium in this case with Bates numbers LANCIUM00016546 – LANCIUM00016554
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I. INTRODUCTION

Plaintiffs Austin Storms ("Storms") and BearBox LLC ("BearBox") have three remaining claims against Defendants Lancium LLC ("Lancium"), Michael T. McNamara ("McNamara"), and Raymond E. Cline, Jr. ("Cline"). First, Plaintiffs assert a claim that Storms is the sole inventor of U.S. Patent No. 10,608,433 (the "'433 patent") (Count I of the Second Amended Complaint). Second, in the alternative, Plaintiffs assert a claim that Storms is a joint inventor of the '433 patent (Count II). Third, Plaintiffs assert a claim for conversion of so-called "BearBox technology" (Count V). All of these claims are based on information allegedly provided by Storms to McNamara via their only three communications: (1) a May 3, 2019 conversation at a group dinner attended by several other competitors following a cryptocurrency mining summit; (2) a series of text messages from May 3-9, 2019 following the dinner; and (3) a single email that Storms sent McNamara on May 9, 2019. Based on these extremely limited communications, and despite Defendants' years of innovation and investment in research and development, Plaintiffs allege that Defendants wrongly filed a patent on Storms' alleged invention more than five months after Storms and McNamara last communicated. Likewise, Plaintiffs seek millions of dollars in damages for Defendants' alleged conversion of a small amount of allegedly confidential information in one attachment to Storms' email by purportedly using that information to modify Defendants' Smart Response™ software that is used to control datacenters.

Plaintiffs' claims, however, all fail as a matter of law. Indeed, Plaintiffs' inventorship claims are based on a fundamentally incorrect interpretation of two key claim terms found in every claim of the '433 patent. Plaintiffs rely on this misinterpretation to assert that Storms' "BearBox technology" discloses the inventions of the '433 patent even though these technologies are not only different, they are inconsistent. Plaintiffs' sole inventorship claim thus fails as a matter of law because there is no evidence, much less clear and convincing evidence that could meet their heavy

burden, that Storms conceived of or communicated the inventions of the '433 patent, as properly construed, to Defendants. Likewise, regarding Plaintiffs' joint inventorship claims, they cannot prove, much less by clear and convincing evidence, that Storms made a significant contribution to the '433 patent. In addition, the limited communications between Storms and McNamara cannot, as a matter of law, establish that Storms and McNamara collaborated on the inventions of the '433 patent, as is required for a joint inventorship claim. Furthermore, Plaintiffs' conversion claim is barred by the applicable one-year statute of limitations and is preempted by federal patent law because it is based on the alleged use of information that, as a matter of law, is not confidential. Accordingly, the Court should grant summary judgment for Defendants on all three of Plaintiffs' remaining claims.

II. FACTUAL BACKGROUND

A. Lancium and Its Technology

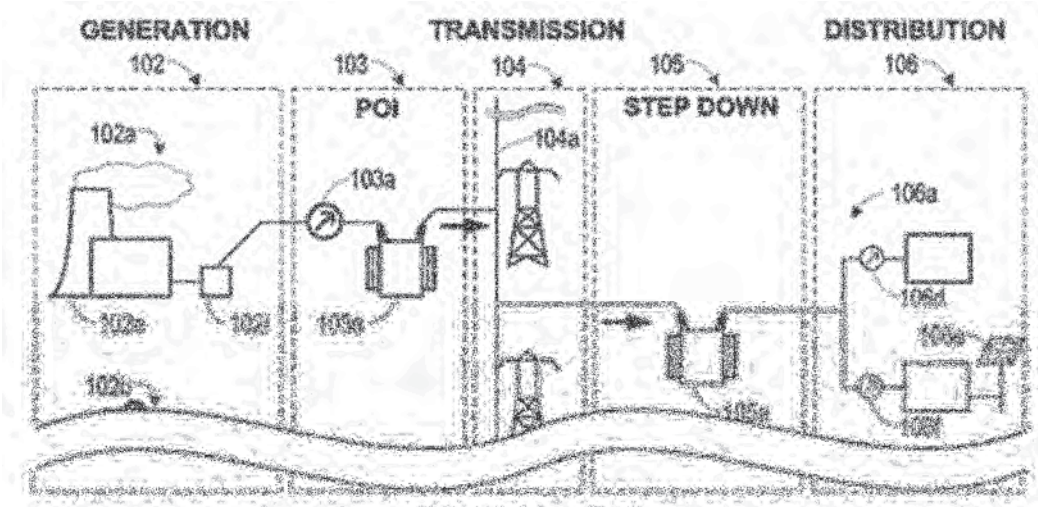
Lancium is a technology company founded in 2017, to, among other things, create software and intellectual property solutions that enable more renewable energy on the nation's power grid, and Lancium began to do so immediately. For example, in February 2018, Lancium, including McNamara and Cline, filed a patent application titled "Method and System for Dynamic Power Delivery To a Flexible Datacenter Using Unutilized Energy Sources," that published as International Publication No. WO 2019/139632A1 (the "'632 application") and later issued as U.S. Patent No. 11,016,456. SOF ¶¶6-9; Ex. 12; Ex. 13. Lancium's technology, as explained in the '632 patent, permits a "flexible data center" to "ramp-up to a fully online status, ramp-down to a fully offline status, or dynamically reduce power consumption," where "the flexible datacenter may perform computational operations, such as blockchain hashing operations" (e.g., Bitcoin mining) "with little to no energy costs, using clean and renewable energy that would otherwise be wasted." Ex. 12 at [0022].

Lancium continued to innovate and by the end of 2018 had filed numerous other patent applications that led to numerous patents such as U.S. Patent No. 10,873,211 (filed September 13. 2018) titled "Systems and Methods for Dynamic Power Routing with Behind-the-Meter Energy Storage," U.S. Patent No. 10,444,818 (filed October 30, 2018) titled "Methods and Systems for Distributed Power Control of Flexible Datacenters," and U.S. Patent No. 10,367,353 (filed October 30, 2018) and "Managing Queue Distribution between Critical Datacenter and Flexible Datacenter." D.I. 28 ¶ 24.

B. United States Patent No. 10,608,433

Through 2019, Lancium continued to innovate and invest in research and development, eventually leading to the filing of U.S. Provisional Patent Application No. 62/927,119 on October 28, 2019 (SOF ¶1; Ex. 21 at 32-33 and documents cited therein) and the follow-on U.S. Nonprovisional Patent Application No. 16/702,931 on December 4, 2019, which issued as the '433 patent, titled "Methods and Systems for Adjusting Power Consumption Based on A Fixed-Duration Power Option Agreement." SOF ¶¶2-4; Ex. 17.

The technology of the '433 patent at issue in this case relates to systems and methods for adjusting the amount of power available on the electrical grid. As depicted in its Figure 1, of which an excerpted version is shown below, an electrical grid typically includes: (i) power generation stations (e.g., nuclear power plants 102a) that produce electricity, (ii) transmission lines 104 that carry the power from the generation stations to demand centers (i.e., consumers), and (iii) distribution networks 106 that carry power to individual consumers. Ex. 17 at 1:26-4:8. To maintain stability on the grid, the grid operator strives to maintain a balance between the amount of power entering the grid (via generators) and the amount of grid power used by loads (e.g., customers in the distribution segment 106). Ex. 17 at 4:9-13.



PRIOR ART
FIGURE 1

In an effort to maintain this balance, grid operators, such as Independent Service Organizations ("ISOs") have various tools at their disposal, some of which are called ancillary services. Ancillary services are programs that give ISOs some amount of control over the amount of power being consumed by loads on the grid in real time in order to balance the amount of power being consumed with the amount of power available.[1] In order to provide this ability, specially qualified loads can bid into the "day-ahead" ancillary services market[2] where the loads offer a specific minimum amount of load (i.e., power in megawatts (MW)) that they commit to use during specific hourly periods the following day (i.e., the "operating day"). If the offer is accepted (i.e., "awarded") by the ISO, the ISO will pay the load for guaranteeing that the load will use the committed minimum amount of power during each specific hourly period the next day while simultaneously providing the ISO with the option to reduce (i.e., "curtail") that power use in real

[1] *See, e.g.*, Ex. 1 at 18 ("ERCOT needs system capacity for two reasons: first for energy dispatch to meet real time system demand, and second as a reserve available to respond to large and small operational fluctuations. This reserve capacity is what is used for Ancillary Services…")

[2] *See, e.g.,* Ex. 1 at 24 ("Qualified LRs ... may provide operating reserves in the ERCOT AS markets.")

time that next day by up to the committed amount, in order to balance generation and consumption of power on the grid.[3] The load is obligated to use at least the committed minimum power amount;[4] otherwise, the ISO could not exercise its option in real time to reduce load on the network up to the committed power amount. Plaintiffs do not dispute how ancillary service programs work.[5]

C. Austin Storms and BearBox

Austin Storms and his company BearBox, in late 2018 and early 2019, sought to develop cryptocurrency mining technology. D.I. 103 at ¶ 29. In particular, Plaintiffs worked to develop a portable container called a "BearBox" that contained cryptocurrency miners (i.e., computers that can perform cryptocurrency mining operations). Ex. 7 at 45:2-17. BearBox, however, only ever built one BearBox, which it eventually sold for no profit. Ex. 7 at 45:18-23; 48:6-7.

D. Storms' Communications with McNamara

On May 3, 2019, Storms attended the Fidelity FCAT Mining Summit in Boston where he explained he was "[g]onna poke around and figure out if anyone else is doing what we're working on." Ex. 16 at BB10003996. At the conference, Storms met McNamara and the two went to a group dinner attended by approximately six others, including competitors in the Bitcoin mining field. SOF ¶¶10-11; D.I. 41 at ¶¶ 38, 40-41; D.I. 28 at ¶¶ 38, 40-41. Storms and McNamara's conversation at the dinner occurred in front of these other attendees, and this was their only oral

[3] Ex. 6 at 17 ("Awarded Ancillary Service Offers, specifying … MW … and price, for each hour of the awarded offer."); Ex. 1 at 24 ("Load Resources that are scheduled or selected in the ERCOT Day-Ahead AS Markets are eligible to receive a capacity payment regardless of whether they are actually curtailed.")

[4] Ex. 6 at 14 ("Ancillary Service (AS) awards are physically binding.")

[5] Dr. Siddiqi describes ancillary service market operation in significant detail in his expert report; Plaintiff's ISO market expert Mr. McCamant states that Dr. Siddiqi's "report is an accurate account of how the ERCOT market functions," and does not dispute the factual operation of the ancillary service market. Ex. 2 at 5.

communication. SOF ¶¶11, 14; D.I. 41 at ¶ 43; D.I. 28 at ¶ 43; Ex. 23 at 9. Shortly thereafter, Storms wrote to an individual, Ben Hakes, with whom he had been working and explained that: "The guys at Lancium ***are doing*** what ***we are trying to do exactly***, but they don't have a container builder or software team yet. Mike's pretty interested in my solution."[6] Ex. 16 at BB10004001.[7]

Following the dinner, from May 3 to May 9, 2019, Storms and McNamara exchanged a handful of text messages, which mostly involved McNamara's request for specifications on the BearBox container. SOF ¶12; Ex. 18. And on May 9, 2019, Storms emailed McNamara a specification sheet for his BearBox as well as a handful of other documents. *See* SOF ¶13; Ex. 10. This was the last communication between Storms and any of Defendants. SOF ¶13; D.I. 103 at ¶ 36.

Following receipt of Storms' email, McNamara forwarded it to a few others at Lancium on May 9, 2019, explaining that "[w]e met this guy at the fidelity conference. … His box seems very expensive though." Ex. 14. There were no responses to McNamara's email.

In addition, none of the attachments to Storms' email were marked as confidential and Storms has testified that three of the attachments were publicly available product specification sheets. SOF ¶16; Ex. 7 at 213:5-214:5; Ex. 10. The fourth attachment contains the BearBox product specification sheet as well as a drawing titled "BearBox Automatic Miner Management System Version 1.0" that Storms also posted on BearBox's public Twitter account. SOF ¶¶19-20; *Compare* Ex. 10 at BB00000092, *with* Ex. 11 at BB00000718. Plaintiffs also do not assert that this attachment is confidential. SOF ¶18; Ex. 7 at 217:13-23. The only reference to confidentiality in

[6] All emphases added unless otherwise noted.

[7] Storms also stated "[T]hey want my logic for curtailing miners on DA and RTMB LMP – all over dinner Friday night and several bottles of wine, they told me they were looking into Digital Shovel, but their Schneider Electric/Siemens engineer was worried about 480/277v because of potential liability…." Ex. 16 at BB10004002.

the email or its attachments was a boilerplate "confidentiality notice" at the bottom of email stating that "[t]his email communication ***may*** contain private, confidential, or legally privileged information intended for the sole use of the designated and/or duly authorized recipient(s)." SOF ¶16; Ex. 7 at 217:6-12; Ex. 10 at BB00000090. Moreover, Storms did not have a confidentiality or nondisclosure agreement with McNamara or any of Defendants although he did have such agreements with other third parties. *See, e.g.*, Ex. 7 at 70:4-6, 124:7-13; Ex. 8.

Plaintiffs learned of the '433 patent and Defendants allegedly wrongful use of BearBox's technology on August 17, 2020 when Storms saw a press release about a lawsuit Lancium filed for infringement of the '433 patent. SOF ¶22; D.I. 103 at ¶¶ 52-54. Nonetheless, and despite the fact that Storms never sought to file a patent on his alleged invention, Plaintiffs waited until April 14, 2021 to file this lawsuit. Ex. 7 at 290:7-16. Indeed, Plaintiffs did not file this lawsuit until after a press release was issued announcing the settlement of the earlier infringement suit regarding the '433 patent and that the defendant in that lawsuit licensed Lancium's intellectual property. D.I. 103 at ¶¶ 56-57.

E. Procedural History

Plaintiffs' claims in this case have continually changed since the original Complaint was filed on April 14, 2021. D.I. 1. Plaintiffs' originally asserted claims, *inter alia*, for trade secret misappropriation, but a little over a month later withdrew these claims and filed an Amended Complaint. *See* D.I. 19. Defendants then moved for judgment on the pleadings regarding Plaintiffs' claims for conversion, unjust enrichment, and negligent misrepresentation, which the Court granted dismissing Plaintiffs' conversion and unjust enrichment claims without prejudice as preempted by federal patent law and dismissing the negligent misrepresentation claim with prejudice. D.I. 92; D.I. 97. Two days before the close of fact discovery, Plaintiffs then filed the Second Amended Complaint asserting new, different conversion and unjust enrichment claims and

re-asserting claims for trade secret misappropriation. D.I. 89 (order adopting stipulated, amended scheduling order); D.I. 103 (Second Amended Complaint). The Court, however, granted Defendants' motion to strike the re-asserted trade secret claims. *See* 4/25/22 Minute Entry. Magistrate Judge Burke has also recommended granting Defendants' motion to dismiss the new unjust enrichment claim, and Plaintiffs have not objected to this recommendation.[8] D.I. 143.

Accordingly, Plaintiffs have three remaining claims: First, Plaintiffs' claim that Storms should be substituted as the sole inventor of the '433 patent (Count I). Second, Plaintiffs' alternative claim that Storms should be found to be a joint inventor of the '433 patent (Count II). Third, Plaintiffs' claim that Defendants converted certain technology relating to energy arbitrage that Storms purports to have provided to McNamara (Count V). D.I. 103. As explained herein, summary judgment is appropriate because each of these claims fail as a matter of law.

III. LEGAL STANDARD

The court shall grant summary judgment if the movant shows that there is no genuine dispute as to any material fact and the movant is entitled to judgment as a matter of law." Fed. R. Civ. P. 56(a). To defeat a motion for summary judgment, the nonmoving party must "do more than simply show that there is some metaphysical doubt as the material facts." *Matsushita Elec. Indus. Co. v. Zenith Radio Corp.*, 475 U.S. 574, 586 (1986). A factual dispute is only genuine where "the evidence is such that a reasonable jury could return a verdict for the nonmoving party." *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 247-48 (1986). The "mere existence of some alleged factual dispute between the parties will not defeat an otherwise properly supported motion for summary judgment." *Id.*

IV. ARGUMENT

[8] Defendants also have pending objections to Magistrate Judge Burke's recommendation to deny Defendants' motion to dismiss Plaintiffs' new conversion claim. D.I. 146.

A. Plaintiffs' Sole Inventorship Claim Fails As A Matter Of Law Because There Is No Evidence Austin Storms Conceived Of The Inventions Claimed In The '433 Patent Or Communicated The Inventions To Defendants.

The '433 patent invented systems and methods that can be used to adjust power consumption of computing systems (e.g., cryptocurrency or Bitcoin miners) that can be used, *inter alia*, to participate in ancillary services programs. Although Plaintiffs have previously avoided specifically explaining how they claim Storms' so-called "BearBox technology" encompasses and relates to the claimed technology of the '433 patent, during expert discovery it became clear that Plaintiffs' inventorship claims are premised on a fundamentally incorrect interpretation of two key claim terms appearing in every claim of the '433 patent: (1) "power option agreement"; and (2) "minimum power threshold." This is significant because resolution of Plaintiffs' inventorship claims requires proper construction of these claim terms, and there is simply no evidence that Storms conceived of, much less communicated, the inventions of the '433 patent as properly construed. Thus, summary judgment denying Storms claim of sole inventorship of the '433 patent should be granted.

1. Applicable Legal Principles

a. Inventorship

Inventorship is a question of law premised on underlying questions of fact. *Eli Lilly and Co. v. Arandigm Corp.*, 376 F.3d 1352, 1362 (Fed. Cir. 2004). Patent issuance creates a presumption that the named inventors are the true and only inventors, and that people not named are not to be inventors. *Scott v. Zimmer, Inc.*, 889 F. Supp. 2d 657, 662 (D. Del. 2012). A person seeking to add himself/herself as an inventor, therefore, "must meet the heavy burden of proving [his/her] case by clear and convincing evidence." *Id.*; *Eli Lilly*, 376 F.3d at 1358. Inventorship, therefore, is often decided as a matter of law, including at summary judgment. *See*, *e.g.*, *Symantec Corp. v. Computer Associates Intern., Inc.*, 522 F.3d 1279, 1295-96 (Fed. Cir. 2008) (affirming

summary judgment of no inventorship); *Univ. of Utah v. Max-Planck-Gesellschaft Zur Foerderung Der Wissenschaften E.V.*, 851 F.3d 1317 (Fed. Cir. 2017) (same); *Wagner v. Simpson Performance Prod., Inc.*, Civ. No. 5:18-CV-00123-KDB-DCK, 2021 WL 411144, at *2 (W.D.N.C. Feb. 5, 2021), aff'd sub nom. *Wagner v. Ashline*, No. 2021-1715, 2021 WL 5353889 (Fed. Cir. Nov. 17, 2021) (granting summary judgment of no inventorship because Plaintiff failed to provide sufficient evidence to corroborate its claim of co-inventorship); *Eli Lilly*, 376 F.3d at 1364 (reversing jury's verdict that unnamed inventor was a joint inventor because the evidence was insufficient to meet the clear and convincing standard).

The inventorship analysis first requires construction of each disputed claim to determine the subject matter encompassed. *Gemstar-TV Guide Int'l, Inc. v. Int'l Trade Comm'n*, 383 F.3d 1352, 1381-82 (Fed. Cir. 2004). Then, "[t]o state a claim for complete substitution of inventors under Section 256," a plaintiff must establish that "(1) the erroneously omitted inventor conceived the invention claimed in the patent *and* (2) the named inventor on the patent did *not* conceive the invention." *Iceotope Grp. Ltd. v. LiquidCool Sols., Inc.*, No. 20-CV-2644, 2022 WL 204923, at *2 (D. Minn. Jan. 24, 2022) (emphasis in original) (citing to *CODA Dev. S.R.O. v. Goodyear Tire & Rubber Co.*, 916 F.3d 1350, 1358 (Fed. Cir. 2019)).

Ultimately, conception is the touchstone of inventorship. *Gemstar*, 383 F.3d at 1381. Conception is "the formation in the mind of the inventor of a definite and permanent idea of the complete and operative invention." *Id.* Conception is complete when one of ordinary skill in the art could construct the apparatus, perform the process, or make the composition without unduly extensive research or experimentation. *Trovan Ltd. v. Sokymat SA, Irori*, 299 F.3d 1292, 1302 (Fed. Cir. 2002). A would-be inventor's contribution must have been to the conception of the claims, not something outside the claims. *Scott*, 889 F. Supp. 2d, at 662.

A would-be inventor's proof of conception, however, must be more than simply his/her testimony. "To prove [his or her] contribution, the purported inventor must provide corroborating evidence of any asserted contributions to the conception." *Acromed*, 253 F.3d at 1379 (internal citations and quotations omitted); *see also Ethicon, Inc. v. U.S. Surgical Corp.*, 135 F.3d 1456, 1461 (Fed. Cir. 1998). Indeed, a would-be inventor's testimony regarding their own inventorship claim is "regarded with skepticism." *Scott*, 889 F. Supp. 2d at 664. Would-be inventors, therefore, must supply evidence to corroborate their testimony. *Symantec*, 552 F.3d at 1295. The sufficiency of the corroborating evidence is evaluated under a rule of reason analysis, which requires that an evaluation of all pertinent evidence be made so that a sound determination of the credibility of the alleged inventor's story may be reached. *Id.*; *Gemstar*, 383 F.3d at 1382.

b. Claim Construction

"When the parties raise an actual dispute regarding the proper scope of these claims, the court, not the jury, must resolve that dispute." *O2 Micro Int'l Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351, 1360 (Fed. Cir. 2008). A district court "may engage in claim construction during various phases of litigation" and is "well within its power to clarify, supplement, and even alter its construction" of disputed terms "in its summary judgment order." *Level Sleep LLC v. Sleep No. Corp.*, No. 2020-1718, 2021 WL 2934816, at *3 (Fed. Cir. July 13, 2021).

"Words of a claim are generally given their ordinary and customary meaning, which is the meaning a term would have to a person of ordinary skill in the art after reviewing the intrinsic record at the time of the invention." *O2 Micro*, 521 F.3d at 1360 (citing *Philips v. AWH Corp.*, 415 F.3d 1303, 1312-13 (Fed. Cir. 2005)). "A determination that a claim term 'needs no construction' or has the 'plain and ordinary meaning' may be inadequate when a term has more than one 'ordinary' meaning or when reliance on a term's 'ordinary' meaning does not resolve the parties' dispute." *Id.* at 1361. "To determine the meaning of the claims, courts start by considering the

intrinsic evidence," which "includes the claims themselves, the specification, and the prosecution history." *Philips*, 415 F.3d at 1312-1314. "[C]laims 'must be read in view of the specification, of which they are a part.'" *Id*. "[T]he specification 'is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.'" *Id*. Expert testimony may aid a court in understanding the underlying technology and determining the particular meaning of a term in the pertinent field, but an expert's conclusory, *unsupported* assertions as to a term's definition are entirely unhelpful to a court. *Phillips*, 415 F.3d at 1317 (emphasis in original).

2. There Is No Evidence That Austin Storms Communicated The Inventions Of The '433 Patent To Defendants.

a. Proper Claim Construction of "Power Option Agreement"

Claim Term	Defendants' Construction	Plaintiffs' Construction
"power option agreement" ('433 patent, independent claims 1, 17, & 20)	an agreement between a power entity associated with the delivery of power to a load and the load, wherein the load provides the power entity with the option to reduce the amount of power delivered to the load up to an agreed amount of power during an agreed upon time interval such that the load must use at least the amount of power subject to the option during the time interval	Plain and ordinary meaning

On October 15, 2021, the parties indicated to the Court that they did not seek claim construction at that time and would advise, or seek construction, if developments suggested otherwise. *See* D.I. 61; D.I. 63. During expert discovery it has become apparent that Plaintiffs seek to ignore the clear meaning of "power option agreement" as established by the intrinsic evidence, and instead assert a purported "plain and ordinary" meaning that they contort to support their

inventorship claims. The intrinsically-supported clear meaning of power option agreement is: "an agreement between a power entity associated with the delivery of power to a load and the load, wherein the load provides the power entity with the option to reduce the amount of power delivered to the load up to an agreed amount of power during an agreed upon time interval such that the load must use at least the amount of power subject to the option during the time interval." However, Plaintiffs improperly depart from the intrinsic evidence and instead use a purported "plain and ordinary" meaning under which their expert, Dr. Stanley McClellan, describes the power option agreement as "an agreement [by the load] to purchase a certain amount of power at a certain time at a certain price." Ex. 3 at ¶ 49; Ex. 5 (McClellan Dep. Tr.) at 90:2-13. Dr. McClellan further contends that the "option" is the load "buying power ahead of time," which the load can then decide to use the power or not. Ex. 5 at 157:1-18. Plaintiffs' interpretation of "power option agreement" is fundamentally inconsistent with the patent specification, which specifically describes and provides examples related to the term. As such, construction of this term is needed because "[a] determination a claim term 'needs no construction' or has the 'plain and ordinary meaning' may be inadequate when a term has more than one 'ordinary' meaning or when reliance on a term's 'ordinary' meaning does not resolve the parties' dispute." *O2 Micro*, 521 F.3d at 1361.

It is well-established that "claims must be read in view of the specification, of which they are a part" and "the specification is always highly relevant to the claim construction analysis. Usually it is dispositive; it is the single best guide to the meaning of a disputed term." *Phillips*, 415 F.3d at 1315 (internal quotations omitted). Here, the specification is dispositive and explains in great detail that a "power option agreement" is an agreement between a power entity (such as a grid operator) and a load (such as a datacenter) that gives the power entity the option to reduce the

amount of power delivered to the load, up to an agreed amount during an agreed time interval.[9]

Indeed, the '433 patent explains that:

> "In general, a power option agreement is an agreement between a power entity 1140 associated with the delivery of power to a load (e.g., a grid operator, power generation station, or local control station) and the load (e.g., the datacenters 1102-1106). As part of the power option agreement, the load (e.g., load operator, contracting agent for the load, semi-automated control system associated with the load, and/or automated control system associated with the load) provides the power entity 1140 with the right, but not obligation, to reduce the amount of power delivered (e.g., grid power) to the load up to an agreed amount of power during an agreed upon time interval." Ex. 17 at 43:46-57.

The specification further explains that the power option agreement gives the power entity this optionality as a tool to balance the supply and demand for power on the grid:

> "The power option agreement may be used by the power entity 1140 to reserve the right to reduce the amount of grid power delivered to the load during a set time frame (e.g., the next 24 hours). For instance, the power entity 1140 may exercise a predefined power option to reduce the amount of grid power delivered to the load during a time when the grid power may be better redirected to other loads coupled to the power grid. As such, the power entity 1140 may exercise power option agreements to balance loads coupled to the power grid." Ex. 17 at 44:3-12.

The '433 patent even gives an example of how a power option agreement could work:

> "To illustrate an example, a power option agreement may specify that a load (e.g., the datacenters 1102-1106) is required to use at least 10 MW or more at all times during the next 12 hours. … In order to comply with the agreement, the load must subsequently operate using 10 MW or more power at all times during the next 12 hours. This way, the load can accommodate a situation where the power entity 1140 exercises the option. Particularly, exercising the option may trigger the load to reduce the amount of power it consumes by an amount up to 10 MW at any point during the 12 hour interval. By establishing this power option agreement, the power entity 1140 can manipulate the amount of power consumed at the load during the next 12 hours by up to 10 MW if power needs to be redirected to another load or a reduction in power consumption is needed for other reasons." Ex. 17 at 44:17-35.

Furthermore, the '433 patent explains that a load may enter into a power option agreement and

[9] The prosecution history does not alter the meaning of "power option agreement" as established by the specification because the '433 patent issued without any rejections by the examiner. *See* SOF ¶5; Ex. 15 at BB0000553-62 (1/27/20 Notice of Allowance)

give the power entity the ability to exercise the option in return for monetary consideration from the power entity, such as payment from the power entity or a reduced price for power. Ex. 17 at 43:65-44:2.

The meaning of the term that Plaintiffs apply is flatly inconsistent with the meaning established by the '433 patent's specification. As an initial matter, although Plaintiffs' expert, Dr. McClellan, purported to apply the "plain and ordinary meaning" of the term to his inventorship analysis, he asserts that a system that "calculated profitability at distinct time intervals" demonstrates conception of claim elements including this term, even though that has nothing do with a "power option agreement" as described by the '433 patent. Ex. 3 at ¶¶ 49, 62. And Dr. McClellan confirmed his misinterpretation of the claim at his deposition. Indeed, Dr. McClellan testified that he interpreted "power option agreement" to mean "essentially a contract to buy power at a certain price. It's like a wholesale purchase. I'm going to buy X number of units at X price." Ex. 5 at 83:5-10. Dr. McClellan further testified that his understanding of the "plain and ordinary meaning" of the term is "opting to purchase power ahead of time at a certain rate and then I'm going to pay for that power, and then when it comes for that time I'm going to pay for that power whether I use it or not." Ex. 5 at 157:1-18. He then gave the example of "I'm going to pay for that power, that's the option. When it comes time, I'm going to pay for that whether I use it or not. I don't have to use it. I can screw in that light bulb and turn off the switch, and I'm still paying for that minimum power." Ex. 5 at 157:1-18. Thus, Plaintiffs and their expert misinterpret "power option agreement" as an agreement that gives the purchaser (i.e., the load) the option to use power rather than an agreement that requires the load to use a certain amount of power and gives a power entity the option to reduce the amount of power used by the load.

Based on the clear guidance the specification of the '433 patent provides to a person of

ordinary skill in the art regarding the meaning of "power option agreement," the Court should resolve the parties' dispute and construe this term using Defendants' proposed construction.

b. Proper Claim Construction of "Minimum Power Threshold"

Claim Term	Defendants' Construction	Plaintiffs' Construction
"minimum power threshold" ('433 patent, claims 1, 17, & 20)	a minimum amount of power a load must use during an associated time interval	Plain and ordinary meaning

As with "power option agreement," Plaintiffs purport to apply the "plain and ordinary" meaning of the term "minimum power threshold" but ignore the guidance the specification provides for the meaning of this term. Based on the meaning established by the intrinsic evidence, the Court should construe "minimum power threshold" to mean "a minimum amount of power a load must use during an associated time interval."

The claim construction analysis "must begin and remain centered on the language of the claims themselves, for it is that language the patentee chose to use to 'particularly point[] out and distinctly claim[] the subject matter which the patentee regards as his invention.'" *Interactive Gift Express, Inc. v. Compuserve, Inc.*, 256 F.3d 1323, 1331 (Fed. Cir. 2001) (quoting 35 U.S.C. § 112). Here, the claim language itself supports Defendants' proposed construction. Exemplary claim 1 is instructive:

> 1. A system comprising:
> a set of computing systems, wherein the set of computing systems is configured to perform computational operations using power from a power grid;
> a control system configured to:
> monitor a set of conditions;
> receive power option data based, at least in part, on a power option agreement, wherein the power option data specify: (i) a set of **minimum power thresholds**, and (ii) a set of time intervals, wherein each **minimum power threshold** in the set of **minimum power thresholds** is associated with a time interval in the set of time intervals;

> responsive to receiving the power option data, determine a performance strategy for the set of computing systems based on a combination of at least a portion of the power option data and at least one condition in the set of conditions, wherein the performance strategy comprises a power consumption target for the set of computing systems for each time interval in the set of time intervals, wherein each power consumption target is equal to or greater than the **minimum power threshold** associated with each time interval; and
> provide instructions to the set of computing systems to perform one or more computational operations based on the performance strategy.

Ex. 17 at 59:2-28. Thus, consistent with Defendants' proposed construction, the claim language generally sets forth a system where a load—pursuant to a power option agreement and data received under that agreement—determines a performance strategy for a set of computing systems in order to ensure that they use at least a minimum amount of power during specified time intervals (i.e., minimum power thresholds).

The specification, which "is always highly relevant to the claim construction analysis" and "is the single best guide to the meaning of a disputed term," also supports Defendants' construction. *Phillips*, 415 F.3d at 1315. For example, the specification explains that in order to provide a power entity with the option contemplated by a power option agreement—i.e., "the right, but not obligation, to reduce the amount of power delivered (e.g., grid power) to the load"—"the load needs to be using at least the amount of power subject to the option (e.g., a minimum power threshold)." Ex. 17 at 43:50-60. The '433 patent further explains that:

> "To illustrate an example, a power option agreement may specify that a load (e.g., the datacenters 1102-1106) is required to use at least 10 MW or more at all times during the next 12 hours. Thus, the **minimum power threshold** according to the power option agreement is 10 MW and this minimum threshold extends across the time interval for the next 12 hours. In order to comply with the agreement, the load must subsequently operate using 10 MW or more power at all times during the next 12 hours." Ex. 17 at 44:17-25; *see also id.* at 44:26-35.

The '433 patent also provides an example in Figure 12, which depicts a graph line 1206 indicating "the set of time intervals associated with minimum power thresholds" where "time 1202

increases along the X-axis and minimum power thresholds 1204 increase along the Y-axis of the graph 1200." Ex. 17 at 50:56-59; 50:66-51:5; *see also* 50:53-56; 51:8-52:11.

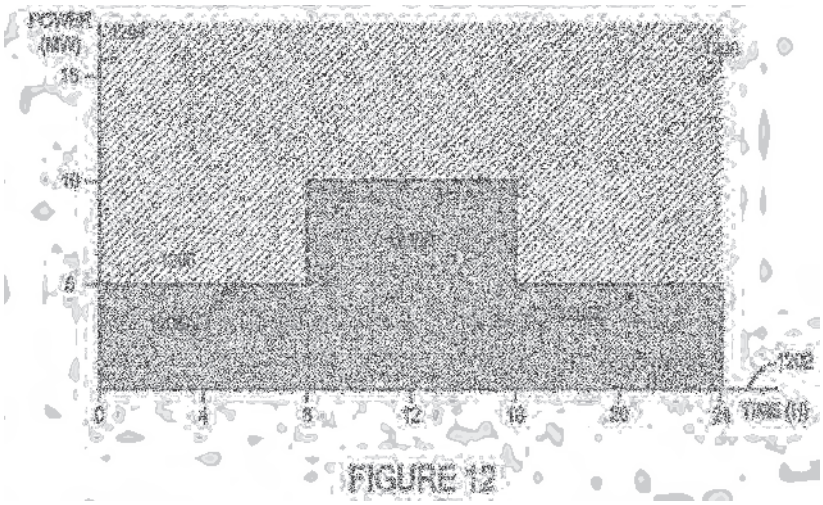


FIGURE 12

In relation to Figure 12, the '433 patent further explains that:

> "To further illustrate, an initial minimum power threshold 1206A is shown associated with the time interval starting at hour 0 and extending to hour 8. In particular, the minimum power threshold 1206A is set at 5 MW during this time interval. Thus based on the power option data shown in FIG. 12, the loads must be able to operate at a target power consumption level that is equal to or greater than the 5 MW minimum power threshold 1206A at all times during the time interval extending from hour 0 to hour 8, in order to be able to satisfy the power option if it is exercised for that time interval. Similarly, the power entity could reduce the power consumed by loads by any amount up to 5 MW at any point during the time interval from hour 0 to hour 8 in accordance with the power option agreement. For instance, the power entity could exercise its option at any point during this time interval to reduce the power consumed by the loads by 3 MW as a way to load balance the power grid."

Ex. 17 at 51:24-40; *see also id.* at 51:8-23; 51:41-52:11.

Plaintiffs and their expert, Dr. McClellan purport to apply the "plain and ordinary meaning of "minimum power threshold," but Dr. McClellan made clear at his deposition that his interpretation of "minimum power threshold" is not based on how the term is used in the '433 patent. Ex. 3 at ¶ 49. In particular, Dr. McClellan testified that:

> Q. What specifically is a minimum power threshold?
>
> A. That's the amount of power that you're contracted to consume.

> Q. And by consume you don't mean use, correct?
>
> A. ***I may not use it***, but I'm going to consume it. I'm purchasing it. ***Whether I use it or whether I sell it, that's a completely separate issue***. I'm agreeing to purchase it at that threshold.

Ex. 5 at 82:18-85:1. As a further example of his interpretation of the term, Dr. McClellan also testified that "[w]ell, if I purchase one kilowatt at $1, I'm going to pay that $1 whether I use that kilowatt or not," thus "[t]he power threshold is the kilowatt." Ex. 5 at 87:16-88:17. Dr. McClellan, however, also testified that he was not sure whether or not there was actually a requirement to use the amount of power set by a minimum power threshold. Rather than being a requirement established by the '433 patent, however, he testified that "[f]undamentally it's a business question." Ex. 5 at 90:14-91:21; *see also id.* at 87:2-15. Dr. McClellan also asserted that "this is a question for McCamant"—another of Plaintiffs' experts, Mr. Frank McCamant. Ex. 5 at 91:22-92:24; *see also id.*at 155:13-156:11. But Mr. McCamant did not offer any opinions regarding claim construction or the meaning of "minimum power threshold." *See generally* Ex. 1; Ex. 2 (McCamant Reply Report). As such, Plaintiffs' and their experts' interpretation of this claim term is somewhat unclear, but nonetheless is not based on the intrinsic record.

It is thus apparent that Plaintiffs at the very least to take an ambiguous position on whether a "minimum power threshold" sets an amount of power a load must actually use. Accordingly, and based on the meaning established by the intrinsic evidence, the Court should resolve the parties' dispute and construe "minimum power threshold" to mean "a minimum amount of power a load must use during an associated time interval."

c. None of the documents Storms sent to Lancium disclose the claimed inventions of the '433 patent.

To prevail on their claim that Storms is the sole true inventor of the '433 patent, Plaintiffs

must prove by clear and convincing evidence that Storms "is the sole inventor of each of the claims of the patent" and that "any contribution by defendant[s] to the conception of each and every claim was insignificant." *See, e.g., Imprenta Servs., Inc. v. Karll*, No. 220CV06177GWPVCX, 2021 WL 4555333, at *6 (C.D. Cal. July 13, 2021). Moreover, it is axiomatic that because Plaintiffs seek to have Storms substituted as the sole inventor of a patent filed by Defendants, they must also prove—again by clear and convincing evidence—that they communicated the inventions of the '433 patent to Defendants. *See Weaver v. Houchin*, 467 Fed. App'x 878, 880 (Fed. Cir. 2012); *Wagner v. Ashline*, No. 2021-1715, 2021 WL 5353889, at *4 (Fed. Cir. Nov. 17, 2021).

As a matter of law, however, Plaintiffs cannot meet this "heavy burden" because there is no evidence that Storms conceived of the properly construed inventions of the '433 patent, much less that he communicated these inventions to Defendants.[10]

The only written communications between Storms and any of Defendants were a handful of text messages exchanged from May 3-9, 2019 and a single email that Storms sent to McNamara on May 9, 2019. SOF ¶14; Ex. 20; *see also* D.I. 103 at ¶¶ 34-36. Plaintiffs cannot establish that any of these written communications demonstrate, by clear and convincing evidence, possession of the inventions of the '433 patent by Storms or conveyance of the claimed inventions to Defendants. For example, because Plaintiffs rely on a misinterpretation of "power option agreement" and "minimum power threshold" they cannot establish that Storms' communications show possession or communication of a system that can:

- "receive power option data based, at least in part, on a power option agreement, wherein the power option data specify: (i) a set of minimum power thresholds, and (ii) a set of time intervals, wherein each minimum power threshold in the set of

[10] Likewise, Plaintiffs cannot prove that McNamara and Cline—the '433 patent's named inventors—did not provide a significant contribution to conception of any claim. Indeed, Plaintiffs' expert, Dr. McClellan does not offer any opinions or analysis that McNamara and Cline did not provide a significant contribution to any of the claims. *See, e.g.*, Ex. 3 at ¶ 14 (summary of opinions).

minimum power thresholds is associated with a time interval in the set of time intervals"; or

- "responsive to receiving the power option data, determine a performance strategy for the set of computing systems based on a combination of at least a portion of the power option data and at least one condition in the set of conditions, wherein the performance strategy comprises a power consumption target for the set of computing systems for each time interval in the set of time intervals, wherein each power consumption target is equal to or greater than the minimum power threshold associated with each time interval"

as required by independent claim 1 of the '433 patent—or the similar requirements of the other two independent claims (claims 17 and 20). Indeed, Plaintiffs' expert, Dr. McClellan provides no explanation how of the written communications and documents Storms sent to McNamara disclose or convey the properly construed requirements of the claims. *See generally* Ex. 3 (McClellan Opening Report); Ex. 4 (McClellan Reply Report).

Fundamentally, the alleged "invention" that Storms purportedly conceived of and communicated to Defendants does not pertain to the claimed inventions of the '433 patent. Rather, as Dr. McClellan asserts, it pertains to "a system that utilizes a set of Bitcoin miners under the direction of a control system" that based on certain information "periodically determinine[s] mining profitability" and then "may either instruct some or all of the miners to mine Bitcoin or sell power to the grid (power arbitrage)." Ex. 3 at ¶ 9. Dr. McClellan thus relies on his misinterpretation of "power option agreement" and "minimum power threshold" to mistakenly conclude that Storms' written communications with McNamara demonstrate the above claim requirements because these communications show a system that "calculated profitability at distinct time intervals, each with an associated power threshold, such as comparing mining profitability based on, inter alia, current power usage and energy price conditions on the one hand with profitability based, inter alia, on expected future power usage and energy price conditions" and then "determin[es] performance strategies … to determine, for example, whether to mine Bitcoin"

based on whether that is the most profitable use of purchased power. Ex. 3 at ¶¶ 188-189; *see also id.* at ¶¶ 62, 66. But the claim elements—and indeed the claimed inventions—have no requirements relating to profitability calculations.

Furthermore, the claims set forth requirements that a load (e.g., a Bitcoin mining operation) must use the amount of power set by the minimum power thresholds regardless of profitability, which is the opposite of the system contemplated by Storms' communications. Indeed, when asked whether the system described in Storms' communications "contemplate[s] a performance strategy where X amount of power must be utilized by the miners, they must mine and use X amount of power, regardless of whether or not it's profitable for the miners to do so?", Dr. McClellan testified that "[t]he simulation kind of ignores" what he called a "nonsensical case … because it's focusing on ways to make positive dollars … ." Ex. 5 at 238:7-23.

Thus, for the reasons above, Plaintiffs cannot establish that any written communications between Storms and Defendants demonstrate conception of the inventions of the '433 patent by Storms or communication of the inventions to Defendants.

d. There is no corroboration that Storms verbally communicated the claimed inventions to Defendants.

Plaintiffs also cannot prove by clear and convincing evidence that Storms orally communicated the inventions of the '433 patent, as properly construed, to Defendants, including McNamara, because they have no evidence to corroborate any such assertion. *See Ethicon*, 135 F.3d at 1461.

As an initial matter, even Plaintiffs' expert, Dr. McClellan testified that "I think it's unlikely that an enormous amount of pertinent information was communicated at the dinner" where Storms and McNamara spoke in person because for "dinners like that there's not normally an enormous amount of information that's passed back and forth." Ex. 5 at 186:24-187:20.

Moreover, as set forth above, because none of the written communications that Storms had with Defendants disclose the claimed inventions of the '433 patent, these communications cannot corroborate that Storms communicated the inventions of the '433 patent to Defendants.

Wagner v. Ashline is instructive on this point. No. 2021-1715, 2021 WL 5353889 (Fed. Cir. Nov. 17, 2021). In *Wagner*, the Federal Circuit affirmed summary judgment of no inventorship by a purported inventor, concluding that purported corroborating evidence of a discussion between the purported inventor and the named inventor "corroborate[d] only the undisputed fact that [the named inventor] and [the purported inventor] met and that they discussed" other topics, but "[i]t does not corroborate [the purported inventor]'s testimony in support of her claim of joint inventorship." 2021 WL 5353889, at *5. In other words, the Federal Circuit concluded that in order for an unnamed inventor's testimony to meet the clear and convincing evidence of proving an inventorship claim, there must be evidence that corroborates what was actually communicated between the purported inventor and the named inventor(s).

Here, as a matter of law, Plaintiffs cannot prove by clear and convincing evidence that Storms orally communicated the claimed inventions of the '433 patent to Defendants because they have no corroborating evidence of what was actually communicated. Plaintiffs have not deposed or offered testimony from any other attendees of the dinner where Storms and McNamara spoke, and McNamara certainly does not corroborate Storms' claim. In addition, as set forth above, none of the written communications between Storms and McNamara corroborate that Storms possessed or communicated the inventions of the '433 patent as properly construed.

In addition, evidence in the case demonstrates that Storms did not conceive of the inventions of the '433 patent, much less communicate these inventions to Defendants. Indeed, two days after meeting McNamara, Storms texted another person he was working with, Ben Hakes,

and admitted "[t]he guys at Lancium ***are <u>doing</u>*** what ***we are <u>trying</u> to do*** exactly … . *See* Ex. 16 at BB10004001.

Thus, for the reasons above, Storms' oral communications with Defendants do not establish conception or communication of the claimed inventions of the '433 patent, because as a matter of law, Storms has no clear and convincing evidence corroborating any such communication. Likewise, Plaintiffs cannot establish that the written communications between Storms and Defendants establish conception or communication of the claimed inventions. Accordingly, summary judgment should be granted on Plaintiffs' Count I that Storms is not the sole inventor of the '433 patent.

B. Plaintiffs' Joint Inventorship Claim Fails As A Matter Of Law Because Plaintiffs Cannot Meet Their Burden Of Proving Collaboration.

1. Applicable Legal Principles

The law regarding claims for correction of inventorship under 35 U.S.C. § 256 is generally the same whether the claim is for complete substitution of inventors or addition of unnamed joint inventors. However, for joint inventorship claims, the alleged contribution of the purported co-inventor is compared with the subject matter of the properly construed claims to determine whether the alleged inventor contributed in some "significant manner" to the conception of the claimed invention. *Gemstar*, 383 F.3d at 1381. To meet this standard, the would-be co-inventor must demonstrate that she/he made a contribution that "is not insignificant in quality, when that contribution is measured against the dimension of the full invention," as opposed to merely explaining well-known concepts and/or the state of the art to the real inventors. *Acromed Corp. v. Sofamor Danek Group, Inc.*, 253 F.3d 1371, 1379 (Fed. Cir. 2001) (reversing a jury verdict of invalidity for improper inventorship due to insufficiency of evidence).

A would-be co-inventor must also demonstrate some element of joint behavior, such as

collaboration or working under common direction. *See, e.g.*, *Kimberly-Clark Corp. v. Procter & Gamble Distributing Co., Inc.*, 973 F.3d 911, 917 (Fed. Cir. 1992). Stated differently, "a joint invention is 'a product of a collaboration between two or more persons working together to solve the problem addressed.'" *Rubin v. Gen. Hosp. Corp.*, No. 09-10040-DJC, 2011 WL 1625024, at *6 (D. Mass. Apr. 28, 2011) (quoting *Kimberly-Clark*, 973 F.2d at 917).

2. Plaintiffs Cannot Prove By Clear And Convincing Evidence That Storms Collaborated With Messrs. McNamara and Cline On The Claimed Inventions

Plaintiffs' joint inventorship claim fails because the claim is not supported by clear and convincing evidence that there was "joint behavior" or "collaboration" between putative inventor Storms and named inventors McNamara and Cline as to the '433 patent's claimed inventions. The only communications—and thus potential collaboration—between Storms and any of Defendants were: (1) a conversation during a group dinner on May 3, 2019; (2) a series of text messages following the dinner sent from May 3 to May 9, 2019; and (3) an email that Storms sent McNamara on May 9, 2019. *See* SOF ¶14; D.I. 103 at ¶¶ 32-36; D.I. 41 at ¶¶ 38, 40-41, 43, 46-50; D.I. 28 at ¶¶ 38, 40-41, 43, 46-50, Exs. C-D. But these communications, as a matter of law, cannot establish the required collaboration.

University of Utah v. Max-Planck-Gesellschaft Zur Foerderung Der Wissenschaften E.V., is instructive. 851 F.3d 1317 (Fed. Cir. 2017). In *University of Utah*, the putative inventor, Dr. Bass, wrote a "mini-review" of research of others relating to RNA interference ("RNAi") and included her "own hypotheses about enzymatic processes that may be responsible for the RNAi activity reported in" prior work by another, Dr. Tuschl. *Id.* at 1320. "It [was] undisputed that Dr. Tuschl read Dr. Bass' mini-review, recognized her hypothesis … and tested that hypothesis." *Id.* In addition, "Dr. Bass and Dr. Tuschl met for dinner during a conference and discussed Dr. Tuschl's research in relation to Dr. Bass' hypothesis." *Id.* at 1321. And based on Dr. Tuschl's test

results that confirmed Dr. Bass' hypothesis, Dr. Tuschl and his colleagues filed and received a patent on their discovery. *Id.* at 1320. Based on these facts, the plaintiff filed suit seeking to add Dr. Bass as a joint inventor on the patent-at-issue, but the district court granted summary judgment against this claim reasoning that "there was no evidence to support a finding of collaboration between Dr. Bass and the [named] inventors." *Id.* at 1321. This was because the court found that Dr. Bass' mini-review paper "was already in the public domain by the time the [named] inventors relied on it" so it "could not, on its own, support a finding of collaboration," and the single discussion between Dr. Bass and Dr. Tuschl "at an academic conference could not constitute the collaboration needed to establish joint inventorship." *Id.* The Federal Circuit also did not dispute the district court's reasoning. *Id.*

The basis of Plaintiffs' joint inventorship claim here is analogous to *University of Utah* and also warrants summary judgment based on the lack of collaboration. As an initial matter, just as the dinner conversation in *University of Utah* did not demonstrate collaboration, neither does Storms and McNamara's dinner conversation here. Indeed, although the dinner conversation in *University of Utah* occurred while the named inventors' work on the patent-at-issue was ongoing, the dinner conversation between Storms and McNamara was the ***first*** communication they had. Moreover, Plaintiffs admit that Storms' conversation with McNamara occurred in front of other of the approximately eight attendees at the May 3, 2019 dinner, which included competitors in the Bitcoin mining field. SOF ¶11; D.I. 41 at ¶¶ 38, 40-41, 43; D.I. 28 at ¶¶ 38, 40-41, 43. Thus, this dinner provides even less support for collaboration than the dinner in *University of Utah*.

Turning to the handful of text messages between Storms and McNamara, these messages plainly do not disclose any elements of the '433 patent claims, and thus do not show collaboration on the inventions of the '433 patent. *See* D.I. 41 at ¶¶ 46-48; D.I. 28 at ¶¶ 46-48, Ex. C. Moreover,

Plaintiffs do not contend otherwise. Indeed, Plaintiffs' expert Dr. McClellan does not point to any of these text messages in support of his opinions that Storms is an unnamed inventor of the '433 patent. *See generally* Ex. 3 at Sections VII-VIII.

In addition, the email that Storms sent to McNamara cannot establish collaboration for several reasons. First, one of the five attachments to the email included a drawing titled "BearBox Automatic Miner Management System Version 1.0" that Storms also posted on BearBox's Twitter account on June 24, 2019—more than three months before the provisional application leading to the '433 patent was filed on October 28, 2019. SOF ¶¶1, 3, 19-20; *Compare* Ex. 10 at BB00000092, *with* Ex. 11 at BB00000718. Storms testified that this Twitter account, which had its first tweet on November 1, 2018, was "public for maybe two years or so." *See* Ex. 7 at 247:8-248:21; Ex. 11 at BB00000718. Thus, this drawing was publicly available before the filing of the '433 patent. *See* SOF ¶¶19-20. Plaintiffs, including through their expert Dr. McClellan, assert that this publicly available drawing discloses numerous claim elements of the '433 patent. *See, e.g.*, Ex. 3 at ¶¶ 185, 186, 188, 190, 192, 196, 200, 230, 237, 241, 244, 248, 250, 262. But just as in *University of Utah*, this publicly available document cannot support a finding of collaboration. *University of Utah*, 851 F.3d at 1321.

Second, Storms admitted that three of the other five email attachments were publicly available product specification sheets. Ex. 7 at 213:5-214:5; Ex. 10; *see also* SOF ¶18. Thus, these documents also cannot support a finding of collaboration because they only disclose information about the state of the art in the field.[11] *See Acromed*, 253 F.3d at 1379; *University of Utah*, 851 F.3d at 1321.

[11] Plaintiffs also cannot establish that these documents disclose a significant contribution to the claimed inventions.

Third, although Storms testified that the only allegedly confidential information in the email was in the fifth attachment, an Excel spreadsheet, this document also cannot support a finding of collaboration. As an initial matter, this document contains much of the same information as the publicly available drawing, and Dr. McClellan cites the documents as both disclosing many of the same claim elements. *See, e.g.*, Ex. 3 at ¶¶ 190, 196, 200, 230, 237, 241, 244, 248, 250. Moreover, Plaintiffs' only basis for asserting that the Excel file is confidential is a boilerplate "confidentiality notice" at the bottom of Storms' cover email—the Excel file itself contains no confidentiality marking—stating that "[t]his email communication ***may*** contain private, confidential, or legally privileged information intended for the sole use of the designated and/or duly authorized recipient(s)." SOF ¶16; Ex. 10 at BB00000090. Storms did not have a confidentiality or nondisclosure agreement with McNamara or any of Defendants. And Plaintiffs admit that "Storms last communicated with McNamara on May 9, 2019 via e-mail, and after sending that message, Storms did not hear from McNamara again." SOF ¶13; D.I. 103 at ¶ 36. Thus, Storms did not, and could not, have asked McNamara to treat the Excel file as confidential after emailing it to him.

Storms also sent the information he claims to be confidential to others. Specifically, Storms emailed similar spreadsheets to an individual named Todd Garland. Ex. 7 at 186:17-189:12, 214:6-12 Ex. 9. These spreadsheets include the same column headers and categories of information as the spreadsheet sent to Mr. McNamara only from different times. *Compare* Ex. 9 at BB10000912, *with* Ex. 10 at BB00000097. Storms admitted that he did not have a nondisclosure agreement with Garland or Garland's company, and Garland did not give his word to keep it confidential. Ex. 7 at 71:18-23; 188:1-189:2. Moreover, as with his email to McNamara, Plaintiffs' only basis for asserting that this email was confidential is the boilerplate confidentiality notice that Storms

included on all of his emails. Ex. 7 at 72:4-9; 188:18-21.

But courts have found that "[a] boilerplate confidentiality statement" in an email "does not constitute a reasonable measure to keep secrecy—especially when [it] use[s] the phrase 'may contain information that is … confidential.'" *Acad. of Allergy & Asthma in Primary Care v. Quest Diagnostics, Inc*, No. 5:17-CV-1295-RCL, 2022 WL 980791, at *10 (W.D. Tex. Mar. 31, 2022) (dismissing trade secret claim); *Sortiumusa LLC v. Hunger*, No. 3:11-cv-1656, 2013 WL 11730655, at *11-12 (N.D. Tex. Mar. 31, 2013) (dismissing trade secret claims and finding that a "confidentiality statement" at the bottom of an email stating it "*may* contain information that is confidential or otherwise protected from disclosure … bears no relevance, as a matter of law, as to whether [plaintiff] took appropriate steps to safeguard its alleged trade secrets" (emphasis in original)). And under federal patent law, an idea is considered publicly available if "given to a member of the public without restriction." *See Pronova Biopharma Norge AS v. Teva Pharms. USA, Inc*., 549 F. App'x 934, 940 (Fed. Cir. 2013). Thus, Storms' Excel file was also publicly disclosed and cannot support a finding of collaboration.

Rubin v. General Hosp. Corp., is also instructive. 523 Fed. Appx. 719 (Fed. Cir. 2013). In *Rubin*, a group of researchers (the Rubin group), authored a paper identifying two specific gene mutations that caused the disease Familial Dysautonomia (FD), and contrary to their request the abstract of this paper was sent to another group of researchers (the Gusella group), who were also working on identifying the cause of FD. *Id.* at 721. When the Gusella group filed a patent claiming a diagnostic method for FD using these gene mutations, the Rubin group sought to be added as joint inventors. *Id.* at 722. The Federal Circuit, however, affirmed summary judgment of no joint inventorship, concluding that "the nature of this communication of information, do[es] not support joint invention." *Id.* at 723. Just as in *Rubin*, Storms' transmission of documents to McNamara,

with no further discussion or communication, cannot support a finding of collaboration or support a claim of joint inventorship.

Thus, summary judgment should be granted in Defendants' favor on Plaintiffs' joint inventorship claims (Count II).

3. Plaintiffs Cannot Prove By Clear And Convincing Evidence That Storms Made A Significant Contribution To The '433 Patent.

To be named as a joint inventor of a patent, one must "contribute in some significant manner to the conception of the invention." *Gemstar*, 383 F.3d at 1381. And "[t]he general rule is that a party alleging misjoinder or non-joinder of inventors must meet the heavy burden of proving its case by clear and convincing evidence." *Eli Lilly*, 376 F.3d at 1358. Here, as set forth above in Section IV.A.2, Plaintiffs premise their inventorship claims on misinterpretations and misconstructions of two key claim terms of the '433 patent. Indeed, Plaintiffs' experts offer no analysis or opinions supporting any significant contribution by Storms to the claims of the '433 patent as properly construed. Thus, Plaintiffs have not met and cannot meet their "heavy burden" of proving a significant contribution to the claims of the '433 patent. Accordingly, summary judgment should be granted to Defendants on Plaintiffs' joint inventorship claim (Count II).

C. Plaintiffs' Conversion Claim Is Prescribed By The One Year Statute Of Limitations.

Plaintiffs' conversion claim (Count V) is premised on Defendants' alleged conversion of a power arbitrage method disclosed in the documents that Storms emailed to McNamara. But Plaintiffs' own allegations in this case demonstrate that they knew or should have known of Defendants' alleged use of their purported power arbitrage method more than one year before bringing this claim. Therefore, summary judgment should be granted for Defendants on Plaintiffs' conversion claim because this claim is prescribed by Louisiana's applicable one-year statute of limitations.

It is well-established that under Louisiana law, "[a] conversion action sounds in tort and is subject to a one-year liberative prescriptive period" under Louisiana Civil Code Article 3492.[12] *Bihm v. Deca Systems, Inc.*, 226 So.3d 466, 480 (La. 2017); *see also Jefferson v. Crowell*, 956 So.2d 746, 749 (La. App. 2d Cir. 2007). In addition, "[a] prescriptive period will begin to run even if the injured party does not have actual knowledge of facts that would entitle him to bring a suit as long as there is constructive knowledge of same. Prescription commences upon whatever notice is enough to excite attention and put the party on guard or call for inquiry." *Bihm*, 226 So.2d at 480 (internal citations omitted). In other words, "[t]he prescriptive period commences on the date the aggrieved party has actual or constructive knowledge of the facts that would entitle him to bring suit." *Jefferson*, 956 So.2d at 749.

Here, Plaintiffs' conversion claim is based on Defendants' alleged use of Plaintiffs' so-called "power arbitrage" method, which Dr. McClellan explains is "a system that utilizes a set of Bitcoin miners under the direction of a control system" that will "periodically determine mining profitability" and "may either instruct some or all of the miners to mine Bitcoin or sell power back to the grid (power arbitrage)."[13] Ex. 3 at ¶ 9. This conversion claim was also first pled in Plaintiffs' Second Amended Complaint, which was filed on February 16, 2022[14] after the Court dismissed

[12] The Court has previously found that Louisiana law applies to Plaintiffs' conversion claim and that "both sides agree" on this point. *See* D.I. 143.

[13] Dr. McClellan's opening report explicitly states that "[i]n my opinion, Lancium is using BearBox's power arbitrage trade secrets," and his reply report—issued after the Court struck Plaintiffs' trade secret misappropriation claims—clarifies that "[m]y opinions, in this report and my opening report, are not dependent on whether the cause of action in this lawsuit is trade secret misappropriation, which I understand is no longer at issue in this case, or conversion." *See* Ex. 3 at ¶ 302; Ex. 4 at ¶ 215

[14] *See* D.I. 103-3 at 20-22 (providing a comparison of Plaintiffs' newly pled conversion claim against the previously pled conversion claim).

Plaintiffs' original conversion claim as preempted by federal patent law.[15] Plaintiffs further admit in the Second Amended Complaint that they "became aware of Defendants' wrongful use of BearBox's technology on or about August 17, 2020, when they learned about the Layer1 Lawsuit" (i.e., *Lancium LLC v. Layer1 Technologies, Inc.*, Case No. 6:20-cv-739 (W.D. Texas) "through a press release dated August 14, 2020." D.I. 103 at ¶ 54; *see also id.* ¶ 52. And the publicly available complaint in the Layer1 Lawsuit explains that Lancium's technology allows "computationally intensive activities requiring significant amounts of electricity such as Bitcoin mining" to "ceas[e] (or reduc[e]) Bitcoin mining operations" during "times of high-priced electricity" and thereby "receive[] the difference in value of the real time electricity versus the data center's pre-existing power purchase agreement price." *See* Ex. 19 (Layer1 Lawsuit complaint) at ¶ 10; *see also* ¶¶ 8-9, 11. In other words, the complaint in the Layer1 Lawsuit explains that Lancium's technology can do what Plaintiffs now allege is their purported power arbitrage method, by ceasing Bitcoin mining operations and selling the power that would otherwise be used to mine Bitcoin, when doing so is more profitable.

Thus, through their knowledge of the Layer1 Lawsuit and their knowledge of the information Storms provided to McNamara, by August 17, 2020 Plaintiffs had actual knowledge, or at the very least constructive knowledge, of facts that would have enabled them to bring the present claim. And because Plaintiffs had this knowledge well over a year before they pled their conversion claim on February 16, 2022, this claim is prescribed by the statute of limitations.

Moreover, Plaintiffs' currently pled conversion claim does not "relate back" to the filing of the original complaint in this case because it does not "arise[] out of the conduct, transaction, or occurrence set forth or attempted to be set forth in the original pleading." *See Hammons v. City*

[15] *See* D.I. 92 at 12 (recommending dismissal); D.I. 97 (adopting recommendation of D.I. 92).

of Tallulah, 708 So.2d 502, 504 (La.App. 2d Cir. 1998) (finding conversion claim did not relate back to original complaint). As pled, Plaintiffs' current conversion claim is based upon Defendants' allegedly using "Bearbox's technology" to "modify their Smart Response™ software." D.I. 103 at ¶ 87. This is entirely different than the claim pled in their original Complaint, which did not assert any claims based on Lancium's Smart Response™ software or the alleged use of Plaintiffs' power arbitrage method. Rather, all of the claims of the original Complaint (and the First Amended Complaint) were based on Lancium's alleged patenting of Plaintiffs' invention. *See generally* D.I. 1; D.I. 19. Indeed, at the hearing on Defendants' motion to strike the trade secret claims in the Second Amended Complaint, Magistrate Judge Burke explained that:

> "Like a key issue here is defendants say that plaintiffs were basically talking about the types of arbitrage methods that are referred to in the second amended complaint back in the original complaint. And the plaintiff is saying, No, we weren't. No, no, we were talking about something else. … But I'm still struggling to understand what it was you were talking about in the first complaint."

In response to this, Plaintiffs' counsel made clear that "[f]irst of all, it had nothing to do with energy value arbitrage methods" Ex. 22 at 22:16-23:21. And when the Court followed up, Plaintiffs' counsel confirmed "it didn't have anything to do with arbitrage methods at all." Ex. 22 at 24:1-3. As such, Plaintiffs' conversion claim does not arise out of the same conduct pled in the original Complaint, and thus does not "relate back" to the original Complaint.

Accordingly, summary judgment should be granted that Plaintiffs' conversion claim (Count V) is prescribed by the applicable one-year statute of limitations.

D. Plaintiffs' Conversion Claim Is Preempted By Federal Patent Law

Plaintiffs' conversion claim is based upon Defendants' use of information in documents that, as a matter of law, was not confidential. But because Plaintiffs' claim seeks to restrict the use of non-confidential information, it conflicts with federal patent law. Accordingly, the Court should grant summary judgment that Plaintiffs' conversion claim is preempted by federal patent law.

It is well-established that "[f]ederal law preempts state law that offers patent-like protection to discoveries unprotected under federal patent law." *Ultra-Precision Mfg., Ltd v. Ford Motor Co.*, 411 F.3d 1369, 1377-78 (Fed. Cir. 2005) (noting that "Federal Circuit law governs whether federal patent law preempts a state law claim") (internal quotations and citation omitted). The Supreme Court has also explained that "[a] state law that substantially interferes with the enjoyment of an unpatented utilitarian or design conception which has been freely disclosed by its author to the public at large impermissibly contravenes the ultimate goal of public disclosure and use which is the centerpiece of federal patent policy." *Bonito Boats, Inc. v. Thunder Craft Boats, Inc.*, 489 U.S. 141, 156-57 (1989). Thus, "[a]bsent secrecy, state law cannot create a collateral set of rights available as an adjunct or expansion to patent rights." *Ultra- Precision*, 411 F.3d at 1379 (quoting *Waner v. Ford Motor Co.*, 331 F.3d 851, 856 (Fed. Cir. 2003)). Moreover, under federal patent law, an idea is considered publicly available if "given to a member of the public without restriction." *See Pronova Biopharma Norge AS v. Teva Pharms. USA, Inc*., 549 F. App'x 934, 940 (Fed. Cir. 2013); *see also Bonito Boats*, 489 U.S. at 149 (under 35 U.S.C. § 102, "[o]nce an inventor has decided to lift the veil of secrecy from his work, he must choose the protection of a federal patent or the dedication of his idea to the public at large").

Plaintiffs' Second Amended Complaint alleges that Defendants are liable for conversion because:

> "[w]ithout Plaintiffs' consent, Defendants intentionally and willfully assumed dominion and control over BearBox's technology, including system designs, documents, data, and know-how, and improperly used it to modify their Smart Response™ software, and corresponding system designs, to function as reflected in BearBox's system designs, documents, data, and know-how … ."

D.I. 103 at ¶ 87. Under Louisiana law, however, a claim for conversion applies only to "goods" or "chattel." *See Quealy v. Paine, Webber, Jackson & Curtis, Inc.*, 475 So.2d 756, 760 (La. 1985);

Dual Drilling Co. v. Mills Equip. Invs., Inc., 721 So. 2d 853, 857 (La. 1998); *Dorsey v. Money Mack Music, Inc.*, 304 F. Supp. 2d 858, 866 (E.D. La. 2003) ("[T]he torts of conversion and trespass relate to interference with tangible rather than intangible property."); *Brand Coupon Network, LLC v. Catalina Mktg. Corp.*, No. 11-00556, 2014 WL 6674034, at *6 (M.D. La. Nov. 24, 2014) ("[C]onversion requires unlawful interference with *chattel*.") (emphasis in original). And chattel "is deemed 'corporeal movable' property." *BASF Agrochemical Prods. v. Unkel*, No. 05-1478, 2006 WL 3533133, at *7 (W.D. La. Dec. 7, 2006). Thus, Plaintiffs' conversion claim is premised on the "conversion" of information contained in electronic files that Storms emailed to McNamara in a single email sent on May 9, 2019.[16] Ex. 7 at 113:24-114:6; 212:7-10; *see also* D.I. 103 at ¶ 36.

As set forth above in Section IV.B.2, although the email that Storms sent to McNamara had several attachments, Plaintiffs only contend that one of the attachments, an Excel file, contained confidential information. SOF ¶17. And as also set forth above in Section IV.B.2, the only basis for Plaintiffs' assertion that this Excel file is confidential—the "confidentiality notice" at the bottom of the cover email, which states only that "that "[t]his email communication ***may*** contain private, confidential . . . information" (SOF ¶16; Ex. 10 at BB00000090)—does not, as a matter of law, make it confidential. *See, e.g., Acad. of Allergy & Asthma*, 2022 WL 980791, at *10; *Sortiumusa*, 2013 WL 11730655, at *11-12 Thus, Plaintiffs cannot establish that the allegedly converted information was confidential.

The Federal Circuit has also repeatedly found state law claims based on the use of non-

[16] To the extent Plaintiffs' conversion claim is premised on Defendants' alleged conversion of intangible "system designs, … data, and know-how" that are not contained in a physical, tangible property, the Court should grant summary judgment in Defendants' favor because the claim does not satisfy the elements of conversion and fails as a matter of law. *See, e.g., Quealy*, 475 So.2d at 760; *Dorsey* 304 F. Supp. 2d at 866.

confidential information to be preempted. For example, in *Ultra-Precision*, the court held plaintiff's unjust enrichment claim, which was premised upon the defendant's "using, manufacturing, and selling vehicles equipped with [Ultra-Precision's] technology" was preempted because the idea/technology was not kept confidential and was therefore "free for all the world to enjoy." *Id.* at 1380-82. Additionally, in *Waner* the Federal Circuit affirmed dismissal of the plaintiff's unjust enrichment claim premised upon the use of his non-confidential idea because such "ideas can only be protected under intellectual property law by the patent system." *Waner*, 331 F.3d at 856–57.

Therefore, because Plaintiffs' conversion claim is based on the alleged use of information that as a matter of law was not confidential, the Court should grant summary judgment that Plaintiffs' conversion claim (Count V) is preempted by federal patent law.

V. CONCLUSION

For at least the foregoing reasons, Plaintiff's claims for correction of inventorship (Counts I and II) and for conversion (Count V) fail as a matter of law. Accordingly, summary judgment should be granted for Defendants on all three claims.

Dated: June 15, 2022

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IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

BEARBOX LLC and AUSTIN STORMS, Plaintiffs, v. LANCIUM LLC, MICHAEL T. MCNAMARA, and RAYMOND E. CLINE, JR. Defendants.	)	C.A. No. 21-534-MN

CERTIFICATE OF SERVICE

I certify that on June 15, 2022, I caused a sealed copy of **Defendants' Opening Brief in Support of their Motion for Summary Judgment and to Exclude Certain Portions of the Opinions of Plaintiffs' Technical Expert** to be served on the following counsel of record by via FileShare.

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communications Mr. Storms had with Mr. McNamara. D.I. 28 at ¶ 38; D.I. 41 at ¶ 38; D.I. 103 at ¶¶ 35-36.

15. Austin Storms has never had any oral communications with Raymond Cline. Ex. 23 at 10-11.

16. The May 9, 2019 email that Austin Storms sent Michael McNamara includes a "Confidentiality Notice" that states "This email communication may contain private, confidential, or legally privileged information intended for the sole use of the designated and/or duly authorized recipient(s)." D.I. 28 at ¶¶ 48-49, Ex. D; D.I. 41 at ¶¶ 48-49. None of the attachments to this email include any confidentiality marking or designation. D.I. 28 at ¶¶ 48-49, Ex. D; D.I. 41 at ¶¶ 48-49.

17. The documents produced by Plaintiffs with Bates numbers BB00000090-BB00000097, are the May 9, 2019 email and its attachments that Austin Storms sent to Michael McNamara. Ex. 10

18. Plaintiffs Austin Storms and BearBox LLC do not assert that the May 9, 2019 email (BB00000090) or its attachments marked as BB00000091-BB00000096 are confidential. Ex. 7 at 217:13-23.

19. The drawing titled "BearBox Automatic Miner Management System Version 1.0" in the document marked as BB00000092 was posted on the BearBox Twitter account on June 24, 2019. Ex. 10 at BB00000092; Ex. 11 at BB00000718.

20. The BearBox Twitter account was publicly viewable on June 24, 2019. Ex. 7 at 247:8-248:21.

IV. BEARBOX

21. BearBox only built one BearBox container, which it sold for no profit. Ex. 7 at 45:18-23; 48:6-7.

[6] Multiple methods were used to analyze the relevant technologies and items of development, including document review and source code review.

[7] My source code review involved analyzing the structure and design of the Bearbox technologies, including identifying architectural and functional elements of the Bearbox product suite which contain technologies, protocols, and architectures or which exhibit functions, behaviors, or structures that may infringe on corresponding aspects of the subject patent(s).

[8] Certain source code has been produced as printouts with Bates labeling. I reserve the right to rely on all such printouts. I understand that certain relevant source code from Defendants has not been produced. I reserve the right to supplement my opinions in the event that additional source code is produced. My analysis yielded a number of observations, including without limitation the following example high-level points. In the following, [n] denotes a claim number of the subject patent, and "*text*" denotes some verbiage copied from the referenced claim language.

[9] I understand that Bearbox and Austin Storms developed a system that utilizes a set of Bitcoin miners under the direction of a control system that uses (1) various API calls to retrieve relevant information (such as real-time and day-ahead energy prices), (2) custom PDU logic and fan control to provide fine grain load control for the miners, and (3) custom logic to process the information and periodically determine mining profitability. Based on conditions, the system may either instruct some or all of the miners to mine Bitcoin or sell power to the grid (power arbitrage).

[10] I understand that Lancium also uses and/or sells Bitcoin mining related and power arbitrage features under a product named Smart Response™. I understand that Lancium's Smart Response™ system acts as a "Controllable Load Resource" data center which alternately mines Bitcoin or sells energy to the grid based on conditions such as energy prices, Bitcoin pricing and hashtag rates, and the like.

[11] I am a salaried employee of Texas State University and I am being compensated in addition to my normal salary for my professional services in this case by either The Barr Group or

patent coverage under the doctrine of equivalents that would be so broad as to include the same features that were disclaimed to distinguish the invention from the prior art during the prosecution of the patent

V. THE ’433 PATENT

[43] United States Patent No. 10,608,433 titled “METHODS AND SYSTEMS FOR ADJUSTING POWER CONSUMPTION BASED ON A FIXED - DURATION POWER OPTION AGREEMENT,” was filed on December 4, 2019 and issued on March 31, 2020.

A.1. Overview of the '433 Patent

[44] In general, the '433 Patent discloses example embodiments which enable a computing system to adjust power consumption based on a power option agreement, and using some combinations of power thresholds, time intervals, and monitored conditions. The '433 Patent provides an overview of this aspect of the disclosure:

> Examples relate to adjusting load power consumption based on a power option agreement. A computing system may receive power option data that is based on a power option agreement and specify minimum power thresholds associated with time intervals . The computing system may determine a performance strategy for a load (e.g., set of computing systems) based on a combination of the power option data and one or more monitored conditions. The performance strategy may specify a power consumption target for the load for each time interval such that each power consumption target is equal to or greater than the minimum power threshold associated with each time interval. The computing system may provide instructions the set of computing systems to perform one or more computational operations based on the performance strategy.

’433 patent, 1:6-25.

A.2. Level of Ordinary Skill in the Art

[45] I also have been asked to evaluate the level of ordinary skill in the art for the purpose of reading and understanding the '433 patent. In order to make this assessment, I considered the level of education and experience of persons of ordinary skill in the art at the time

of the filing of the '433 patent. I understand that the filing date of the '433 patent is December 4, 2019.

[46] In my opinion, at the time of the filing of the '433 patent, one of ordinary skill in the art should have a degree in electrical engineering, computer science, or a similar field and one to two years of experience in the field of software or an equivalent level of experience.

[47] My qualifications and experience exceed those of a person having ordinary skill in the art.

A.3. Claim Construction of Certain Terms in the '433 patent

[48] I understand that the determination of whether there is infringement involves a two-step analysis. The first step in an infringement analysis is to determine or construe the meaning of the terms of the asserted claims. The second step in an infringement analysis is to apply or compare each of the asserted claims, as construed, to the accused products or to the use of the accused products.

[49] I understand that claim terms by default are construed by their plain and ordinary meanings to a person of ordinary skill in the art. For purposes of my analysis, I have applied the plain and ordinary meaning of the claim terms. I reserve the right to supplement my report should Lancium use a different construction, if the Court provides a construction, or the like.

VI. OVERVIEW OF THE LANCIUM'S SMART RESPONSE SYSTEM

[50] I understand that Lancium uses and/or sells Bitcoin mining related and power arbitrage services under the product name Smart Response™. I understand that Lancium's Smart Response™ system acts as a "Controllable Load Resource" data center which alternately mines Bitcoin or sells energy to the grid based on conditions such as energy prices, Bitcoin pricing and hashtag rates, and the like, as explained in more detail below.

wherein the power option data specify: (i) a set of minimum power thresholds, and (ii) a set of time intervals, wherein each minimum power threshold in the set of minimum power thresholds is associated with a time interval in the set of time intervals.

[62] The systems conceived of and/or developed by Bearbox satisfy this aspect of claim 1 at least because the Bearbox systems calculated profitability at distinct time intervals, each with an associated power threshold, such as comparing mining profitability based on, inter alia, current power usage and energy price conditions on the one hand with profitability based, inter alia, on expected future power usage and energy price conditions. For example, the Bearbox system used multiple time intervals, including the day-ahead hourly intervals and real-time 5-minute intervals, each of which included an associated minimum power threshold used in periodically determining performance strategies (i.e. every five minutes). The Bearbox system also included custom PDU software capable of providing fine grain load control (i.e. the ability to turn on some but not all of the miners) and also was configured to work modularly with a variety of different miners that had different power requirements.[3]

[63] To the extent this feature is found not to be explicitly described in the Bearbox disclosure, it is my opinion that merely ordinary skill would have been required to modify the existing system to explicitly incorporate this feature. For example, the involvement of and communication with a QSE in connection with power option agreements (and the data associated with power option agreements) was well-known, conventional feature in the art at the time of the invention.[4]

[64] I list below certain exemplary modules and files that I considered pertinent to my analysis and opinions. The noted modules perform functions related to receiving power option data in which minimum power thresholds at various time intervals are used to determine a performance

[3] Ex. 5, Deposition of Austin Storms, dated February 23, 2022, pp. 99-100, 290.
[4] I discussed these issues and facts with Frank McCamant by telephone on April 1, 2022, and I understand that his report explains these concepts in additional detail. I reserve the right to supplement my report based on any additional information that may be included in his report.

[65] Bearbox conceived of and developed technology that includes a system that, responsive to receiving the power option data, determine a performance strategy for the set of computing systems based on a combination of at least a portion of the power option data and at least one condition in the set of conditions, wherein the performance strategy comprises a power consumption target for the set of computing systems for each time interval in the set of time intervals, wherein each power consumption target is equal to or greater than the minimum power threshold associated with each time interval.

[66] The systems conceived of and/or developed by Bearbox satisfy this aspect of claim 1 at least because the Bearbox system calculated profitability at distinct time intervals, each with an associated power threshold, such as comparing mining profitability based on, inter alia, current power usage and energy price conditions on the one hand with profitability based, inter alia, on expected future power usage and energy price condition. Each time interval included an associated minimum power threshold used in periodically determining performance strategies, such as, inter alia, whether to mine Bitcoin based on variables such as Bitcoin price and hashrate. The Bearbox system also included custom PDU software capable of providing fine grain load control (i.e. the ability to turn on some but not all of the miners) and also was configured to work modularly with a variety of different miners that had different power requirements. [5]

[67] I list below certain exemplary modules and files that I considered pertinent to my analysis and opinions. The noted modules perform functions related to determining a performance strategy based on the power option data and monitored conditions. Non-exhaustive examples are listed below with reference to the current claim language. A detailed analysis of each module is provided in the Appendix.

1. arb_main_AEC.py - Processes marginal power price data to determine profitability of Bitcoin mining based on several parameters, and controls power to mining systems based on outcomes.

[5] Ex.5, Deposition of Austin Storms, pp. 99-100, 290.

2. cgminer_sqlite_test.py - Remotely communicates with miners to retrieve status information
3. DA_LMP_import.py - Imports marketplace data and returns the day-ahead marginal power price (LMP)
4. DA_LMP_import_AEC.py - Imports marketplace data and returns the day-ahead marginal power price (LMP)
5. email_alert.py - Provides email alerts for mining machine states (on, off, restart, shutdown, etc)
6. EXELON4.py - Computes "break even" point for mining Bitcoin in dollars per kilowatt-hour.
7. get_current_RT_LMP.py - Fetches marketplace data and returns the real-time local market price (LMP)
8. miner_amort_breakeven_.py - Performs profitability determinations for dynamic power thresholds and manages mining system based on resulting performance strategy.
9. LMP_csv_import.py - Retrieves the marginal power pricing data from Southwest Power Pool marketplace
10. test_profit.py - Simulates a mining operation's profitability
11. test_test_test.py - Simulates a mining operation's profitability.

Claim 1(e): "provide instructions to the set of computing systems to perform one or more computational operations based on the performance strategy"

[68] Bearbox conceived of and developed technology that includes a system comprising providing instructions to the set of computing systems to perform one or more computational operations based on the performance strategy.

[69] The systems conceived of and/or developed by Bearbox satisfy this aspect of claim 1 at least because the Bearbox system instructed miners in accordance with the determined performance strategy, such as enabling certain miners to mine Bitcoin. The Bearbox system also included custom PDU software capable of providing fine grain load control (i.e. the ability to turn

examples are listed below with reference to the current claim language. A detailed analysis of each module is provided in the Appendix.

1. arb_main_AEC.py - Processes marginal power price data to determine profitability of Bitcoin mining based on several parameters, and controls power to mining systems based on outcomes.
2. cgminer_sqlite_test.py - Remotely communicates with miners to retrieve status information
3. email_alert.py - Provides email alerts for mining machine states (on, off, restart, shutdown, etc)
4. EXELON4.py - Computes "break even" point for mining Bitcoin in dollars per kilowatt-hour.
5. miner_amort_breakeven_.py - Performs profitability determinations for dynamic power thresholds and manages mining system based on resulting performance strategy.

A.2.v. Claim 5

[87] Claim 5 is reproduced below:

> **The system of claim 4, wherein the performance strategy further comprises:**
>
> **at least one power consumption target that is greater than a minimum power threshold when the price of power from the power grid is below a threshold price during the time interval associated with the minimum power threshold.**

[88] It is my opinion that Bearbox was in possession of each claim element of claim 5 of the of the '433 patent. The sub-sections below provide additional detail concerning the basis for my opinion.

[89] Bearbox conceived of and developed technology that includes a performance strategy that further comprises: at least one power consumption target that is greater than a minimum power threshold when the price of power from the power grid is below a threshold price during the time interval associated with the minimum power threshold.

[90] The systems conceived of and/or developed by Bearbox satisfy this aspect of claim 5 at least because the Bearbox system calculated profitability at distinct time intervals, each with

an associated power threshold, such as comparing mining profitability based on, inter alia, current power usage and energy price conditions on the one hand with profitability based, inter alia, on expected future power usage and energy price condition. Each time interval included an associated minimum power threshold used in periodically determining performance strategies, such as, inter alia, whether to mine Bitcoin based on variables such as Bitcoin price and hashrate. The Bearbox system also included custom PDU software capable of providing fine grain load control (i.e. the ability to turn on some but not all of the miners) and also was configured to work modularly with a variety of different miners that had different power requirements. [7]

[91] I list below certain exemplary modules and files that I considered pertinent to my analysis and opinions. The noted modules perform functions related to a performance strategy further comprises: at least one power consumption target that is greater than a minimum power threshold when the price of power from the power grid is below a threshold price during the time interval associated with the minimum power threshold. Non-exhaustive examples are listed below with reference to the current claim language.

1. arb_main_AEC.py - Processes marginal power price data to determine profitability of Bitcoin mining based on several parameters, and controls power to mining systems based on outcomes.
2. DA_LMP_import.py - Imports marketplace data and returns the day-ahead marginal power price (LMP)
3. DA_LMP_import_AEC.py - Imports marketplace data and returns the day-ahead marginal power price (LMP)
4. EXELON4.py - Computes “break even” point for mining Bitcoin in dollars per kilowatt-hour.
5. get_current_RT_LMP.py - Fetches marketplace data and returns the real-time local market price (LMP)
6. miner_amort_breakeven_.py - Performs profitability determinations for dynamic power thresholds and manages mining system based on resulting performance strategy.

[7] Ex. 5, Deposition of Austin Storms, pp. 99-100, 290.

7. LMP_csv_import.py - Retrieves the marginal power pricing data from Southwest Power Pool marketplace
8. test_profit.py - Simulates a mining operation's profitability
9. test_test_test.py - Simulates a mining operation's profitability.

A.2.vi. Claim 6

[92] Claim 6 is reproduced below:

> **The system of claim 1, wherein the control system is further configured to:**
>
> **receive subsequent power option data based, at least in part, on the power option agreement,**
>
> **wherein the subsequent power option data specify to decrease one or more minimum power thresholds of the set of minimum power thresholds.**

[93] It is my opinion that Bearbox was in possession of each claim element of claim 6 of the of the '433 patent. The sub-sections below provide additional detail concerning the basis for my opinion.

[94] Bearbox conceived of and developed technology wherein the control system was further capable of receiving subsequent power option data based, at least in part, on the power option agreement, wherein the subsequent power option data specify to decrease one or more minimum power thresholds of the set of minimum power thresholds.

[95] The systems conceived of and/or developed by Bearbox satisfy this aspect of claim 6 at least because the Bearbox system calculated profitability at distinct time intervals, each with an associated power threshold, such as comparing mining profitability based on, inter alia, current power usage and energy price conditions on the one hand with profitability based, inter alia, on expected future power usage and energy price condition. Each time interval included an associated minimum power threshold used in periodically determining performance strategies, such as, inter alia, whether to mine Bitcoin based on variables such as Bitcoin price and hashrate. The Bearbox system also included custom PDU software capable of providing fine grain load control (i.e. the

ability to turn on some but not all of the miners) and also was configured to work modularly with a variety of different miners that had different power requirements. [8]

[96] I list below certain exemplary modules and files that I considered pertinent to my analysis and opinions. The noted modules perform functions related to receiving power option data based on a power option agreement in which minimum power thresholds at various time intervals. Non-exhaustive examples are listed below with reference to the current claim language. A detailed analysis of each module is provided in the Appendix.

1. arb_main_AEC.py - Processes marginal power price data to determine profitability of Bitcoin mining based on several parameters, and controls power to mining systems based on outcomes.
2. DA_LMP_import.py - Imports marketplace data and returns the day-ahead marginal power price (LMP)
3. DA_LMP_import_AEC.py - Imports marketplace data and returns the day-ahead marginal power price (LMP)
4. EXELON4.py - Computes "break even" point for mining Bitcoin in dollars per kilowatt-hour.
5. get_current_RT_LMP.py - Fetches marketplace data and returns the real-time local market price (LMP)
6. miner_amort_breakeven_.py - Performs profitability determinations for dynamic power thresholds and manages mining system based on resulting performance strategy.
7. LMP_csv_import.py - Retrieves the marginal power pricing data from Southwest Power Pool marketplace

A.2.vii. Claim 7

[97] Claim 7 is reproduced below:

> **The system of claim 6, wherein the control system is further configured to:**
>
> **responsive to receiving the subsequent power option data, modify the performance strategy for the set of computing systems based on a combination of at least the portion of the subsequent power option data and at least one condition in the set of conditions,**

[8] Ex. 5, Deposition of Austin Storms, pp. 99-100, 290.

modified performance strategy. Non-exhaustive examples are listed below with reference to the current claim language. A detailed analysis of each module is provided in the Appendix.

1. arb_main_AEC.py - Processes marginal power price data to determine profitability of Bitcoin mining based on several parameters, and controls power to mining systems based on outcomes.
2. cgminer_sqlite_test.py - Remotely communicates with miners to retrieve status information
3. email_alert.py - Provides email alerts for mining machine states (on, off, restart, shutdown, etc)
4. test_profit.py - Simulates a mining operation's profitability
5. test_test_test.py - Simulates a mining operation's profitability.

A.2.ix. Claim 9

[106] Claim 9 is reproduced below:

> **The system of claim 1, wherein the control system is a remote master control system positioned remotely from the set of computing systems.**

[107] It is my opinion that Bearbox was in possession of each claim element of claim 9 of the of the '433 patent. The sub-sections below provide additional detail concerning the basis for my opinion.

[108] Bearbox conceived of and developed technology wherein the control system is a remote master control system positioned remotely from the set of computing systems.

[1] The systems conceived of and/or developed by Bearbox satisfy this aspect of claim 9 at least because the Bearbox system included individually addressable miners in communication with a control system over IP-based networking protocols. This feature was supported by Bearbox's networking capabilities, which included an Ethernet interface, a 48-port switch and on-site WAN or satellite interfaces[9] and custom PDU software capable of providing fine grain load

[9] *See e.g.* Ex. 4, May 9, 2019 email from A. Storms to M. McNamara, at BB00000090.

control (i.e. the ability to turn on some but not all of the miners) and also was configured to work modularly with a variety of different miners that had different power requirements. [10]

[109] To the extent this feature is found not to be explicitly described in the Bearbox disclosure, it is my opinion that merely ordinary skill would have been required to modify the existing system to explicitly incorporate this feature. For example, using IP-based protocols for communications between control systems physically remote from the resources under their control has been a conventional feature of computing systems for decades.

[110] I list below certain exemplary modules and files that I considered pertinent to my analysis and opinions. The noted modules perform functions related to remote master control system positioned remotely from the set of computing systems. Non-exhaustive examples are listed below with reference to the current claim language. A detailed analysis of each module is provided in the Appendix.

1. arb_main_AEC.py - Processes marginal power price data to determine profitability of Bitcoin mining based on several parameters, and controls power to mining systems based on outcomes.
2. cgminer_sqlite_test.py - Remotely communicates with miners to retrieve status information
3. DA_LMP_import.py - Imports marketplace data and returns the day-ahead marginal power price (LMP)
4. DA_LMP_import_AEC.py - Imports marketplace data and returns the day-ahead marginal power price (LMP)
5. email_alert.py - Provides email alerts for mining machine states (on, off, restart, shutdown, etc)
6. EXELON4.py - Computes “break even” point for mining Bitcoin in dollars per kilowatt-hour.
7. get_current_RT_LMP.py - Fetches marketplace data and returns the real-time local market price (LMP)

[10] Ex. 5, Deposition of Austin Storms, pp. 99-100, 290.

[129] It is my opinion that Bearbox was in possession of each claim element of claim 14 of the of the '433 patent. The sub-sections below provide additional detail concerning the basis for my opinion.

[130] Bearbox conceived of and developed technology that includes a system that determines the performance strategy for the set of computing systems such that the performance strategy comprises: a first power consumption target for the set of computing systems for the first time interval, wherein the first power consumption target is equal to or greater than the first minimum power threshold; and a second power consumption target for the set of computing systems for the second time interval, wherein the second power consumption target is equal to or greater than the second minimum power thresholds. For example, the Bearbox system calculated profitability could use dynamic power thresholds at multiple time intervals, such as current and day-ahead time intervals.

[131] The systems conceived of and/or developed by Bearbox satisfy this aspect of claim 14 at least because the Bearbox system calculated profitability at distinct time intervals, each with an associated power threshold, such as comparing mining profitability based on, inter alia, current power usage and energy price conditions on the one hand with profitability based, inter alia, on expected future power usage and energy price condition. Each time interval included an associated minimum power threshold used in periodically determining performance strategies, such as, inter alia, whether to mine Bitcoin based on variables such as Bitcoin price and hashrate. The Bearbox system also included custom PDU software capable of providing fine grain load control (i.e. the ability to turn on some but not all of the miners) and also was configured to work modularly with a variety of different miners that had different power requirements. [12]

[132] I list below certain exemplary modules and files that I considered pertinent to my analysis and opinions. The noted modules perform functions related to determining the performance strategy for the set of computing systems such that the performance strategy

[12] Ex. 5, Deposition of Austin Storms, pp. 99-100, 290.

comprises: a first power consumption target for the set of computing systems for the first time interval, wherein the first power consumption target is equal to or greater than the first minimum power threshold; and a second power consumption target for the set of computing systems for the second time interval, wherein the second power consumption target is equal to or greater than the second minimum power thresholds. Non-exhaustive examples are listed below with reference to the current claim language. A detailed analysis of each module is provided in the Appendix.

1. arb_main_AEC.py - Processes marginal power price data to determine profitability of Bitcoin mining based on several parameters, and controls power to mining systems based on outcomes.
2. DA_LMP_import.py - Imports marketplace data and returns the day-ahead marginal power price (LMP)
3. DA_LMP_import_AEC.py - Imports marketplace data and returns the day-ahead marginal power price (LMP)
4. EXELON4.py - Computes “break even” point for mining Bitcoin in dollars per kilowatt-hour.
5. get_current_RT_LMP.py - Fetches marketplace data and returns the real-time local market price (LMP)
6. miner_amort_breakeven_.py - Performs profitability determinations for dynamic power thresholds and manages mining system based on resulting performance strategy.
7. LMP_csv_import.py - Retrieves the marginal power pricing data from Southwest Power Pool marketplace

A.2.xv. Claim 15

[133] Claim 15 is reproduced below:

> **The system of claim 1, wherein a total duration of the set of time intervals corresponds to a twenty-four hour period.**

[134] It is my opinion that Bearbox was in possession of each claim element of claim 15 of the of the ’433 patent. The sub-sections below provide additional detail concerning the basis for my opinion.

> software in a large like super structure build. It's not specific to the housing in which the machines run.
> Q. Did you tell Mr. McNamara that?
> A. Yes.
> Q. What -- tell me everything you remember talking to either Mr. McNamara or his CFO.
> A. Yeah, so I talked with them about like their current physical infrastructure and what they were looking at from an electrical standpoint. I talked with them about … their electrical engineer they said on staff who didn't like the Digital Shovel electrical distribution and why I thought it was a bad idea as well. I talked to them about physical characteristics of my BearBox units and why I thought that they were different than other offerings in the market, and I talked with them about … some of the software that I was working on to offer flexibility for those units and … their load and how they … could be controlled and how you could really maximize the profitability depending on the setup.
> Q. Anything else?
> A. There's … a lot that goes into that and some of the ideas around kind of … how the development took place … from the physical side of the power distribution units to me writing the software and understanding how electricity moves through the market.[16]

[172] I understand that Mr. Storms also described the physical characteristics of his BearBox and control software that Mr. Storms believed provided fine grain load control over the mining machines within the build (i.e. the ability to turn on or off a subset of miners).[17] As Mr. Storms explained, dependent on variables such as power pricing, one could determine a strategy for how many machines to use mining, the break-even costs and the opportunity costs of those machines and how to calculate those values.[18] In Mr. Storms' words, his system could be used to "maximize profitability" by determining when it's most profitable to utilize the power to mine Bitcoin or to sell the power back to the grid, in both the day-ahead and real-time markets.[19]

[173] Mr. Storms testified that his discussions with Mr. McNamara and Lancium's CFO were "[e]xtremely specific":

> I shared with them how to design database tables for a miner management system that could effectively pull in individual data from individual miners that were mapped to PDUs[20] and relays within the

[16] Ex. 5, Deposition of Austin Storms, pp. 95-97.
[17] Ex. 5, Deposition of Austin Storms, pp. 99-100.
[18] Ex. 5, Deposition of Austin Storms, pp. 100-101.
[19] Ex. 5, Deposition of Austin Storms, pp. 104-105.
[20] I understand a PDU refers to a Power Distribution Unit.

to the grid (depicted with green dollar signs in the middle of the diagram). The diagram indicates that the system may periodically (such as every 5-minutes, hourly, or the like) re-evaluate the monitored conditions and implement a performance strategy based on those conditions.

[178] In addition, Bearbox also provided a comma-separated value (.CSV) file[25] that described various monitored conditions, including Bitcoin price, Bitcoin block height, real time LMP day ahead LMP, an estimated network hash rate and a network difficulty. This proprietary .CSV file also described and/or explained how to determine a generated mining revenue figure to be expect from using power to mine Bitcoin, a real time LMP revenue figure based on selling energy to the grid at the current real time energy price, a day ahead LMP revenue figure based on selling energy to the grid in the future at the day ahead energy price, and a realized revenue figure that represented the most profitable of the three other revenue figures. In some instances, the most profitable option was to mine Bitcoin (*see, e.g.,* row 2 and cells H2 and L2), while in other instances, the most profitable option was to sell energy to the grid (*see, e.g.,* row 7 and cells K7 and L7).

A.2. My Opinions Concerning Whether the Information Provided by Bearbox to Lancium Disclosed The Inventions Claimed in the '433 Patent

[179] In my opinion, the information provided by Bearbox to Lancium would have enabled a person of ordinary skill the art to make and use the invention recited in claims 1-20, either by its explicit description or because it was described in such detail that only ordinary skill was required to modify the information to arrive at the claimed inventions.

A.3. The Claims of the '433 Patent

[180] I understand claims 1, 17 and 20 are the only Asserted Claims written in independent form.

A.3.i. Claim 1

[181] Claim 1 is reproduced below:

[25] Ex. 4, BB00000097.

Q. In the context you're talking about, who sells the power back to the grid?

A. Variety of different options there. It could be the generator sells the power back. It could be the mining facility sells the power back. It could be a different market participant depending on the ISO.

Q. And what we've just been discussing, is that part of what you maintain you talked to Mr. McNamara about regarding how load can be controlled to maximize profitability?

A. Yes

Q. So anything else other than what we just -- so how -- in your memory, how specific were you with your discussions with Mr. McNamara and his CFO?

A. Extremely specific.

Q. What do you mean by that?

A. I -- I shared with them how to design database tables for a miner management system that could effectively pull in individual data from individual miners that were mapped to PDUs and relays within the build to determine what the break-even cost is there, and then the power distribution unit and control system could at the same time toggle relays on or off or send a command to the miner to, you know, power on or power off or stop mining or change the mode which it's operating depending upon the power and price and things of that nature.

Q. And you did -- you did all of this over dinner?

A. Yeah. Almost like huddled up at the end of the table, yeah.

Q. Did anybody else hear these conversations?

A. Not to my knowledge, no.[64]

A.3. Lancium is using Bearbox's power arbitrage trade secrets

[302] In my opinion, Lancium is using Bearbox's power arbitrage trade secrets.

[303] It is my understanding that, in an email dated Fri, 16 Aug 2019, Mr. McNamara wrote the following: "As of today, we have a fixed price power contract with Calpine at Thomas Road for ATC power at~$34/MWh. This is cool. We now have two revenue sources: Bitcoin mining and selling power back to grid."[65] Based on this statement, I understand that this was the first such instance of Lancium engaging in power arbitrage of this nature.

[64] Ex. 5, Deposition of Austin Storms, pp. 104-106.
[65] Ex. 10, PX041, LANCIUM00033064.

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

BEARBOX LLC AND AUSTIN STORMS, *Plaintiffs*,	§	
v.	§	**CIVIL ACTION 1:21-cv-00534-MN-CJB**
LANCIUM LLC, MICHAEL T. MCNAMARA, **AND RAYMOND E. CLINE, JR.,** *Defendants.*	§	

Reply Expert Report of Dr. Stan McClellan

May 20, 2022

(SOURCE CODE – OUTSIDE ATTORNEYS EYES ONLY –

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provide instructions to the set of computing systems to perform one or more computational operations based on the performance strategy.

[22] It is my opinion that McNamara and Cline were not in possession of each claim element of claim 1 of the of the '433 patent at least as of May 1, 2019. The sub-sections below provide additional detail concerning the basis for my opinion.

Claim 1(b): "a control system configured to: monitor a set of conditions;"

[23] In paragraph 114, Dr. Ehsani alleges that '632 Application teaches cryptocurrency prices as an economic consideration. I disagree. While the '632 Application does mention cryptocurrency mining as a possible use of its computing systems, it nowhere describes monitoring cryptocurrency prices.

Claim 1(c): "receive power option data based, at least in part, on a power option agreement, wherein the power option data specify: (i) a set of minimum power thresholds, and (ii) a set of time intervals, wherein each minimum power threshold in the set of minimum power thresholds is associated with a time interval in the set of time intervals"

[24] In paragraph 116, Dr. Ehsani refers to Lancium's supposed "flash of insight" in which Cline and McNamara conceived of this aspect of claim 1. I note that this supposed "flash of insight" occurred August 27, 2019, nearly four months after Lancium received Storms information. I also note that this "flash of insight" appears to simply be repeating what MP2 representatives had told Lancium a few hours earlier that day. Ex. 6, LANCIUM00033240.

[25] As I explained in my Initial Report, the systems conceived of and/or developed by Bearbox and communicated to Lancium satisfy this aspect of claim 1 at least because the Bearbox systems calculated profitability at distinct time intervals, each with an associated power threshold, such as comparing mining profitability based on, inter alia, current power usage and energy price conditions on the one hand with profitability based, inter alia, on expected future power usage and energy price conditions. For example, the Bearbox system used multiple time intervals, including

the day-ahead hourly intervals and real-time 5-minute intervals, each of which included an associated minimum power threshold used in periodically determining performance strategies (i.e. every five minutes). The Bearbox system also included custom PDU software capable of providing fine grain load control (i.e. the ability to turn on some but not all of the miners) and also was configured to work modularly with a variety of different miners that had different power requirements.[1]

[26] In my opinion, the Lancium system did not consider multiple time intervals with associated power thresholds, as exemplified by the Lancium system described in the '632 Application (described above), until after its communications with Storms.

[27] In addition, I also explained that, to the extent this feature is found not to be explicitly described in the Bearbox disclosure, it is my opinion that merely ordinary skill would have been required to explicitly incorporate this feature. For example, the involvement of and communication with a QSE in connection with power option agreements (and the data associated with power option agreements) was well-known, conventional feature in the art at the time of the invention.[2] Dr. Ehsani appears to agree with me to the extent he states that McNamara and Cline were familiar with these well-known principles.

Claim 1(d): responsive to receiving the power option data, determine a performance strategy for the set of computing systems based on a combination of at least a portion of the power option data and at least one condition in the set of conditions, wherein the performance strategy comprises a power consumption target for the set of computing systems for each time interval in the set of time intervals, wherein each power consumption target is equal to or greater than the minimum power threshold associated with each time interval"

[1] Ex. 7, Deposition of Austin Storms, dated February 23, 2022, pp. 99-100, 290.
[2] I discussed these issues and facts with Frank McCamant by telephone on April 1, 2022, and I have now since reviewed his report and my opinions have not changed. I reserve the right to supplement my report based on any additional information that may be included in his supplemental report.

[77] In my experience writing code and simulations, a system designer will typically make many assumptions about real-world variables in order to test other aspects of the system. For example, in simulating a process that utilizes energy, one may assume an endless supply of power so that other aspects, such as logic simulating a real-time profitability determination and the like, can be tested more specifically. As the software is eventually released into a real-world application, those assumed variables may be updated in the software to account for the real-world environment in which the software operates. Based on my experience writing software, it is my opinion that a POSA would understand that Mr. Storms' simulation assumed an unlimited amount of power to test his profitability determination algorithm, and that (1) any real-world system will necessarily need to account for power availability and (2) replacing Mr. Storms' assumed power availability with data from an ISO or QSE was a well-known, conventional capability that would have required merely ordinary skill to implement.

[78] While Dr. Ehsani eventually discusses the profitability spreadsheet in paragraphs 185-187, he again oversimplifies the document, implying that a POSA would not be ability to decipher the process embodied in the spreadsheet. For example, Dr. Ehsani alleges that "The so-called .CSV file is nothing more than a hard-coded Excel spreadsheet—meaning that it shows values only. The document contains no source code, no mathematical formulas, no explicit logic, no methodology, and, other than the respective column headings, the document contains no description of any of the values or where those values came from." Yet, Cline contradicts this implication, as he had no issues deciphering the methodology embodied in the spreadsheet:

Q. And Column L, it says, "Realized revenue."

Do you see that?

A. Yes.

Q. Do you know what that means?

again conflates minute details of the simulation Storm built with the full breadth of the capabilities of which the system both described in the various documents and embodied in the simulation serve as proof of concept. A POSA would understand that are a finite number of sources of power (e.g. grid power and behind-the-meter power), and that any of these limited sources would predictably provide the power required to operate the system.

[83] In paragraph 196, Dr. Ehsani's mischaracterizes well-known principles and features of the art as supposed contributions by McNamara and/or Cline

Claim 1(b): "a control system configured to: monitor a set of conditions;"

[84] In paragraph 198, Dr. Ehsani's mischaracterizes well-known principles and features of the art as supposed contributions by McNamara and/or Cline.

Claim 1(c): "receive power option data based, at least in part, on a power option agreement, wherein the power option data specify: (i) a set of minimum power thresholds, and (ii) a set of time intervals, wherein each minimum power threshold in the set of minimum power thresholds is associated with a time interval in the set of time intervals"

[85] In paragraph 195, Dr. Ehsani alleges that because Bearbox's system diagram shows behind the meter power, "There is no indication of grid connection or grid power." Dr. Ehsani again conflates minute details of the simulation Storm built with the full breadth of the capabilities of which the system both described in the various documents and embodied in the simulation serve as proof of concept. A POSA would understand that are a finite number of sources of power (e.g. grid power and behind-the-meter power), and that any of these limited sources would predictably provide the power required to operate the system.

[86] In paragraph 200, Dr. Ehsani alleges that I fundamentally misunderstand the claim. I disagree as the plain and ordinary meaning of the language supports the positions set forth in my

Initial Report. Additionally, and as noted above, the Lancium system did not consider multiple time intervals with associated power thresholds until after its communications with Storms.

[87] In paragraph 201, Dr. Ehsani again conflates minute details of the simulation Storm built with the full breadth of the capabilities of which the system both described in the various documents and embodied in the simulation serve as proof of concept

[88] In paragraph 202, Dr. Ehsani' criticizes Mr. Storm's for not meeting ERCOT CLR requirements, but I note that the claim does not recite ERCOT CLR certification.

[89] In paragraph 203, Dr. Ehsani's mischaracterizes well-known principles and features of the art as supposed contributions by McNamara and/or Cline.

> **Claim 1(d): responsive to receiving the power option data, determine a performance strategy for the set of computing systems based on a combination of at least a portion of the power option data and at least one condition in the set of conditions, wherein the performance strategy comprises a power consumption target for the set of computing systems for each time interval in the set of time intervals, wherein each power consumption target is equal to or greater than the minimum power threshold associated with each time interval"**

[90] In paragraph 205, Dr. Ehsani restates his arguments relating to power option agreements and the data associated therewith. I disagree with this statement for the reasons set forth above.

[91] In paragraph 206, Dr. Ehsani criticizes Storms for acknowledging that certain aspects of the invention, such as Bitcoin mining, retrieving energy price and availability data, are conventional aspects of the art. I disagree that this acknowledgement by Storms implies a lack of contribution. All inventions utilize and build-upon well-known, conventional technologies.

[92] In paragraphs 206 and 207, Dr. Ehsani mischaracterizes well-known principles and features of the art as supposed contributions by McNamara and/or Cline. I also disagree with his analysis for the reasons I disagree with his analysis in paragraph 117 of his report.

[249] In paragraph 112, Mr. Baer states "None of the 11 identified source code files determine a performance strategy comprising a power consumption target for any time intervals where the power consumption target is equal to or greater than a minimum power threshold for a specific time interval and that is received by the system." I disagree for the reasons stated in my Initial Report. In addition, as noted above, in paragraph 104, Mr. Baer acknowledges that the system operates on a five minute interval. As a result, when a decision is made to turn on a miner(s) by the Bearbox software, the system operates at the energy level reflected in the ***kW_load*** variable for a 5-minute interval.

Claim 1(e): "provide instructions to the set of computing systems to perform one or more computational operations based on the performance strategy"

[250] In paragraphs 113 and 114, Mr. Baer indicates that his analysis of this limitation is limited to the source code only, and not the entirety of the evidence supporting Storms' conception.

[251] In paragraph 115, Mr. Baer restates his arguments relating to element 1(d), which I disagree with for the reasons states above.

[252] In paragraph 116, Mr. Baer restates his arguments set forth in paragraph 102. I disagree with his analysis for the reasons set forth above in my response to paragraph 102.

[253] In paragraph 117, Mr. Baer misleadingly cites Mr. Storms testimony in conflating minute details of the simulation Storm built with the full breadth of the capabilities of which the system both described in the various documents and embodied in the simulation serve as proof of concept. Mr. Storms actual testimony stated that he did conceive of the relevant functionality:

> Q. Had you written code that would tell the miners that they must maintain five megawatts of load and could not drop below that regardless of what the price of power was?

A. Yeah, so the system's definitely capable of doing that. I would say that the miners themselves aren't instructed to maintain a certain amount of load. The total build is, right.
Q. But had you written -- had you written code to ensure that the total build would, in fact, maintain that amount of load?
A. Yeah, I definitely -- I conceived of that at the time as it relates to, you know, buying power from various entities, and the system's capable of doing that because of how I architected it…

Ex. 7, Storms Dep. at 171:12-172:2

[254] In addition, as noted above, in paragraph 104, Mr. Baer acknowledges that the system operates on a five minute interval. As a result, when a decision is made to turn on a miner(s) by the Bearbox software, the system operates at the energy level reflected in the ***kW_load*** variable for a 5-minute interval.

[255] In paragraph 119, Mr. Baer again conflates minute details of the simulation Storm built with the full breadth of the capabilities of which the system both described in the various documents and embodied in the simulation serve as proof of concept in alleging that the Bearbox source code did not allow for turning individual miners on and/or off. I disagree for the reasons stated above.

[256] In paragraph 120, Mr. Baer states "to the extent turning all relays of connected PDUs on or off together (and thus turning all connected computers, such as Bitcoin miners on or off together) could be considered a "performance strategy" it is not a performance strategy as that term is used in the claims of the '433 patent and is not a performance strategy to maintain a power consumption target that is equal to or greater than a specified minimum power threshold for a specific time period." Mr. Baer again conflates minute details of the simulation Storm built with the full breadth of the capabilities of which the system both described in the various documents

Q. Was it a nondisclosure agreement or was it something else?

A. I believe it was a nondisclosure agreement.

Q. Did you have a nondisclosure agreement with GlidePath?

A. I believe so.

Q. Do you know at that time was GlidePath also working with a company called BuySellAds?

A. I don't believe they were.

Q. Did you ever work with BuySellAds?

A. Yes.

Q. What -- what -- what was the nature of your relationship with BuySellAds?

A. I was a contractor.

Q. When was that?

A. In late 2019 through I guess like mid 2020. It was -- it was part of the -- it was the original entity that Great American Mining spun out of.

Q. Okay. Prior to actually becoming a consultant for them did you have communications with them?

A. I believe so, yes.

Q. What did those communications relate to?

A. They related to certain things surrounding

the BearBox technology.

Q. What -- what specific things do you remember that those communications related to?

A. I -- I don't remember specific things. I imagine some high level -- high level descriptions of what the BearBox technology was, what it could be used for and -- and the like.

Q. Do you think you had specific conversations with them but you just don't remember or do you think the conversations were high level?

A. I don't believe I had any conversations with them.

Q. I mean e-mail as well. I don't just mean conversations.

A. Oh, no, yeah, I -- I don't recall. There could have been some specifics, but, again, I'd have to review some of that stuff.

Q. Did you have a nondisclosure agreement with the BuySellAd guys when you were having the -- having the e-mail exchanges with them that at least right now were characterized as a high level?

A. I don't believe that I had a nondisclosure agreement with them at the time.

Q. Did you understand your conversations with

them were confidential?

A. Yes.

Q. Why? What's the basis?

A. The basis for that confidentiality is the footer I include in the e-mails and the understanding between two parties.

Q. So that footer is included on all your e-mails, isn't it?

A. Yes.

Q. So other than the footer on the e-mail did you have any other basis for believing your communications with the BuySellAd guys at this time were confidential?

A. Other -- other than the -- I guess the verbal understanding that those communications were confidential and the e-mail footer, no.

Q. Maybe -- maybe I missed something, but I thought you said that at this time you hadn't talked to them, that it was just e-mail communication?

A. I met Todd who's the CEO of BuySellAds briefly at the Fidelity summit, but that was the only conversation I'd had with him at the time.

Q. Had you said anything to him before then?

A. I don't believe so.

Q. What did you and Todd talk about at the Fidelity conference?

A. We -- we talked about BearBox containers.

Q. What did you tell him about them?

A. Bunch of different ways I thought they could be utilized for, you know, stranded, essentially stranded energy assets and -- and monetizing those.

Q. And what's Todd's last name?

A. Garland.

Q. Garland. When did you speak to Todd about that?

A. It was during the day at the conference when I met him.

Q. How long did you talk to him?

A. Maybe 15 minutes.

Q. Did he tell you at that time he was going to keep the information confidential?

A. I don't recall.

Q. Did you ask him to?

A. I don't -- I don't think at that time -- the answer's no.

Q. So was the Fidelity conference -- was it a one-day conference or was it longer?

A. I believe it was a one-day summit.

Q. What makes it confidential?
A. That it wasn't published non-confidential. I'm not sure I understand the question.
Q. Well, I just -- just wondering, you know, if there's something specific about it that you believe makes it confidential?
A. I would say it's -- it's confidential because it wasn't published in an open source forum. It's something that resided in my machine.
Q. What is Github, G-I-T-H-U-B?
A. It's a version control mechanism.
Q. For software?
A. Correct.
Q. Is Github public or private?
A. It can be either.
Q. Can be either.
I'll mark Exhibit 51. So the Todd at todd@buysellads, is that Todd Garland?
A. Correct.
Q. And why are you sending Todd Garland this information?
A. Which information?
Q. The information in the attachment.
A. This is information to verify some of the

calculations around what the BearBox system could potentially do.
Q. And why are you sending it to Todd Garland?
A. Oh, so I sent it to Todd Garland because they were interested in pursuing cheap power and something that I believe I communicated to him at the Fidelity summit was that I had a way to do that via BearBox.
Q. So this is a follow-up from that summit?
A. Um-hum.
Q. And what is Exelon on this data?
A. Exelon is the specific pricing nodes within the -- within the Southwest Power Pool.
Q. And this is for the GlidePath wind farm, the Exelon sites?
A. Yes.
Q. How do I tell the difference between Exelon 4 data, Exelon 2, Exelon 7?
A. They're different CSV files.
Q. How do I tell that from this spreadsheet?
A. You can't tell it from the printouts. You would have to tell it from the file itself.
Q. Okay. Do you consider the information sent to Mr. Garland to be confidential?
A. I do.

Q. Was there an NDA at this time in place between you and he?
A. There was not.
Q. Was there an NDA between GlidePath and Mr. Garland?
A. I don't believe so.
Q. Then why are you sending it to him?
A. Because this was information that I -- I did myself.
Q. Okay.
A. Yeah, none of the information in these spreadsheets was provided to me by GlidePath, and I had the same information for, you know, every other pricing node.
Q. You just chose to use GlidePath nodes?
A. Yep. Those are the ones that I had the most complete modeling set for.
Q. Okay. Did you have any agreement with Mr. Garland to keep this confidential?
A. Nothing besides his word and the confidentiality notice at the bottom of this e-mail.
Q. Did he give you his word he was going to keep it confidential?
A. Not explicitly.

Q. So no?
A. No would be the correct answer there, yeah.
Q. So I'm trying to figure out if this -- if the columns on the data here, the headings are basically the same headings as the previous headings on the spreadsheets you sent out to Mr. Hakes. The version I have here is kind of crunched together. Yours might be horizontal. It might be better.
A. Yeah, there are -- there are a few differences. I reorganized some of the columns to make it flow better, but the columns and the data are the same.
Q. Okay. I hand you what I'll mark as Exhibit 52. So this looks like a further follow-up to your conversation with Mr. Garland?
A. Yes.
Q. And why are you sending him this information?
A. Because he wasn't -- he wasn't educated enough in the Bitcoin mining and power space to understand how some of these -- some of these calculations in this Excel spreadsheet were done.
Q. And so let's talk about the upper black box code here first.
A. Um-hum.

Q. So that's Python code for calculating get_breakeven_usdollar_perkilowatthour?

A. Yes.

Q. And what -- this is part of your Python code, I take it?

A. It is.

Q. Is this, again, this code that was running on your model on the system in your apartment or is this -- was running somewhere else?

A. Correct, in my apartment.

Q. Okay. What -- what specific code is -- code file is this running in, do you remember, is this part of?

A. There's -- there's a bunch of different code files that this snipet runs in.

Q. And which -- can you identify them for me?

A. Exelon 10_11, all those Exelon files, the Dennis Logic, new gen, basically anywhere that you would have to calculate a break-even U.S. dollar cost per kilowatt hour for a miner.

Q. Okay. And then what's the -- what's the second box down here represent?

A. It was a terrible attempt by me to give a fully amortized cost for five minutes -- five-minute

revenue. I'm not an accountant. It wasn't -- it didn't work well.

Q. Okay. So I noticed Ben Hakes isn't included on this. Why is Mr. Hakes not included in these e-mails?

A. I didn't have any reason to include Ben in these e-mails.

Q. I hand you one more here. This is Defendants' Exhibit 53. So can you tell me what Exhibit 53 is?

A. It's an e-mail from me to the GlidePath guys and Ben Hakes.

Q. And why are you sending this to the GlidePath guys and Ben Hakes?

A. Because I told them I was going to the conference/summit and that I would give them an update based on information that I learned at the summit.

Q. Is this -- is this -- I haven't gone through it and done a complete comparison, but is this basically the same type of data that you sent to Mr. Garland at BuySellAds the day -- on the 3rd?

A. Yes, it does look similar.

Q. What -- what's the purpose of sending this to GlidePath?

A. To send them the modeling data and these

settlement locations to prove that it is more profitable to mine Bitcoin than sell the power to the grid most of the time.

Q. And so the modeling that you're doing here is basically using the price information of power and calculating whether it's cheaper to mine -- whether the cost of power is above the cost of mining or below the cost of mining or is it more complex than that?

A. Ask the question one more time.

Q. Yeah, let me see if I can phrase it better.

So when you're calculating -- I'll just ask it off the data here. When you're calculating the data in the columns here, what is the -- what is the column that you're looking at to determine whether it's more profitable to mine or to not mine?

A. The comparison would be between the day-ahead LMP revenue column, the real-time LMP revenue column and the mining revenue column.

Q. And so if the mining revenue column is greater, it makes more sense to mine?

A. Correct, and that -- and that should represent itself in the realized revenue column.

Q. And if it's cheaper not to mine, then that would be represented in the day-ahead LMP and the

real-time LMP columns?

A. If it's cheaper not to mine. Can you ask that one more time?

Q. Well, so if I understand correctly, if it's more profitable to mine, it's reflected in the mining revenue column?

A. Well, the mining revenue column is always reflecting the mining revenue given the power.

Q. Yeah, I'm sorry. So if -- if it's more profitable to mine, you compare -- you compare the mining revenue column with what columns to make that determination?

A. The day-ahead LMP rev and the real-time LMP rev.

Q. And so if the mining revenue's greater, it's more profitable to mine?

A. Correct.

Q. And if the mining revenue is less, then it doesn't make sense to mine?

A. Correct.

Q. And then in the context of where the mining revenue column is less, what did your model contemplate doing at that point?

A. The model contemplates selling that amount of

A. Yeah, interested is like so many varying levels, right.

Q. So what -- what did they say to you about -- after you got -- after your conversation -- well, what did you tell them?

A. I told like how -- how my system worked. I told them how I communicated it to McNamara and the Lancium CFO at the dinner. I told them that I had e-mail correspondence going back and forth and text message correspondence as well and that I believe that what they were suing or getting sued for by Lancium was something that I taught McNamara and told him how to do in great detail.

Q. What did they respond?

A. I guess they didn't really respond. They just asked for me to send them a few things.

Q. And you sent them those things?

A. Yeah.

Q. Was it one conversation or more than one conversation?

A. Just one conversation.

Q. Let me mark this as Exhibit 67. And is this what you sent them, Exhibit 67?

A. Yes, it appears so.

Q. And you're aware -- after this -- they received this information do you know what they did with it?

A. I don't know what they did with it.

Q. And you're aware they ultimately settled the case with Lancium, aren't you?

A. I'm aware of the settlement, yes, sir.

Q. I'll mark Defendants' Exhibit 68. Can you just identify Exhibit 68?

A. Exhibit 68 is a printout of the BearBox Twitter account.

Q. And that's -- these tweets are created by you?

A. Yes.

Q. What's the purpose of this Twitter account?

A. To communicate things that BearBox as a company was working on and have presence within Twitter.

Q. Just to the general public?

A. Yeah, at the time it was locked but previous to that it was not.

Q. You say "at the time it was locked."

A. At the time of this printout the Twitter account was in private mode, so it wouldn't have been to the general public, but the purpose of the Twitter

account in totality was to communicate to the general public what I was working on.

Q. Okay. So it was available to the general public and then it was not, is that -- am I understanding you correctly?

A. You are, yes.

Q. Okay. And if you look at the first page, Page 717, it says: "Casually pitch the idea of using Bitcoin mining as load as a service to a PM at Entergy over the last year." Do you see that?

A. Yeah.

Q. Who is that?

A. I don't remember his name. I met him at a Mardi Gras event -- at a young life event at the -- it might be Avenue Pub. I want to say Charles Avenue. I know he's a PM for Entergy but that's about it.

Q. Okay. And so the stuff on this Twitter was public for a long time; is that fair, and then it was not?

A. Yeah, it was -- it was public for maybe two years or so.

Q. Okay. So let me mark Exhibit 69 which is BEARBOX1 through 43. So maybe just to save time here I would -- just trying to figure out sort of what all of

these different pictures are. There's pictures of different things, and maybe if we just go one at a time by Bates number and you just tell me quickly what it's a picture of, and then I'll stop and ask you questions if something else comes up.

A. Sounds good.

Q. Okay. So let's start with Page 1.

A. Page 1 is a picture of a single miner running in my apartment that's connected to a 120-volt circuit to the wall. There's an early relay controller called a Sanesmart 16 channel. There's a 25 amp solid state relay, the white part on the stool. Then there's a large white box on the stool that is an AC to DC inverter that applies voltage to a coil.

Q. Can you tell sort of what the date is in this picture just from looking at it roughly or not?

A. I can't. I think we produced metadata with these picture.

Q. Yeah. I'm just trying to figure out where in the process of creating the model in your apartment this is.

A. Oh, this is really early. That's -- that's the first relay controller and solid state relay that I bought. The solid state relay got like super hot with

datetime	block_height	network_diff	est_network_hashrate	BTC_price	day_ahead_LMP	real_time_LMP	breakeven_mining_cost	day_ahead_LMP_rev	real_time_LMP_rev	mining_rev	realized_rev
17:54.4	574204	6.35303E+12	5.38327E+13	5320.85	0.0051274	0.0037112	0.0737773	0.1586418	0.1148245	2.2484294	2.2484294
22:57.3	574204	6.35303E+12	5.38327E+13	5320.01	0.0051274	0.0047409	0.0737656	0.1586418	0.1466834	2.2480744	2.2480744
28:00.5	574204	6.35303E+12	5.38327E+13	5319.51	0.0051274	0.0044381	0.0737587	0.1586418	0.1373148	2.2478631	2.2478631
33:03.6	574204	6.35303E+12	5.38327E+13	5321.94	0.0051274	0.0035711	0.0737924	0.1586418	0.1104898	2.24889	2.24889
38:06.6	574205	6.35303E+12	5.30839E+13	5321.95	0.0051274	0.0020195	0.0748335	0.1586418	0.0624833	2.2806172	2.2806172
43:09.6	574205	6.35303E+12	5.30839E+13	5326.19	0.0051274	0.0006489	0.0748931	0.1586418	0.020077	2.2824342	2.2824342
48:12.6	574206	6.35303E+12	5.44532E+13	5326.23	0.0051274	0.0036433	0.0730105	0.1586418	0.1127237	2.2250598	2.2250598
53:15.7	574206	6.35303E+12	5.44532E+13	5327.84	0.0051274	0.0056932	0.0730325	0.1586418	0.1761476	2.2257324	2.2257324
58:18.9	574207	6.35303E+12	5.39845E+13	5327.8	0.0051274	-0.0005791	0.073666	0.1586418	-0.0179174	2.2450369	2.2450369
03:21.8	574207	6.35303E+12	5.39845E+13	5327.2	0.0003049	0.0011538	0.0736577	0.0094336	0.0356986	2.244784	2.244784
08:24.9	574208	6.35303E+12	5.34662E+13	5325.01	0.0003049	-0.0046871	0.0743412	0.0094336	-0.1450189	2.2656139	2.2656139
13:28.6	574209	6.35303E+12	5.33477E+13	5325.01	0.0003049	-0.009641	0.0745063	0.0094336	-0.2982925	2.2706452	2.2706452
18:31.5	574209	6.35303E+12	5.33477E+13	5321.01	0.0003049	-0.0003526	0.0744503	0.0094336	-0.0109094	2.2689395	2.2689395
23:35.0	574210	6.35303E+12	5.36221E+13	5327.95	0.0003049	-0.0001515	0.074166	0.0094336	-0.0046874	2.2602762	2.2602762
28:38.3	574212	6.35303E+12	5.54528E+13	5325.19	0.0003049	-0.0193232	0.0716803	0.0094336	-0.5978598	2.184522	2.184522
33:41.4	574212	6.35303E+12	5.54528E+13	5323.36	0.0003049	-0.0316161	0.0716557	0.0094336	-0.9782021	2.1837713	2.1837713
38:44.4	574215	6.35303E+12	5.58834E+13	5323.1	0.0003049	-0.0307121	0.0711001	0.0094336	-0.9502324	2.1668382	2.1668382
43:47.3	574215	6.35303E+12	5.58834E+13	5323.1	0.0003049	-0.0298462	0.0711001	0.0094336	-0.9234414	2.1668382	2.1668382
48:50.3	574215	6.35303E+12	5.58834E+13	5325.88	0.0003049	-0.0268598	0.0711372	0.0094336	-0.8310422	2.1679698	2.1679698
53:53.3	574215	6.35303E+12	5.58834E+13	5326.72	0.0003049	-0.0306503	0.0711484	0.0094336	-0.9483203	2.1683117	2.1683117
58:56.4	574216	6.35303E+12	5.54406E+13	5326.69	0.0003049	-0.0316255	0.0717163	0.0094336	-0.978493	2.1856184	2.1856184
03:59.3	574216	6.35303E+12	5.54406E+13	5330.34	-0.0001867	-0.0309598	0.0717654	-0.0057765	-0.9578962	2.187116	2.187116
09:02.8	574219	6.35303E+12	5.59245E+13	5330.78	-0.0001867	-0.0034559	0.0711504	-0.0057765	-0.1069255	2.1683719	2.1683719
14:05.9	574220	6.35303E+12	5.59914E+13	5329.45	-0.0001867	-0.0195392	0.0710476	-0.0057765	-0.6045428	2.1652392	2.1652392
19:08.9	574220	6.35303E+12	5.59914E+13	5343.74	-0.0001867	-0.0179458	0.0712381	-0.0057765	-0.5552431	2.1710449	2.1710449
24:11.9	574223	6.35303E+12	5.60912E+13	5334.1	-0.0001867	-0.027899	0.0709831	-0.0057765	-0.8631951	2.1632744	2.1632744
29:14.9	574226	6.35303E+12	5.60441E+13	5330.7	-0.0001867	-0.030306	0.0709974	-0.0057765	-0.9376676	2.1637101	2.1637101
34:17.9	574226	6.35303E+12	5.60441E+13	5333.77	-0.0001867	-0.0264455	0.0710383	-0.0057765	-0.8182238	2.1649562	2.1649562
39:21.0	574227	6.35303E+12	5.56725E+13	5332.07	-0.0001867	-0.0197591	0.0714897	-0.0057765	-0.6113466	2.1787132	2.1787132
44:24.0	574227	6.35303E+12	5.56725E+13	5339.99	-0.0001867	-0.0202167	0.0715959	-0.0057765	-0.6255047	2.1819493	2.1819493
49:27.4	574228	6.35303E+12	5.52451E+13	5343.15	-0.0001867	-0.0198226	0.0721925	-0.0057765	-0.6133112	2.2001303	2.2001303
54:30.5	574229	6.35303E+12	5.5892E+13	5338.61	-0.0001867	-0.0294808	0.0712963	-0.0057765	-0.912136	2.1728179	2.1728179
59:33.7	574229	6.35303E+12	5.5892E+13	5336.4	-0.0001867	-0.0238324	0.0712668	-0.0057765	-0.7373745	2.1719184	2.1719184
04:36.7	574229	6.35303E+12	5.5892E+13	5340.73	-0.0002365	-0.0191566	0.0713246	-0.0073173	-0.5927052	2.1736808	2.1736808
09:39.8	574229	6.35303E+12	5.5892E+13	5341.69	-0.0002365	-0.0309356	0.0713374	-0.0073173	-0.9571475	2.1740715	2.1740715
14:43.1	574230	6.35303E+12	5.53347E+13	5347.99	-0.0002365	-0.030382	0.0721408	-0.0073173	-0.9400191	2.1985565	2.1985565
19:46.4	574230	6.35303E+12	5.53347E+13	5348.14	-0.0002365	-0.0302146	0.0721428	-0.0073173	-0.9348397	2.1986182	2.1986182
24:49.4	574231	6.35303E+12	5.49411E+13	5341.24	-0.0002365	-0.0278795	0.072566	-0.0073173	-0.8625917	2.211515	2.211515
29:53.0	574231	6.35303E+12	5.49411E+13	5342.72	-0.0002365	-0.0280598	0.0725861	-0.0073173	-0.8681702	2.2121278	2.2121278
34:56.1	574232	6.35303E+12	5.47061E+13	5349.99	-0.0002365	-0.0264476	0.0729971	-0.0073173	-0.8182887	2.2246529	2.2246529
39:59.3	574232	6.35303E+12	5.47061E+13	5346.06	-0.0002365	-0.0271937	0.0729435	-0.0073173	-0.8413731	2.2230187	2.2230187
45:02.9	574232	6.35303E+12	5.47061E+13	5350.69	-0.0002365	-0.0271939	0.0730067	-0.0073173	-0.8413793	2.224944	2.224944
50:06.0	574232	6.35303E+12	5.47061E+13	5358.36	-0.0002365	-0.0287285	0.0731113	-0.0073173	-0.8888598	2.2281334	2.2281334
55:09.1	574232	6.35303E+12	5.47061E+13	5358.38	-0.0002365	-0.0279997	0.0731116	-0.0073173	-0.8663107	2.2281417	2.2281417
00:12.7	574232	6.35303E+12	5.47061E+13	5374.99	0.0021778	-0.0258886	0.0733382	0.0673811	-0.8009933	2.2350485	2.2350485
05:15.7	574233	6.35303E+12	5.35475E+13	5380.56	0.0021778	-0.0030487	0.0750026	0.0673811	-0.0943268	2.2857722	2.2857722

10:18.8	574233	6.35303E+12	5.35475E+13	5358.81	0.0021778	-0.0011696	0.0746994	0.0673811	-0.0361874	2.2765324	2.2765324	
15:21.8	574233	6.35303E+12	5.35475E+13	5362.05	0.0021778	-0.0011696	0.0747446	0.0673811	-0.0361874	2.2779088	2.2779088	
20:24.8	574233	6.35303E+12	5.35475E+13	5360.02	0.0021778	-0.0182287	0.0747163	0.0673811	-0.563996	2.2770464	2.2770464	
25:28.4	574234	6.35303E+12	5.31615E+13	5359.43	0.0021778	-0.0150284	0.0752505	0.0673811	-0.4649787	2.2933275	2.2933275	
30:31.4	574234	6.35303E+12	5.31615E+13	5349.43	0.0021778	-0.0150284	0.0751101	0.0673811	-0.4649787	2.2890484	2.2890484	
35:34.9	574234	6.35303E+12	5.31615E+13	5344.78	0.0021778	-0.0164614	0.0750448	0.0673811	-0.5093157	2.2870587	2.2870587	
40:37.9	574236	6.35303E+12	5.29706E+13	5350.2	0.0021778	-0.0316425	0.0753917	0.0673811	-0.9790189	2.2976295	2.2976295	
45:40.9	574237	6.35303E+12	5.26741E+13	5349.03	0.0021778	-0.0303346	0.0757995	0.0673811	-0.9385525	2.3100592	2.3100592	
50:43.9	574238	6.35303E+12	5.2719E+13	5355.31	0.0021778	-0.0059234	0.0758238	0.0673811	-0.18327	2.3107995	2.3107995	
55:46.8	574238	6.35303E+12	5.2719E+13	5349.01	0.0021778	-0.0018265	0.0757346	0.0673811	-0.0565119	2.308081	2.308081	
00:49.8	574239	6.35303E+12	5.28168E+13	5350.18	0.011704	-0.0315837	0.0756109	0.3621218	-0.9771997	2.3043114	2.3043114	
05:52.7	574239	6.35303E+12	5.28168E+13	5349.09	0.011704	-0.0304342	0.0755955	0.3621218	-0.9416341	2.303842	2.303842	
10:55.6	574240	6.35303E+12	5.25658E+13	5348.27	0.011704	-0.0002699	0.0759448	0.3621218	-0.0083507	2.314487	2.314487	
15:58.4	574243	6.35303E+12	5.35108E+13	5354.35	0.011704	0.0001733	0.0746885	0.3621218	0.0053619	2.2762	2.2762	
21:01.3	574245	6.35303E+12	5.38531E+13	5358.66	0.011704	0.0007385	0.0742735	0.3621218	0.0228492	2.2635505	2.2635505	
26:04.2	574246	6.35303E+12	5.41667E+13	5357.51	0.011704	-0.0035407	0.0738276	0.3621218	-0.1095493	2.2499632	2.2499632	
31:07.4	574246	6.35303E+12	5.41667E+13	5361.77	0.011704	-0.0018346	0.0738863	0.3621218	-0.0567625	2.2517522	2.2517522	
36:10.5	574246	6.35303E+12	5.41667E+13	5361.98	0.011704	0.0045642	0.0738892	0.3621218	0.1412163	2.2518404	2.2518404	
41:13.6	574246	6.35303E+12	5.41667E+13	5366.22	0.011704	-0.0158533	0.0739476	0.3621218	-0.4905011	2.2536211	2.2536211	
46:16.7	574248	6.35303E+12	5.41479E+13	5365.01	0.011704	-0.0018765	0.0739567	0.3621218	-0.0580589	2.2538956	2.2538956	
51:19.6	574251	6.35303E+12	5.52479E+13	5360.99	0.011704	0.001301	0.0724298	0.3621218	0.0402529	2.2073645	2.2073645	
56:22.6	574251	6.35303E+12	5.52479E+13	5356.1	0.011704	0.0012559	0.0723638	0.3621218	0.0388575	2.2053511	2.2053511	
01:25.7	574252	6.35303E+12	5.50584E+13	5358.27	0.0165726	0.0046048	0.0726423	0.5127562	0.1424725	2.2138386	2.2138386	
06:29.7	574252	6.35303E+12	5.50584E+13	5360.85	0.0165726	0.157986	0.0726772	0.5127562	4.8880868	2.2149045	4.8880868	
11:34.4	574254	6.35303E+12	5.55733E+13	5360.76	0.0165726	0.0130504	0.0720027	0.5127562	0.4037794	2.1943466	2.1943466	
16:37.5	574255	6.35303E+12	5.5978E+13	5358.19	0.0165726	0.0094017	0.0714478	0.5127562	0.2908886	2.1774367	2.1774367	
21:40.6	574256	6.35303E+12	5.57331E+13	5364.52	0.0165726	0.0100556	0.0718465	0.5127562	0.3111203	2.1895872	2.1895872	
26:43.8	574257	6.35303E+12	5.59531E+13	5368.93	0.0165726	0.0078173	0.0716229	0.5127562	0.2418673	2.182771	2.182771	
31:46.9	574257	6.35303E+12	5.59531E+13	5369.94	0.0165726	0.0063222	0.0716363	0.5127562	0.1956089	2.1831816	2.1831816	
36:49.8	574257	6.35303E+12	5.59531E+13	5368.01	0.0165726	0.0062178	0.0716106	0.5127562	0.1923787	2.182397	2.182397	
41:53.7	574258	6.35303E+12	5.61961E+13	5363.48	0.0165726	0.007283	0.0712408	0.5127562	0.225336	2.1711281	2.1711281	
46:56.9	574258	6.35303E+12	5.61961E+13	5363.48	0.0165726	0.0070341	0.0712408	0.5127562	0.2176351	2.1711281	2.1711281	
52:00.0	574258	6.35303E+12	5.61961E+13	5367.12	0.0165726	0.0072728	0.0712892	0.5127562	0.2250204	2.1726015	2.1726015	
57:06.7	574258	6.35303E+12	5.61961E+13	5368.74	0.0165726	0.0087738	0.0713107	0.5127562	0.2714614	2.1732573	2.1732573	
02:09.6	574258	6.35303E+12	5.61961E+13	5363.48	0.0168443	0.009364	0.0712408	0.5211626	0.2897222	2.1711281	2.1711281	
07:12.8	574258	6.35303E+12	5.61961E+13	5360.86	0.0168443	0.013432	0.071206	0.5211626	0.4155861	2.1700675	2.1700675	
12:16.3	574260	6.35303E+12	5.46276E+13	5360.85	0.0168443	0.0108808	0.0732504	0.5211626	0.336652	2.2323717	2.2323717	
17:19.2	574260	6.35303E+12	5.46276E+13	5368.73	0.0168443	0.0083528	0.0733581	0.5211626	0.2584356	2.2356531	2.2356531	
22:22.2	574260	6.35303E+12	5.46276E+13	5367.1	0.0168443	0.0079968	0.0733358	0.5211626	0.247421	2.2349743	2.2349743	
27:25.3	574260	6.35303E+12	5.46276E+13	5367.89	0.0168443	0.0067041	0.0733466	0.5211626	0.2074249	2.2353033	2.2353033	
32:28.2	574261	6.35303E+12	5.36607E+13	5369.99	0.0168443	0.0077119	0.0746974	0.5211626	0.2386062	2.2764693	2.2764693	
37:31.2	574261	6.35303E+12	5.36607E+13	5367.41	0.0168443	0.007023	0.0746615	0.5211626	0.2172916	2.2753756	2.2753756	
42:34.3	574261	6.35303E+12	5.36607E+13	5361.03	0.0168443	0.0080277	0.0745727	0.5211626	0.248377	2.2726709	2.2726709	
47:37.2	574261	6.35303E+12	5.36607E+13	5361.94	0.0168443	0.0080701	0.0745854	0.5211626	0.2496889	2.2730567	2.2730567	
52:40.2	574261	6.35303E+12	5.36607E+13	5373.41	0.0168443	0.0102078	0.0747449	0.5211626	0.3158293	2.2779191	2.2779191	
57:43.1	574263	6.35303E+12	5.26165E+13	5380.52	0.0168443	0.0081298	0.0763292	0.5211626	0.251536	2.3262005	2.3262005	
02:46.1	574266	6.35303E+12	5.51716E+13	5372.23	0.0186731	0.0076622	0.0726821	0.5777457	0.2370685	2.215053	2.215053	

07:49.0	574268	6.35303E+12	5.60115E+13	5366.01	0.0186731	0.0072848	0.0715093	0.5777457	0.2253917	2.1793098	2.1793098	
12:51.9	574269	6.35303E+12	5.58958E+13	5350.76	0.0186731	0.008065	0.0714536	0.5777457	0.2495311	2.1776143	2.1776143	
17:54.9	574270	6.35303E+12	5.6144E+13	5352.52	0.0186731	0.0075466	0.0711611	0.5777457	0.2334918	2.1686995	2.1686995	
22:57.9	574271	6.35303E+12	5.6095E+13	5356.14	0.0186731	0.007405	0.0712715	0.5777457	0.2291107	2.172064	2.172064	
28:01.0	574271	6.35303E+12	5.6095E+13	5350.02	0.0186731	0.0072809	0.0711901	0.5777457	0.225271	2.1695821	2.1695821	
33:04.1	574271	6.35303E+12	5.6095E+13	5354.6	0.0186731	0.0074885	0.071251	0.5777457	0.2316942	2.1714394	2.1714394	
38:07.2	574273	6.35303E+12	5.53104E+13	5354.48	0.0186731	0.0079015	0.0722601	0.5777457	0.2444724	2.2021917	2.2021917	
43:10.6	574274	6.35303E+12	5.53441E+13	5355.03	0.0186731	0.0099941	0.0722236	0.5777457	0.3092175	2.2010786	2.2010786	
48:13.7	574274	6.35303E+12	5.53441E+13	5354.14	0.0186731	0.0113173	0.0722116	0.5777457	0.3501573	2.2007128	2.2007128	
53:17.4	574274	6.35303E+12	5.53441E+13	5355.18	0.0186731	0.0164817	0.0722256	0.5777457	0.5099438	2.2011403	2.2011403	
58:20.3	574274	6.35303E+12	5.53441E+13	5369.19	0.0186731	0.0138726	0.0724146	0.5777457	0.4292182	2.2068988	2.2068988	
03:23.5	574274	6.35303E+12	5.53441E+13	5370.66	0.0212675	0.0091036	0.0724344	0.6580165	0.2816654	2.207503	2.207503	
08:26.5	574274	6.35303E+12	5.53441E+13	5369.11	0.0212675	0.0082747	0.0724135	0.6580165	0.2560192	2.2068659	2.2068659	
13:29.7	574274	6.35303E+12	5.53441E+13	5363.09	0.0212675	0.0151147	0.0723323	0.6580165	0.4676488	2.2043915	2.2043915	
18:32.7	574275	6.35303E+12	5.36343E+13	5365.75	0.0212675	0.0155968	0.0746751	0.6580165	0.482565	2.2757902	2.2757902	
23:35.6	574275	6.35303E+12	5.36343E+13	5369.99	0.0212675	0.0157182	0.0747341	0.6580165	0.4863211	2.2775885	2.2775885	
28:38.4	574275	6.35303E+12	5.36343E+13	5367.99	0.0212675	0.0155447	0.0747063	0.6580165	0.480953	2.2767402	2.2767402	
33:41.8	574277	6.35303E+12	5.50501E+13	5371.77	0.0212675	0.0198338	0.0728363	0.6580165	0.6136578	2.2197521	2.2197521	
38:45.1	574279	6.35303E+12	5.54528E+13	5384.78	0.0212675	0.0190493	0.0724824	0.6580165	0.5893853	2.2089672	2.2089672	
43:48.1	574281	6.35303E+12	5.67946E+13	5379.99	0.0212675	0.0170259	0.0707071	0.6580165	0.5267813	2.1548622	2.1548622	
48:51.0	574281	6.35303E+12	5.67946E+13	5377.85	0.0212675	0.0169016	0.070679	0.6580165	0.5229355	2.154005	2.154005	
53:54.3	574282	6.35303E+12	5.6096E+13	5375.53	0.0212675	0.0131463	0.0715283	0.6580165	0.4067465	2.1798898	2.1798898	
58:57.4	574282	6.35303E+12	5.6096E+13	5379.99	0.0212675	0.0178311	0.0715877	0.6580165	0.5516942	2.1816984	2.1816984	
04:00.6	574283	6.35303E+12	5.56063E+13	5387.53	0.0232187	0.0178063	0.0723193	0.7183866	0.5509269	2.2039945	2.2039945	
09:05.0	574283	6.35303E+12	5.56063E+13	5405.85	0.0232187	0.0198195	0.0725652	0.7183866	0.6132153	2.211489	2.211489	
14:08.3	574283	6.35303E+12	5.56063E+13	5409.86	0.0232187	0.019659	0.072619	0.7183866	0.6082495	2.2131295	2.2131295	
19:11.6	574284	6.35303E+12	5.64188E+13	5401.19	0.0232187	0.020979	0.0714585	0.7183866	0.6490903	2.1777626	2.1777626	
24:14.7	574284	6.35303E+12	5.64188E+13	5401.3	0.0232187	0.0205583	0.07146	0.7183866	0.6360738	2.1778069	2.1778069	
29:17.8	574285	6.35303E+12	5.57835E+13	5408.19	0.0232187	0.0200525	0.072366	0.7183866	0.6204244	2.2054203	2.2054203	
34:20.7	574285	6.35303E+12	5.57835E+13	5406.02	0.0232187	0.0204614	0.072337	0.7183866	0.6330757	2.2045354	2.2045354	
39:23.6	574285	6.35303E+12	5.57835E+13	5400.59	0.0232187	0.0195542	0.0722643	0.7183866	0.6050069	2.202321	2.202321	
44:26.7	574285	6.35303E+12	5.57835E+13	5401.93	0.0232187	0.0203561	0.0722823	0.7183866	0.6298177	2.2028675	2.2028675	
49:29.7	574285	6.35303E+12	5.57835E+13	5404.01	0.0232187	0.0200873	0.0723101	0.7183866	0.6215011	2.2037157	2.2037157	
54:32.7	574285	6.35303E+12	5.57835E+13	5401.27	0.0232187	0.0203132	0.0722734	0.7183866	0.6284904	2.2025983	2.2025983	
59:36.0	574285	6.35303E+12	5.57835E+13	5405.56	0.0232187	0.0202868	0.0723309	0.7183866	0.6276736	2.2043478	2.2043478	
04:39.2	574285	6.35303E+12	5.57835E+13	5407.94	0.0243161	0.0203594	0.0723627	0.7523401	0.6299198	2.2053183	2.2053183	
09:42.2	574286	6.35303E+12	5.36818E+13	5415.78	0.0243161	0.0205197	0.0753047	0.7523401	0.6348795	2.2949778	2.2949778	
14:45.4	574287	6.35303E+12	5.50908E+13	5406.57	0.0243161	0.0204524	0.0732539	0.7523401	0.6327973	2.2324797	2.2324797	
19:48.6	574287	6.35303E+12	5.50908E+13	5390.94	0.0243161	0.0204571	0.0730422	0.7523401	0.6329427	2.2260258	2.2260258	
24:51.7	574288	6.35303E+12	5.6446E+13	5374.99	0.0243161	0.0204895	0.0710776	0.7523401	0.6339451	2.1661531	2.1661531	
29:54.9	574288	6.35303E+12	5.6446E+13	5391.07	0.0243161	0.020504	0.0712902	0.7523401	0.6343938	2.1726335	2.1726335	
34:58.3	574289	6.35303E+12	5.61643E+13	5386.28	0.0243161	0.0215335	0.0715842	0.7523401	0.6662465	2.1815923	2.1815923	
40:02.0	574289	6.35303E+12	5.61643E+13	5381.99	0.0243161	0.0216111	0.0715272	0.7523401	0.6686474	2.1798548	2.1798548	
45:05.1	574289	6.35303E+12	5.61643E+13	5375.06	0.0243161	0.0210446	0.0714351	0.7523401	0.6511199	2.1770479	2.1770479	
50:08.2	574290	6.35303E+12	5.56905E+13	5379.99	0.0243161	0.0216184	0.0721089	0.7523401	0.6688733	2.1975834	2.1975834	
55:11.2	574292	6.35303E+12	5.59818E+13	5380.89	0.0243161	0.021687	0.0717456	0.7523401	0.6709958	2.1865119	2.1865119	
00:14.3	574294	6.35303E+12	5.66874E+13	5378.02	0.0257744	0.0216429	0.0708148	0.7974599	0.6696313	2.1581456	2.1581456	

05:17.2	574295	6.35303E+12	5.71185E+13	5388.44	0.0257744	0.0212776	0.0704165	0.7974599	0.6583289	2.1460054	2.1460054
10:20.9	574296	6.35303E+12	5.69506E+13	5391.26	0.0257744	0.0214204	0.070661	0.7974599	0.6627472	2.1534583	2.1534583
15:24.1	574298	6.35303E+12	5.77593E+13	5389.31	0.0257744	0.0214204	0.0696465	0.7974599	0.6627472	2.1225393	2.1225393
20:27.3	574298	6.35303E+12	5.77593E+13	5388.39	0.0257744	0.0220102	0.0696346	0.7974599	0.6809956	2.122177	2.122177
25:31.0	574298	6.35303E+12	5.77593E+13	5393.64	0.0257744	0.025403	0.0697024	0.7974599	0.7859688	2.1242446	2.1242446
30:34.5	574299	6.35303E+12	5.69012E+13	5395.3	0.0257744	0.0261091	0.0707755	0.7974599	0.8078156	2.1569462	2.1569462
35:39.5	574301	6.35303E+12	5.7613E+13	5391.27	0.0257744	0.0834465	0.0698488	0.7974599	2.5818347	2.1287047	2.5818347
40:44.8	574301	6.35303E+12	5.7613E+13	5390.99	0.0257744	0.2182033	0.0698452	0.7974599	6.7512101	2.1285942	6.7512101
45:49.0	574302	6.35303E+12	5.77583E+13	5394.98	0.0257744	0.15508	0.069721	0.7974599	4.7981752	2.1248099	4.7981752
50:52.9	574302	6.35303E+12	5.77583E+13	5395.4	0.0257744	0.1766657	0.0697264	0.7974599	5.4660368	2.1249753	5.4660368
55:56.9	574304	6.35303E+12	5.7411E+13	5395.01	0.0257744	0.174439	0.0701432	0.7974599	5.3971427	2.1376776	5.3971427
01:01.0	574305	6.35303E+12	5.8471E+13	5392.45	0.0279426	0.2174554	0.0688389	0.864544	6.7280701	2.0979265	6.7280701
06:05.1	574305	6.35303E+12	5.8471E+13	5393.6	0.0279426	0.0374936	0.0688536	0.864544	1.160052	2.0983739	2.0983739
11:09.9	574305	6.35303E+12	5.8471E+13	5393.59	0.0279426	0.0279332	0.0688534	0.864544	0.8642532	2.09837	2.09837
16:13.3	574307	6.35303E+12	5.89967E+13	5393.1	0.0279426	0.0249637	0.0682337	0.864544	0.7723769	2.0794831	2.0794831
21:16.3	574309	6.35303E+12	6.00748E+13	5397.01	0.0279426	0.025771	0.0670578	0.864544	0.7973547	2.0436461	2.0436461
26:19.2	574310	6.35303E+12	6.02983E+13	5396.18	0.0279426	0.025585	0.066799	0.864544	0.7915999	2.035759	2.035759
31:22.5	574311	6.35303E+12	6.01255E+13	5399.99	0.0279426	0.0297997	0.0670382	0.864544	0.9220027	2.0430488	2.0430488
36:25.4	574311	6.35303E+12	6.01255E+13	5402.65	0.0279426	0.0297908	0.0670712	0.864544	0.9217274	2.0440552	2.0440552
41:28.4	574312	6.35303E+12	5.99055E+13	5397.01	0.0279426	0.0298367	0.0672472	0.864544	0.9231475	2.0494202	2.0494202
46:31.4	574312	6.35303E+12	5.99055E+13	5395.01	0.0279426	0.0256849	0.0672223	0.864544	0.7946908	2.0486608	2.0486608
51:34.4	574315	6.35303E+12	5.97623E+13	5393.25	0.0279426	0.0284134	0.0673615	0.864544	0.8791106	2.0529008	2.0529008
56:37.4	574315	6.35303E+12	5.97623E+13	5390.48	0.0279426	0.025946	0.0673269	0.864544	0.8027692	2.0518464	2.0518464
01:41.6	574315	6.35303E+12	5.97623E+13	5386.7	0.0296022	0.210997	0.0672796	0.9158921	6.5282472	2.0504076	6.5282472
06:46.0	574317	6.35303E+12	6.04051E+13	5387.76	0.0296022	0.0271557	0.0665768	0.9158921	0.8401974	2.0289892	2.0289892
11:50.0	574319	6.35303E+12	6.0775E+13	5392.75	0.0296022	0.2243785	0.0662328	0.9158921	6.9422708	2.0185049	6.9422708
16:54.3	574320	6.35303E+12	6.21737E+13	5393.01	0.0296022	0.0486987	0.064746	0.9158921	1.5067378	1.9731924	1.9731924
21:59.4	574320	6.35303E+12	6.21737E+13	5399.78	0.0296022	0.0370626	0.0648273	0.9158921	1.1467168	1.9756694	1.9756694
27:02.3	574320	6.35303E+12	6.21737E+13	5404.34	0.0296022	0.0303724	0.064882	0.9158921	0.9397221	1.9773378	1.9773378
32:05.3	574321	6.35303E+12	6.17749E+13	5403.12	0.0296022	0.0280097	0.0652861	0.9158921	0.8666201	1.989654	1.989654
37:08.3	574321	6.35303E+12	6.17749E+13	5402.68	0.0296022	0.0278751	0.0652808	0.9158921	0.8624556	1.989492	1.989492
42:11.3	574321	6.35303E+12	6.17749E+13	5409.99	0.0296022	0.02741	0.0653692	0.9158921	0.8480654	1.9921839	1.9921839
47:14.3	574321	6.35303E+12	6.17749E+13	5409.99	0.0296022	0.027605	0.0653692	0.9158921	0.8540987	1.9921839	1.9921839
52:17.2	574321	6.35303E+12	6.17749E+13	5413.5	0.0296022	0.0276334	0.0654116	0.9158921	0.8549774	1.9934764	1.9934764
57:20.0	574321	6.35303E+12	6.17749E+13	5407.13	0.0296022	0.0265193	0.0653346	0.9158921	0.8205071	1.9911307	1.9911307
02:23.3	574321	6.35303E+12	6.17749E+13	5393.15	0.0289028	0.0265406	0.0651657	0.8942526	0.8211662	1.9859827	1.9859827
07:26.3	574321	6.35303E+12	6.17749E+13	5395.3	0.0289028	0.026646	0.0651917	0.8942526	0.8244272	1.9867744	1.9867744
12:29.4	574321	6.35303E+12	6.17749E+13	5397.72	0.0289028	0.0263766	0.0652209	0.8942526	0.816092	1.9876655	1.9876655
17:32.5	574321	6.35303E+12	6.17749E+13	5399.98	0.0289028	0.0264515	0.0652482	0.8942526	0.8184094	1.9884978	1.9884978
22:35.6	574321	6.35303E+12	6.17749E+13	5394.06	0.0289028	0.0265902	0.0651767	0.8942526	0.8227008	1.9863178	1.9863178
27:38.6	574321	6.35303E+12	6.17749E+13	5393.9	0.0289028	0.026498	0.0651747	0.8942526	0.8198481	1.9862589	1.9862589
32:41.7	574322	6.35303E+12	5.8824E+13	5396.06	0.0289028	0.0264345	0.0684716	0.8942526	0.8178834	2.086735	2.086735
37:45.1	574322	6.35303E+12	5.8824E+13	5392.94	0.0289028	0.0257328	0.0684321	0.8942526	0.7961728	2.0855284	2.0855284
42:48.3	574322	6.35303E+12	5.8824E+13	5392.23	0.0289028	0.0270329	0.068423	0.8942526	0.8363979	2.0852539	2.0852539
47:51.7	574323	6.35303E+12	5.85421E+13	5397.35	0.0289028	0.026317	0.0688178	0.8942526	0.814248	2.097283	2.097283
52:54.6	574323	6.35303E+12	5.85421E+13	5406.09	0.0289028	0.02719	0.0689292	0.8942526	0.8412586	2.1006792	2.1006792
57:58.1	574326	6.35303E+12	5.98016E+13	5402.76	0.0289028	0.0299238	0.0674359	0.8942526	0.9258424	2.0551695	2.0551695

03:01.0	574326	6.35303E+12	5.98016E+13	5405.16	0.0298595	0.0354935	0.0674658	0.9238529	1.0981689	2.0560824	2.0560824	
08:04.2	574326	6.35303E+12	5.98016E+13	5400.27	0.0298595	0.0283365	0.0674048	0.9238529	0.8767313	2.0542223	2.0542223	
13:10.1	574327	6.35303E+12	5.96067E+13	5403.01	0.0298595	0.0272184	0.0676595	0.9238529	0.8421373	2.0619836	2.0619836	
18:13.1	574327	6.35303E+12	5.96067E+13	5402.55	0.0298595	0.0254796	0.0676537	0.9238529	0.7883388	2.061808	2.061808	
23:16.5	574328	6.35303E+12	5.96752E+13	5405.49	0.0298595	0.026922	0.0676129	0.9238529	0.8329667	2.0605642	2.0605642	
28:19.6	574328	6.35303E+12	5.96752E+13	5407.99	0.0298595	0.0266884	0.0676442	0.9238529	0.8257391	2.0615172	2.0615172	
33:22.8	574329	6.35303E+12	5.94855E+13	5414.16	0.0298595	0.0268196	0.0679373	0.9238529	0.8297984	2.0704516	2.0704516	
38:26.4	574330	6.35303E+12	5.97035E+13	5414.16	0.0298595	0.0268326	0.0676893	0.9238529	0.8302006	2.0628912	2.0628912	
43:29.6	574331	6.35303E+12	5.96567E+13	5411.77	0.0298595	0.0255719	0.0677124	0.9238529	0.7911946	2.0635973	2.0635973	
48:32.6	574332	6.35303E+12	5.93593E+13	5409.61	0.0298595	0.0266704	0.0680245	0.9238529	0.8251822	2.0731087	2.0731087	
53:36.1	574333	6.35303E+12	5.9734E+13	5404.43	0.0298595	0.0266612	0.0675331	0.9238529	0.8248975	2.0581326	2.0581326	
58:39.0	574334	6.35303E+12	5.92562E+13	5401.16	0.0298595	0.0269553	0.0680365	0.9238529	0.833997	2.0734727	2.0734727	
03:42.1	574335	6.35303E+12	5.9018E+13	5401.4	0.028602	0.0279105	0.0683141	0.8849459	0.8635509	2.0819329	2.0819329	
08:45.2	574335	6.35303E+12	5.9018E+13	5400.05	0.028602	0.0267242	0.068297	0.8849459	0.8268467	2.0814126	2.0814126	
13:48.8	574337	6.35303E+12	6.04407E+13	5403.81	0.028602	0.0267657	0.0667358	0.8849459	0.8281308	2.0338321	2.0338321	
18:51.7	574338	6.35303E+12	6.00814E+13	5403.9	0.028602	0.026525	0.067136	0.8849459	0.8206835	2.0460298	2.0460298	
23:55.0	574341	6.35303E+12	6.05704E+13	5404.02	0.028602	0.026048	0.0665954	0.8849459	0.8059251	2.0295562	2.0295562	
28:58.6	574342	6.35303E+12	6.0482E+13	5406.89	0.028602	0.0265109	0.0667282	0.8849459	0.8202472	2.0336015	2.0336015	
34:01.7	574343	6.35303E+12	5.99395E+13	5402.19	0.028602	0.0255512	0.0672736	0.8849459	0.7905541	2.0502238	2.0502238	
39:04.8	574343	6.35303E+12	5.99395E+13	5399.98	0.028602	0.0262086	0.0672461	0.8849459	0.8108941	2.0493851	2.0493851	
44:07.8	574344	6.35303E+12	5.95861E+13	5399.01	0.028602	0.0260242	0.0676328	0.8849459	0.8051887	2.0611697	2.0611697	
49:11.2	574344	6.35303E+12	5.95861E+13	5394.85	0.028602	0.0266401	0.0675807	0.8849459	0.8242447	2.0595816	2.0595816	
54:14.4	574344	6.35303E+12	5.95861E+13	5401.23	0.028602	0.0260209	0.0676606	0.8849459	0.8050866	2.0620172	2.0620172	
59:17.3	574344	6.35303E+12	5.95861E+13	5398.44	0.028602	0.0262469	0.0676256	0.8849459	0.8120791	2.0609521	2.0609521	
04:21.4	574346	6.35303E+12	5.84022E+13	5394.51	0.0275993	0.2233023	0.0689463	0.8539223	6.9089732	2.1012014	6.9089732	
09:27.4	574347	6.35303E+12	5.86008E+13	5390.6	0.0275993	0.0264187	0.0686629	0.8539223	0.8173946	2.0925629	2.0925629	
14:30.5	574347	6.35303E+12	5.86008E+13	5397.94	0.0275993	0.0265111	0.0687564	0.8539223	0.8202534	2.0954122	2.0954122	
19:33.5	574348	6.35303E+12	5.87322E+13	5396.99	0.0275993	0.0266306	0.0685905	0.8539223	0.8239508	2.0903567	2.0903567	
24:36.5	574348	6.35303E+12	5.87322E+13	5396.21	0.0275993	0.026318	0.0685806	0.8539223	0.8142789	2.0900545	2.0900545	
29:41.0	574349	6.35303E+12	5.84595E+13	5396.31	0.0275993	0.2222834	0.0689017	0.8539223	6.8774484	2.0998406	6.8774484	
34:45.8	574350	6.35303E+12	5.91267E+13	5395.07	0.0275993	0.0360184	0.0681086	0.8539223	1.1144093	2.07567	2.07567	
39:49.9	574350	6.35303E+12	5.91267E+13	5395.47	0.0275993	0.026792	0.0681136	0.8539223	0.8289445	2.0758239	2.0758239	
44:54.1	574351	6.35303E+12	5.92508E+13	5395.05	0.0275993	0.0245607	0.0679657	0.8539223	0.7599081	2.0713145	2.0713145	
49:58.3	574351	6.35303E+12	5.92508E+13	5393.06	0.0275993	0.0251914	0.0679406	0.8539223	0.7794219	2.0705505	2.0705505	
55:03.7	574351	6.35303E+12	5.92508E+13	5391.73	0.0275993	0.0244349	0.0679238	0.8539223	0.7560158	2.0700399	2.0700399	
00:06.8	574351	6.35303E+12	5.92508E+13	5391.02	0.0287438	0.0246767	0.0679149	0.8893332	0.7634971	2.0697673	2.0697673	
05:09.8	574351	6.35303E+12	5.92508E+13	5365.12	0.0287438	0.0247456	0.0675886	0.8893332	0.7656289	2.0598235	2.0598235	
10:12.8	574351	6.35303E+12	5.92508E+13	5371.89	0.0287438	0.0222708	0.0676739	0.8893332	0.6890586	2.0624227	2.0624227	
15:16.2	574351	6.35303E+12	5.92508E+13	5379.7	0.0287438	0.0239242	0.0677723	0.8893332	0.7402147	2.0654212	2.0654212	
20:19.5	574353	6.35303E+12	5.95341E+13	5378.3	0.0287438	0.0226519	0.0674322	0.8893332	0.7008498	2.0550568	2.0550568	
25:22.4	574353	6.35303E+12	5.95341E+13	5381.03	0.0287438	0.0245188	0.0674664	0.8893332	0.7586117	2.0560999	2.0560999	
30:25.5	574353	6.35303E+12	5.95341E+13	5392.25	0.0287438	0.024939	0.0676071	0.8893332	0.7716127	2.0603871	2.0603871	
35:29.0	574353	6.35303E+12	5.95341E+13	5394.16	0.0287438	0.0248882	0.067631	0.8893332	0.7700409	2.0611169	2.0611169	
40:32.2	574353	6.35303E+12	5.95341E+13	5399.99	0.0287438	0.0245715	0.0677041	0.8893332	0.7602422	2.0633446	2.0633446	
45:35.1	574355	6.35303E+12	6.01266E+13	5396.88	0.0287438	0.0230276	0.0669983	0.8893332	0.7124739	2.0418346	2.0418346	
50:38.3	574356	6.35303E+12	6.01278E+13	5394.77	0.0287438	0.0244562	0.0669709	0.8893332	0.7566748	2.0409989	2.0409989	
55:42.0	574356	6.35303E+12	6.01278E+13	5402.4	0.0287438	0.0216672	0.0670656	0.8893332	0.6703832	2.0438855	2.0438855	

00:45.1	574357	6.35303E+12	5.98782E+13	5408.98	0.0349099	0.0215159	0.0674272	1.0801123	0.6657019	2.0549051	2.0549051
05:48.5	574357	6.35303E+12	5.98782E+13	5415.88	0.0349099	0.021311	0.0675132	1.0801123	0.6593623	2.0575264	2.0575264
10:51.8	574359	6.35303E+12	5.99023E+13	5413.47	0.0349099	0.0215195	0.067456	1.0801123	0.6658133	2.0557835	2.0557835
15:54.9	574359	6.35303E+12	5.99023E+13	5409.99	0.0349099	0.0216145	0.0674127	1.0801123	0.6687526	2.0544619	2.0544619
20:57.9	574360	6.35303E+12	6.0023E+13	5408.83	0.0349099	0.0224358	0.0672626	1.0801123	0.6941637	2.049888	2.049888
26:01.1	574360	6.35303E+12	6.0023E+13	5402.81	0.0349099	0.0221931	0.0671877	1.0801123	0.6866545	2.0476064	2.0476064
31:04.4	574361	6.35303E+12	5.95038E+13	5407.93	0.0349099	0.024178	0.0678382	1.0801123	0.7480673	2.0674304	2.0674304
36:08.0	574361	6.35303E+12	5.95038E+13	5411.14	0.0349099	0.0353979	0.0678785	1.0801123	1.095211	2.0686576	2.0686576
41:11.6	574362	6.35303E+12	5.87448E+13	5422.09	0.0349099	0.0235493	0.0688946	1.0801123	0.7286153	2.0996263	2.0996263
46:14.8	574362	6.35303E+12	5.87448E+13	5435.74	0.0349099	0.0221814	0.0690681	1.0801123	0.6862925	2.1049121	2.1049121
51:17.9	574362	6.35303E+12	5.87448E+13	5435.55	0.0349099	0.0237741	0.0690657	1.0801123	0.7355707	2.1048385	2.1048385
56:21.6	574363	6.35303E+12	5.80502E+13	5427.15	0.0349099	0.032206	0.0697841	1.0801123	0.9964536	2.1267343	2.1267343
01:24.7	574363	6.35303E+12	5.80502E+13	5428.1	0.0262015	0.0475413	0.0697964	0.8106744	1.4709278	2.1271066	2.1271066
06:27.9	574364	6.35303E+12	5.78645E+13	5441.31	0.0262015	0.0428348	0.0701907	0.8106744	1.3253087	2.1391255	2.1391255
11:31.0	574364	6.35303E+12	5.78645E+13	5428.95	0.0262015	0.0240965	0.0700313	0.8106744	0.7455457	2.1342664	2.1342664
16:33.9	574367	6.35303E+12	5.84533E+13	5433.35	0.0262015	0.0244572	0.069382	0.8106744	0.7567058	2.1144803	2.1144803
21:38.4	574367	6.35303E+12	5.84533E+13	5439.23	0.0262015	0.022965	0.0694571	0.8106744	0.7105371	2.1167686	2.1167686
26:41.8	574368	6.35303E+12	5.81378E+13	5433.99	0.0262015	0.0212901	0.0697668	0.8106744	0.6587157	2.1262058	2.1262058
31:45.4	574368	6.35303E+12	5.81378E+13	5446.09	0.0262015	0.0209848	0.0699221	0.8106744	0.6492697	2.1309403	2.1309403
36:48.4	574369	6.35303E+12	5.7527E+13	5440.51	0.0262015	0.0204925	0.0705922	0.8106744	0.634038	2.1513595	2.1513595
41:51.9	574370	6.35303E+12	5.73316E+13	5442.44	0.0262015	0.0198587	0.0708579	0.8106744	0.6144282	2.1594579	2.1594579
46:55.1	574370	6.35303E+12	5.73316E+13	5449.99	0.0262015	0.0197845	0.0709562	0.8106744	0.6121324	2.1624536	2.1624536
51:58.4	574370	6.35303E+12	5.73316E+13	5458.76	0.0262015	0.0194401	0.0710704	0.8106744	0.6014767	2.1659334	2.1659334
57:01.5	574373	6.35303E+12	5.75391E+13	5466.97	0.0262015	0.0197032	0.0709205	0.8106744	0.609617	2.1613669	2.1613669
02:05.0	574373	6.35303E+12	5.75391E+13	5466.18	0.0202338	0.0193913	0.0709103	0.6260338	0.5999668	2.1610546	2.1610546
07:08.3	574373	6.35303E+12	5.75391E+13	5468.2	0.0202338	0.0191518	0.0709365	0.6260338	0.5925567	2.1618532	2.1618532
12:11.9	574374	6.35303E+12	5.70787E+13	5462.25	0.0202338	0.0195416	0.0714308	0.6260338	0.6046171	2.1769189	2.1769189
17:14.8	574375	6.35303E+12	5.67247E+13	5457.72	0.0202338	0.0192754	0.071817	0.6260338	0.5963809	2.1886876	2.1886876
22:17.9	574376	6.35303E+12	5.68162E+13	5459.27	0.0202338	0.0212199	0.0717217	0.6260338	0.6565437	2.185782	2.185782
27:21.2	574376	6.35303E+12	5.68162E+13	5455.91	0.0202338	0.0193854	0.0716775	0.6260338	0.5997843	2.1844367	2.1844367
32:24.1	574377	6.35303E+12	5.63276E+13	5454.55	0.0202338	0.0196209	0.0722814	0.6260338	0.6070706	2.2028394	2.2028394
37:27.2	574377	6.35303E+12	5.63276E+13	5461.19	0.0202338	0.0218394	0.0723693	0.6260338	0.675711	2.205521	2.205521
42:30.2	574377	6.35303E+12	5.63276E+13	5464.3	0.0202338	0.0211972	0.0724106	0.6260338	0.6558414	2.206777	2.206777
47:33.3	574378	6.35303E+12	5.65074E+13	5471.12	0.0202338	0.0212136	0.0722702	0.6260338	0.6563488	2.2024995	2.2024995
52:36.4	574378	6.35303E+12	5.65074E+13	5465.8	0.0202338	0.0207927	0.0721999	0.6260338	0.6433261	2.2003578	2.2003578
57:39.3	574378	6.35303E+12	5.65074E+13	5467.45	0.0202338	0.0196864	0.0722217	0.6260338	0.6090972	2.2010221	2.2010221
03:12.6	574383	6.35303E+12	5.72964E+13	5476.66	0.0174418	0.0187668	0.0713471	0.5396493	0.5806448	2.1743674	2.1743674
08:16.0	574384	6.35303E+12	5.65611E+13	5472.78	0.0174418	0.0187175	0.0722235	0.5396493	0.5791195	2.2010766	2.2010766
13:19.1	574384	6.35303E+12	5.65611E+13	5477.51	0.0174418	0.0187832	0.0722859	0.5396493	0.5811522	2.2029789	2.2029789
18:22.2	574384	6.35303E+12	5.65611E+13	5475.27	0.0174418	0.0184439	0.0722564	0.5396493	0.5706543	2.202078	2.202078
23:25.4	574384	6.35303E+12	5.65611E+13	5485.01	0.0174418	0.0182748	0.0723849	0.5396493	0.5654223	2.2059953	2.2059953
28:28.7	574385	6.35303E+12	5.52675E+13	5483.01	0.0174418	0.0178749	0.0740521	0.5396493	0.5530494	2.2568058	2.2568058
33:31.7	574386	6.35303E+12	5.5002E+13	5486.59	0.0174418	0.0182033	0.0744582	0.5396493	0.5632101	2.2691808	2.2691808
38:35.5	574386	6.35303E+12	5.5002E+13	5489.7	0.0174418	0.0186322	0.0745004	0.5396493	0.5764803	2.270467	2.270467
43:38.3	574387	6.35303E+12	5.4816E+13	5485.01	0.0174418	0.0182313	0.0746893	0.5396493	0.5640764	2.2762247	2.2762247
48:41.2	574387	6.35303E+12	5.4816E+13	5494.56	0.0174418	0.0183895	0.0748194	0.5396493	0.5689711	2.2801879	2.2801879
53:45.0	574387	6.35303E+12	5.4816E+13	5496.86	0.0174418	0.0183358	0.0748507	0.5396493	0.5673097	2.2811424	2.2811424

58:48.0	574388	6.35303E+12	5.41076E+13	5491.71	0.0174418	0.0183548	0.0757595	0.5396493	0.5678975	2.3088405	2.3088405
03:51.1	574388	6.35303E+12	5.41076E+13	5493.27	0.0165491	0.0183691	0.0757811	0.5120292	0.56834	2.3094963	2.3094963
08:54.1	574388	6.35303E+12	5.41076E+13	5497.61	0.0165491	0.0183647	0.0758409	0.5120292	0.5682038	2.311321	2.311321
13:57.4	574390	6.35303E+12	5.36713E+13	5491.93	0.0165491	0.0183673	0.0763785	0.5120292	0.5682843	2.3277048	2.3277048
19:00.7	574393	6.35303E+12	5.4543E+13	5502.77	0.0165491	0.0188417	0.0753062	0.5120292	0.5829622	2.2950255	2.2950255
24:04.5	574393	6.35303E+12	5.4543E+13	5525.72	0.0165491	0.0193995	0.0756203	0.5120292	0.6002205	2.3045972	2.3045972
29:07.6	574393	6.35303E+12	5.4543E+13	5538.58	0.0165491	0.0193609	0.0757963	0.5120292	0.5990262	2.3099607	2.3099607
34:10.9	574393	6.35303E+12	5.4543E+13	5548.77	0.0165491	0.019547	0.0759358	0.5120292	0.6047842	2.3142106	2.3142106
39:14.1	574394	6.35303E+12	5.38779E+13	5544.99	0.0165491	0.0195134	0.0768207	0.5120292	0.6037446	2.3411795	2.3411795
44:17.1	574395	6.35303E+12	5.53825E+13	5512.91	0.0165491	0.0198083	0.0743014	0.5120292	0.6128688	2.2644017	2.2644017
49:20.1	574395	6.35303E+12	5.53825E+13	5524.53	0.0165491	0.0195319	0.074458	0.5120292	0.604317	2.2691746	2.2691746
54:23.3	574395	6.35303E+12	5.53825E+13	5525.3	0.0165491	0.01959	0.0744684	0.5120292	0.6061146	2.2694909	2.2694909
59:26.3	574395	6.35303E+12	5.53825E+13	5519.06	0.0165491	0.0192502	0.0743843	0.5120292	0.5956012	2.2669278	2.2669278
04:29.4	574395	6.35303E+12	5.53825E+13	5533.7	0.0172292	0.0192508	0.0745816	0.5330714	0.5956198	2.2729411	2.2729411
09:32.4	574395	6.35303E+12	5.53825E+13	5530.29	0.0172292	0.0191812	0.0745356	0.5330714	0.5934663	2.2715405	2.2715405
14:35.9	574396	6.35303E+12	5.44713E+13	5534.64	0.0172292	0.0190064	0.0758421	0.5330714	0.588058	2.3113551	2.3113551
19:39.0	574396	6.35303E+12	5.44713E+13	5544.31	0.0172292	0.0189667	0.0759746	0.5330714	0.5868297	2.3153934	2.3153934
24:42.5	574396	6.35303E+12	5.44713E+13	5549.76	0.0172292	0.0190067	0.0760493	0.5330714	0.5880673	2.3176694	2.3176694
29:46.0	574397	6.35303E+12	5.38389E+13	5535.92	0.0172292	0.0190806	0.0767506	0.5330714	0.5903538	2.3390422	2.3390422
34:48.9	574397	6.35303E+12	5.38389E+13	5548.11	0.0172292	0.0187167	0.0769196	0.5330714	0.5790947	2.3441927	2.3441927
39:52.5	574397	6.35303E+12	5.38389E+13	5576.84	0.0172292	0.0189742	0.0773179	0.5330714	0.5870617	2.3563317	2.3563317
44:55.6	574397	6.35303E+12	5.38389E+13	5588.49	0.0172292	0.0188554	0.0774794	0.5330714	0.5833861	2.3612541	2.3612541
49:58.8	574397	6.35303E+12	5.38389E+13	5580.14	0.0172292	0.0189482	0.0773636	0.5330714	0.5862573	2.3577261	2.3577261
55:01.8	574397	6.35303E+12	5.38389E+13	5586.36	0.0172292	0.0194129	0.0774499	0.5330714	0.6006351	2.3603541	2.3603541
00:05.2	574398	6.35303E+12	5.24135E+13	5582.24	0.0174125	0.0194554	0.0794975	0.5387428	0.6019501	2.422758	2.422758
05:09.1	574399	6.35303E+12	5.22154E+13	5575.01	0.0174125	0.0197929	0.0796957	0.5387428	0.6123923	2.4287994	2.4287994
10:12.1	574400	6.35303E+12	5.19602E+13	5555.62	0.0174125	0.0199592	0.0798086	0.5387428	0.6175376	2.4322397	2.4322397
15:15.6	574400	6.35303E+12	5.19602E+13	5578.34	0.0174125	0.0198711	0.080135	0.5387428	0.6148118	2.4421865	2.4421865
20:18.5	574400	6.35303E+12	5.19602E+13	5579.19	0.0174125	0.0198617	0.0801472	0.5387428	0.614521	2.4425586	2.4425586
25:21.5	574401	6.35303E+12	5.14241E+13	5571.72	0.0174125	0.0200228	0.0808744	0.5387428	0.6195054	2.4647197	2.4647197
30:24.5	574401	6.35303E+12	5.14241E+13	5570.27	0.0174125	0.0199827	0.0808533	0.5387428	0.6182647	2.4640783	2.4640783
35:27.4	574402	6.35303E+12	5.15991E+13	5586.79	0.0174125	0.0207606	0.080818	0.5387428	0.642333	2.4630024	2.4630024
40:30.4	574403	6.35303E+12	5.16659E+13	5618.48	0.0174125	0.0202218	0.0811714	0.5387428	0.6256625	2.4737726	2.4737726
45:33.7	574404	6.35303E+12	5.22163E+13	5610.56	0.0174125	0.0221828	0.0802027	0.5387428	0.6863358	2.444248	2.444248
50:36.6	574405	6.35303E+12	5.26766E+13	5659.03	0.0174125	0.0202739	0.0801886	0.5387428	0.6272745	2.4438195	2.4438195
55:39.5	574406	6.35303E+12	5.44332E+13	5660.39	0.0174125	0.0201747	0.0776194	0.5387428	0.6242052	2.365522	2.365522
00:42.4	574407	6.35303E+12	5.44179E+13	5674.28	0.0182174	0.0190667	0.0778319	0.5636464	0.5899237	2.3719968	2.3719968
05:45.2	574408	6.35303E+12	5.43366E+13	5665.31	0.0182174	0.0196886	0.0778251	0.5636464	0.6091653	2.3717894	2.3717894
10:47.9	574408	6.35303E+12	5.43366E+13	5669.02	0.0182174	0.0199558	0.077876	0.5636464	0.6174325	2.3733426	2.3733426
15:50.8	574409	6.35303E+12	5.45039E+13	5707.81	0.0182174	0.0201714	0.0781682	0.5636464	0.6241031	2.3822461	2.3822461
20:53.8	574409	6.35303E+12	5.45039E+13	5687.02	0.0182174	0.0225138	0.0778835	0.5636464	0.696577	2.3735691	2.3735691
25:56.9	574410	6.35303E+12	5.4739E+13	5681.9	0.0182174	0.0207126	0.0774792	0.5636464	0.6408478	2.3612479	2.3612479
36:03.0	574410	6.35303E+12	5.4739E+13	5722.07	0.0182174	0.0216808	0.0780269	0.5636464	0.670804	2.3779415	2.3779415
41:06.3	574410	6.35303E+12	5.4739E+13	5722.31	0.0182174	0.0214058	0.0780302	0.5636464	0.6622955	2.3780413	2.3780413
46:09.6	574410	6.35303E+12	5.4739E+13	5758.38	0.0182174	0.0229584	0.0785221	0.5636464	0.7103329	2.393031	2.393031
51:12.9	574410	6.35303E+12	5.4739E+13	5752.53	0.0182174	0.0234792	0.0784423	0.5636464	0.7264464	2.3905999	2.3905999
01:18.1	574412	6.35303E+12	5.33495E+13	5778.34	0.0231716	0.024996	0.0808465	0.7169293	0.7733762	2.46387	2.46387

06:21.2	574412	6.35303E+12	5.33495E+13	5720.48	0.0231716	0.0224302	0.080037	0.7169293	0.6939904	2.4391986	2.4391986	
11:24.7	574412	6.35303E+12	5.33495E+13	5706.21	0.0231716	0.0232405	0.0798373	0.7169293	0.7190611	2.4331139	2.4331139	
16:27.6	574413	6.35303E+12	5.25253E+13	5710.17	0.0231716	0.0234349	0.0811462	0.7169293	0.7250758	2.4730049	2.4730049	
21:30.3	574413	6.35303E+12	5.25253E+13	5738.9	0.0231716	0.0220916	0.0815545	0.7169293	0.6835141	2.4854476	2.4854476	
26:33.4	574413	6.35303E+12	5.25253E+13	5729.99	0.0231716	0.0254117	0.0814279	0.7169293	0.786238	2.4815887	2.4815887	
31:36.2	574414	6.35303E+12	5.19701E+13	5734.45	0.0231716	0.0252112	0.0823619	0.7169293	0.7800345	2.5100531	2.5100531	
36:39.1	574414	6.35303E+12	5.19701E+13	5744.82	0.0231716	0.025471	0.0825108	0.7169293	0.7880727	2.5145922	2.5145922	
41:41.9	574416	6.35303E+12	5.19215E+13	5727.38	0.0231716	0.0253676	0.0823374	0.7169293	0.7848735	2.509306	2.509306	
46:44.7	574418	6.35303E+12	5.19586E+13	5734.35	0.0231716	0.02236	0.0823788	0.7169293	0.6918184	2.510567	2.510567	
51:47.4	574420	6.35303E+12	5.25895E+13	5719.9	0.0231716	0.0361412	0.0811854	0.7169293	1.1182087	2.4741988	2.4741988	
56:50.2	574421	6.35303E+12	5.25734E+13	5661.86	0.0231716	0.0233862	0.0803862	0.7169293	0.723569	2.4498404	2.4498404	
01:53.1	574421	6.35303E+12	5.25734E+13	5685.95	0.0265606	0.0218135	0.0807282	0.821785	0.6749097	2.4602639	2.4602639	
06:56.0	574423	6.35303E+12	5.29406E+13	5678.18	0.0265606	0.0217023	0.0800587	0.821785	0.6714692	2.4398604	2.4398604	
11:59.2	574424	6.35303E+12	5.28202E+13	5698.16	0.0265606	0.0217781	0.0805235	0.821785	0.6738144	2.4540273	2.4540273	
17:02.4	574424	6.35303E+12	5.28202E+13	5677.65	0.0265606	0.028073	0.0802337	0.821785	0.8685786	2.4451943	2.4451943	
22:05.3	574426	6.35303E+12	5.30049E+13	5685.84	0.0265606	0.0482239	0.0800695	0.821785	1.4920475	2.4401892	2.4401892	
27:09.9	574426	6.35303E+12	5.30049E+13	5681.85	0.0265606	0.2355911	0.0800133	0.821785	7.2891886	2.4384768	7.2891886	
32:14.0	574427	6.35303E+12	5.28466E+13	5686.85	0.0265606	0.2281308	0.0803235	0.821785	7.058367	2.4479317	7.058367	
37:18.6	574427	6.35303E+12	5.28466E+13	5693.47	0.0265606	0.0487972	0.080417	0.821785	1.5097854	2.4507813	2.4507813	
42:21.3	574428	6.35303E+12	5.2354E+13	5717.6	0.0265606	0.0277079	0.0815177	0.821785	0.8572824	2.4843261	2.4843261	
47:24.0	574428	6.35303E+12	5.2354E+13	5722.32	0.0265606	0.0280138	0.081585	0.821785	0.866747	2.4863769	2.4863769	
52:27.1	574428	6.35303E+12	5.2354E+13	5715.88	0.0265606	0.028221	0.0814932	0.821785	0.8731577	2.4835787	2.4835787	
57:29.7	574429	6.35303E+12	5.15634E+13	5701.89	0.0265606	0.023821	0.0825403	0.821785	0.7370217	2.5154886	2.5154886	
02:32.4	574429	6.35303E+12	5.15634E+13	5701.69	0.0272743	0.0223137	0.0825374	0.8438668	0.6903859	2.5154004	2.5154004	
07:35.2	574429	6.35303E+12	5.15634E+13	5712.55	0.0272743	0.0230727	0.0826946	0.8438668	0.7138693	2.5201914	2.5201914	
12:38.1	574430	6.35303E+12	5.12815E+13	5715.02	0.0272743	0.0232288	0.083185	0.8438668	0.7186991	2.5351378	2.5351378	
17:41.8	574430	6.35303E+12	5.12815E+13	5703.4	0.0272743	0.0235449	0.0830159	0.8438668	0.7284792	2.5299833	2.5299833	
22:44.7	574430	6.35303E+12	5.12815E+13	5712.82	0.0272743	0.0235528	0.083153	0.8438668	0.7287236	2.5341619	2.5341619	
27:47.6	574430	6.35303E+12	5.12815E+13	5729.59	0.0272743	0.0236272	0.0833971	0.8438668	0.7310256	2.541601	2.541601	
32:50.4	574430	6.35303E+12	5.12815E+13	5736.47	0.0272743	0.0244433	0.0834972	0.8438668	0.7562757	2.5446529	2.5446529	
37:53.2	574430	6.35303E+12	5.12815E+13	5731.9	0.0272743	0.0241428	0.0834307	0.8438668	0.7469782	2.5426257	2.5426257	
42:56.3	574430	6.35303E+12	5.12815E+13	5735.01	0.0272743	0.0245142	0.083476	0.8438668	0.7584693	2.5440052	2.5440052	
47:59.3	574430	6.35303E+12	5.12815E+13	5723.33	0.0272743	0.0472294	0.083306	0.8438668	1.4612776	2.5388241	2.5388241	
53:02.1	574432	6.35303E+12	4.99455E+13	5721.98	0.0272743	0.0283038	0.0855142	0.8438668	0.8757196	2.6061222	2.6061222	
58:05.1	574432	6.35303E+12	4.99455E+13	5706.12	0.0272743	0.047005	0.0852772	0.8438668	1.4543347	2.5988986	2.5988986	
03:08.1	574433	6.35303E+12	4.98413E+13	5717.92	0.0273348	0.0264519	0.0856321	0.8457387	0.8184218	2.6097152	2.6097152	
08:11.2	574435	6.35303E+12	4.97656E+13	5722.49	0.0273348	0.0235867	0.085831	0.8457387	0.7297725	2.6157766	2.6157766	
13:14.2	574435	6.35303E+12	4.97656E+13	5731.99	0.0273348	0.024523	0.0859735	0.8457387	0.7587416	2.6201191	2.6201191	
18:17.4	574437	6.35303E+12	4.98823E+13	5729.41	0.0273348	0.027012	0.0857336	0.8457387	0.8357513	2.61281	2.61281	
23:20.3	574438	6.35303E+12	4.9928E+13	5727.98	0.0273348	0.0259483	0.0856339	0.8457387	0.8028404	2.6097702	2.6097702	
28:23.3	574438	6.35303E+12	4.9928E+13	5745.01	0.0273348	0.0476807	0.0858885	0.8457387	1.4752409	2.6175294	2.6175294	
33:26.3	574441	6.35303E+12	5.04581E+13	5733.7	0.0273348	0.0268104	0.0848189	0.8457387	0.8295138	2.5849309	2.5849309	
38:29.1	574441	6.35303E+12	5.04581E+13	5748.11	0.0273348	0.0266035	0.085032	0.8457387	0.8231123	2.5914274	2.5914274	
43:31.9	574442	6.35303E+12	5.28842E+13	5748.47	0.0273348	0.0478517	0.0811362	0.8457387	1.4805316	2.4726991	2.4726991	
48:35.1	574442	6.35303E+12	5.28842E+13	5745.69	0.0273348	0.0342983	0.081097	0.8457387	1.0611894	2.4715033	2.4715033	
53:37.9	574442	6.35303E+12	5.28842E+13	5748.13	0.0273348	0.0264623	0.0811314	0.8457387	0.8187436	2.4725529	2.4725529	
58:40.9	574443	6.35303E+12	5.28228E+13	5739.99	0.0273348	0.0253293	0.0811107	0.8457387	0.7836885	2.4719226	2.4719226	

03:44.2	574443	6.35303E+12	5.28228E+13	5735.16	0.0298497	0.0255622	0.0810425	0.9235497	0.7908945	2.4698426	2.4698426
08:47.3	574443	6.35303E+12	5.28228E+13	5746.65	0.0298497	0.0244251	0.0812048	0.9235497	0.7557126	2.4747908	2.4747908
13:50.5	574443	6.35303E+12	5.28228E+13	5760.39	0.0298497	0.0246582	0.081399	0.9235497	0.7629247	2.4807079	2.4807079
18:53.5	574443	6.35303E+12	5.28228E+13	5759.7	0.0298497	0.0249722	0.0813893	0.9235497	0.7726399	2.4804107	2.4804107
23:57.3	574444	6.35303E+12	5.21447E+13	5763.19	0.0298497	0.0248231	0.0824975	0.9235497	0.7680267	2.5141848	2.5141848
29:00.1	574445	6.35303E+12	5.19166E+13	5756.99	0.0298497	0.0277305	0.0827709	0.9235497	0.8579817	2.5225189	2.5225189
34:03.0	574446	6.35303E+12	5.17083E+13	5752.55	0.0298497	0.0341344	0.0830402	0.9235497	1.0561183	2.5307244	2.5307244
44:08.1	574446	6.35303E+12	5.17083E+13	5759.01	0.0298497	0.026299	0.0831334	0.9235497	0.8136911	2.5335664	2.5335664
49:11.1	574447	6.35303E+12	5.14685E+13	5756.94	0.0298497	0.0264755	0.0834907	0.9235497	0.819152	2.5444543	2.5444543
54:14.3	574448	6.35303E+12	5.19511E+13	5733.43	0.0298497	0.0263969	0.0823773	0.9235497	0.8167201	2.5105227	2.5105227
59:17.3	574448	6.35303E+12	5.19511E+13	5719.45	0.0298497	0.0296594	0.0821764	0.9235497	0.9176618	2.5044012	2.5044012
04:20.5	574448	6.35303E+12	5.19511E+13	5694.51	0.0289776	0.0266675	0.0818181	0.8965669	0.8250925	2.4934806	2.4934806
09:23.7	574449	6.35303E+12	5.17328E+13	5699.65	0.0289776	0.0248567	0.0822376	0.8965669	0.7690663	2.5062642	2.5062642
14:27.2	574450	6.35303E+12	5.16724E+13	5715.01	0.0289776	0.0254265	0.0825556	0.8965669	0.7866959	2.5159564	2.5159564
19:30.0	574450	6.35303E+12	5.16724E+13	5715.01	0.0289776	0.0257899	0.0825556	0.8965669	0.7979395	2.5159564	2.5159564
24:33.5	574450	6.35303E+12	5.16724E+13	5711.26	0.0289776	0.0254494	0.0825014	0.8965669	0.7874044	2.5143055	2.5143055
29:36.5	574450	6.35303E+12	5.16724E+13	5720.49	0.0289776	0.0255463	0.0826348	0.8965669	0.7904025	2.5183689	2.5183689
34:39.6	574450	6.35303E+12	5.16724E+13	5725.31	0.0289776	0.0252955	0.0827044	0.8965669	0.7826428	2.5204908	2.5204908
39:42.4	574452	6.35303E+12	5.09821E+13	5725.01	0.0289776	0.0258846	0.0838198	0.8965669	0.8008695	2.5544843	2.5544843
44:46.8	574454	6.35303E+12	5.11925E+13	5714.05	0.0289776	0.0259942	0.0833155	0.8965669	0.8042605	2.5391139	2.5391139
49:49.8	574454	6.35303E+12	5.11925E+13	5706.05	0.0289776	0.0248507	0.0831988	0.8965669	0.7688807	2.535559	2.535559
54:52.5	574454	6.35303E+12	5.11925E+13	5709.99	0.0289776	0.0240952	0.0832563	0.8965669	0.7455055	2.5373098	2.5373098
59:55.4	574454	6.35303E+12	5.11925E+13	5714.98	0.0289776	0.0237491	0.083329	0.8965669	0.7347972	2.5395272	2.5395272
04:58.3	574454	6.35303E+12	5.11925E+13	5715.01	0.0314491	0.0249024	0.0833295	0.9730352	0.7704803	2.5395405	2.5395405
10:01.4	574454	6.35303E+12	5.11925E+13	5705.02	0.0314491	0.0238843	0.0831838	0.9730352	0.7389802	2.5351013	2.5351013

datetime	block_height	network_diff	est_network_hashrate	BTC_price	day_ahead_LMP	real_time_LMP	breakeven_mining_cost	day_ahead_LMP_rev	real_time_LMP_rev	mining_rev	realized_rev
20:03.1	574204	6.35303E+12	5.38327E+13	5320.02	0.0062116	0.0053108	0.0737658	0.1921869	0.1643162	2.2480786	2.2480786
25:07.0	574204	6.35303E+12	5.38327E+13	5320.01	0.0062116	0.0063954	0.0737656	0.1921869	0.1978737	2.2480744	2.2480744
30:10.6	574204	6.35303E+12	5.38327E+13	5319.98	0.0062116	0.0064769	0.0737652	0.1921869	0.2003953	2.2480617	2.2480617
35:13.6	574205	6.35303E+12	5.30839E+13	5325.25	0.0062116	0.0050178	0.0748799	0.1921869	0.1552507	2.2820313	2.2820313
40:16.4	574205	6.35303E+12	5.30839E+13	5321.94	0.0062116	0.0038182	0.0748333	0.1921869	0.1181351	2.2806129	2.2806129
45:19.2	574206	6.35303E+12	5.44532E+13	5326.51	0.0062116	0.0054266	0.0730143	0.1921869	0.167899	2.2251767	2.2251767
50:22.3	574206	6.35303E+12	5.44532E+13	5326.54	0.0062116	0.0076717	0.0730147	0.1921869	0.2373624	2.2251893	2.2251893
55:26.0	574207	6.35303E+12	5.39845E+13	5328.24	0.0062116	0.0011776	0.0736721	0.1921869	0.0364349	2.2452223	2.2452223
00:29.0	574207	6.35303E+12	5.39845E+13	5325.77	0.0011643	0.0027475	0.0736379	0.0360234	0.0850077	2.2441815	2.2441815
05:31.8	574208	6.35303E+12	5.34662E+13	5325.77	0.0011643	-0.0033173	0.0743518	0.0360234	-0.1026373	2.2659373	2.2659373
10:34.6	574208	6.35303E+12	5.34662E+13	5325.01	0.0011643	-0.008352	0.0743412	0.0360234	-0.2584109	2.2656139	2.2656139
15:37.4	574209	6.35303E+12	5.33477E+13	5321.01	0.0011643	0.0010002	0.0744503	0.0360234	0.0309462	2.2689395	2.2689395
20:40.3	574209	6.35303E+12	5.33477E+13	5321.01	0.0011643	0.001291	0.0744503	0.0360234	0.0399435	2.2689395	2.2689395
25:43.5	574210	6.35303E+12	5.36221E+13	5326.26	0.0011643	-0.0191129	0.0741425	0.0360234	-0.5913531	2.2595592	2.2595592
30:46.5	574212	6.35303E+12	5.54528E+13	5327.73	0.0011643	-0.0318014	0.0717145	0.0360234	-0.9839353	2.1855639	2.1855639
35:49.4	574213	6.35303E+12	5.51131E+13	5321.02	0.0011643	-0.0309552	0.0720657	0.0360234	-0.9577539	2.1962672	2.1962672
40:52.8	574215	6.35303E+12	5.58834E+13	5323.1	0.0011643	-0.0303368	0.0711001	0.0360234	-0.9386206	2.1668382	2.1668382
45:56.2	574215	6.35303E+12	5.58834E+13	5323.1	0.0011643	-0.0268603	0.0711001	0.0360234	-0.8310577	2.1668382	2.1668382
50:59.1	574215	6.35303E+12	5.58834E+13	5326.69	0.0011643	-0.0314096	0.071148	0.0360234	-0.971813	2.1682995	2.1682995
56:02.0	574215	6.35303E+12	5.58834E+13	5326.69	0.0011643	-0.0323434	0.071148	0.0360234	-1.0007048	2.1682995	2.1682995
01:05.0	574216	6.35303E+12	5.54406E+13	5328.81	0.0005329	-0.0313858	0.0717448	0.0164879	-0.9710767	2.1864882	2.1864882
06:08.0	574216	6.35303E+12	5.54406E+13	5330.34	0.0005329	-0.0029529	0.0717654	0.0164879	-0.0913627	2.187116	2.187116
11:11.1	574219	6.35303E+12	5.59245E+13	5326.73	0.0005329	-0.0191457	0.0710963	0.0164879	-0.592368	2.1667245	2.1667245
16:14.0	574220	6.35303E+12	5.59914E+13	5332.99	0.0005329	-0.017496	0.0710948	0.0164879	-0.5413262	2.1666774	2.1666774
21:16.9	574220	6.35303E+12	5.59914E+13	5343.69	0.0005329	-0.0277353	0.0712374	0.0164879	-0.8581302	2.1710246	2.1710246
26:20.3	574225	6.35303E+12	5.59876E+13	5336.9	0.0005329	-0.0303035	0.0711518	0.0164879	-0.9375903	2.1684142	2.1684142
31:23.1	574226	6.35303E+12	5.60441E+13	5333.74	0.0005329	-0.0262667	0.0710379	0.0164879	-0.8126917	2.1649441	2.1649441
36:26.0	574227	6.35303E+12	5.56725E+13	5331.57	0.0005329	-0.0192771	0.071483	0.0164879	-0.5964335	2.1785089	2.1785089
41:28.9	574227	6.35303E+12	5.56725E+13	5332.07	0.0005329	-0.0198472	0.0714897	0.0164879	-0.6140724	2.1787132	2.1787132
46:31.8	574227	6.35303E+12	5.56725E+13	5343.43	0.0005329	-0.0195084	0.071642	0.0164879	-0.6035899	2.1833549	2.1833549
51:34.6	574228	6.35303E+12	5.52451E+13	5343.99	0.0005329	-0.0293344	0.0722038	0.0164879	-0.9076063	2.2004762	2.2004762
56:37.6	574229	6.35303E+12	5.5892E+13	5328.81	0.0005329	-0.0236519	0.0711654	0.0164879	-0.7317898	2.1688293	2.1688293
01:40.7	574229	6.35303E+12	5.5892E+13	5339.09	0.0004335	-0.0187133	0.0713027	0.0134125	-0.5789895	2.1730133	2.1730133
06:43.9	574229	6.35303E+12	5.5892E+13	5341.16	0.0004335	-0.0309148	0.0713303	0.0134125	-0.9565039	2.1738558	2.1738558
11:46.8	574230	6.35303E+12	5.53347E+13	5346.19	0.0004335	-0.0303946	0.0721165	0.0134125	-0.9404089	2.1978165	2.1978165
16:50.5	574230	6.35303E+12	5.53347E+13	5351.52	0.0004335	-0.0303078	0.0721884	0.0134125	-0.9377233	2.2000077	2.2000077
21:53.4	574231	6.35303E+12	5.49411E+13	5346.91	0.0004335	-0.0281596	0.0726431	0.0134125	-0.871258	2.2138627	2.2138627
26:56.3	574231	6.35303E+12	5.49411E+13	5345.36	0.0004335	-0.0283143	0.072622	0.0134125	-0.8760444	2.2132209	2.2132209
31:59.3	574231	6.35303E+12	5.49411E+13	5345.35	0.0004335	-0.0270691	0.0726219	0.0134125	-0.837518	2.2132168	2.2132168
37:02.5	574232	6.35303E+12	5.47061E+13	5343.98	0.0004335	-0.0275323	0.0729151	0.0134125	-0.8518494	2.2221538	2.2221538
42:05.7	574232	6.35303E+12	5.47061E+13	5350.73	0.0004335	-0.0275121	0.0730072	0.0134125	-0.8512244	2.2249606	2.2249606
47:08.6	574232	6.35303E+12	5.47061E+13	5364.94	0.0004335	-0.0290109	0.0732011	0.0134125	-0.8975972	2.2308695	2.2308695
52:11.5	574232	6.35303E+12	5.47061E+13	5358.68	0.0004335	-0.0282604	0.0731157	0.0134125	-0.8743768	2.2282664	2.2282664
57:14.5	574232	6.35303E+12	5.47061E+13	5363.38	0.0004335	-0.0265346	0.0731798	0.0134125	-0.8209805	2.2302208	2.2302208
02:17.5	574233	6.35303E+12	5.35475E+13	5374.99	0.0030406	-0.02651	0.074925	0.0940762	-0.8202194	2.283406	2.283406
07:20.4	574233	6.35303E+12	5.35475E+13	5371.65	0.0030406	-0.0027186	0.0748784	0.0940762	-0.0841135	2.2819871	2.2819871

12:23.4	574233	6.35303E+12	5.35475E+13	5364.6	0.0030406	-0.0006889	0.0747801	0.0940762	-0.0213146	2.2789921	2.2789921	
17:26.7	574233	6.35303E+12	5.35475E+13	5366.68	0.0030406	-0.0182862	0.0748091	0.0940762	-0.565775	2.2798757	2.2798757	
22:29.5	574234	6.35303E+12	5.31615E+13	5358.76	0.0030406	-0.0018507	0.0752411	0.0940762	-0.0572607	2.2930408	2.2930408	
27:32.4	574234	6.35303E+12	5.31615E+13	5358.18	0.0030406	-0.0146632	0.075233	0.0940762	-0.4536794	2.2927926	2.2927926	
32:35.2	574234	6.35303E+12	5.31615E+13	5349.69	0.0030406	-0.0031882	0.0751138	0.0940762	-0.0986429	2.2891597	2.2891597	
37:38.0	574235	6.35303E+12	5.26774E+13	5347.97	0.0030406	-0.0160738	0.0757796	0.0940762	-0.4973234	2.3094528	2.3094528	
42:41.4	574236	6.35303E+12	5.29706E+13	5347.88	0.0030406	-0.0316489	0.075359	0.0940762	-0.979217	2.2966332	2.2966332	
47:44.2	574237	6.35303E+12	5.26741E+13	5352.24	0.0030406	-0.0302898	0.075845	0.0940762	-0.9371664	2.3114455	2.3114455	
52:47.1	574238	6.35303E+12	5.2719E+13	5350.15	0.0030406	-0.0052788	0.0757508	0.0940762	-0.1633261	2.308573	2.308573	
57:50.1	574238	6.35303E+12	5.2719E+13	5357.76	0.0030406	-0.0014966	0.0758585	0.0940762	-0.0463048	2.3118566	2.3118566	
02:52.9	574239	6.35303E+12	5.28168E+13	5351.07	0.0126546	-0.0319016	0.0756235	0.3915333	-0.9870355	2.3046947	2.3046947	
07:55.6	574240	6.35303E+12	5.25658E+13	5350.11	0.0126546	-0.0306567	0.075971	0.3915333	-0.9485183	2.3152833	2.3152833	
12:58.4	574243	6.35303E+12	5.35108E+13	5352.35	0.0126546	0.0001377	0.0746606	0.3915333	0.0042604	2.2753498	2.2753498	
18:01.2	574243	6.35303E+12	5.35108E+13	5353.74	0.0126546	0.0004942	0.07468	0.3915333	0.0152905	2.2759407	2.2759407	
23:04.0	574245	6.35303E+12	5.38531E+13	5358.7	0.0126546	0.0010492	0.074274	0.3915333	0.0324622	2.2635674	2.2635674	
28:07.3	574246	6.35303E+12	5.41667E+13	5358.74	0.0126546	-0.0032429	0.0738446	0.3915333	-0.1003353	2.2504797	2.2504797	
33:10.6	574246	6.35303E+12	5.41667E+13	5361.99	0.0126546	-0.0011916	0.0738894	0.3915333	-0.0368681	2.2518446	2.2518446	
38:13.3	574246	6.35303E+12	5.41667E+13	5364.93	0.0126546	0.0049583	0.0739299	0.3915333	0.1534098	2.2530793	2.2530793	
43:16.3	574247	6.35303E+12	5.37144E+13	5365.93	0.0126546	-0.015444	0.0745663	0.3915333	-0.4778374	2.2724742	2.2724742	
48:19.5	574249	6.35303E+12	5.43573E+13	5360.33	0.0126546	-0.0011564	0.0736074	0.3915333	-0.035779	2.2432526	2.2432526	
53:23.3	574251	6.35303E+12	5.52479E+13	5359.19	0.0126546	0.0020084	0.0724055	0.3915333	0.0621399	2.2066234	2.2066234	
58:26.4	574252	6.35303E+12	5.50584E+13	5358.28	0.0126546	0.0019878	0.0726424	0.3915333	0.0615025	2.2138427	2.2138427	
03:29.4	574252	6.35303E+12	5.50584E+13	5362.38	0.017578	0.0053492	0.072698	0.5438633	0.1655042	2.2155367	2.2155367	
08:33.3	574253	6.35303E+12	5.55506E+13	5362.51	0.017578	0.1607356	0.0720555	0.5438633	4.9731595	2.195957	4.9731595	
13:36.3	574254	6.35303E+12	5.55733E+13	5360.24	0.017578	0.0139422	0.0719957	0.5438633	0.4313717	2.1941337	2.1941337	
18:39.2	574255	6.35303E+12	5.5978E+13	5358.19	0.017578	0.0102406	0.0714478	0.5438633	0.3168442	2.1774367	2.1774367	
23:42.2	574257	6.35303E+12	5.59531E+13	5367.35	0.017578	0.0108684	0.0716018	0.5438633	0.3362683	2.1821286	2.1821286	
28:45.1	574257	6.35303E+12	5.59531E+13	5368.93	0.017578	0.0086102	0.0716229	0.5438633	0.2663996	2.182771	2.182771	
33:48.1	574257	6.35303E+12	5.59531E+13	5368.01	0.017578	0.0070868	0.0716106	0.5438633	0.2192656	2.182397	2.182397	
38:50.8	574258	6.35303E+12	5.61961E+13	5368.01	0.017578	0.0070146	0.071301	0.5438633	0.2170317	2.1729618	2.1729618	
43:53.8	574258	6.35303E+12	5.61961E+13	5363.48	0.017578	0.0081289	0.0712408	0.5438633	0.2515082	2.1711281	2.1711281	
48:56.8	574258	6.35303E+12	5.61961E+13	5363.48	0.017578	0.0078774	0.0712408	0.5438633	0.2437268	2.1711281	2.1711281	
54:03.4	574258	6.35303E+12	5.61961E+13	5369.24	0.017578	0.0081243	0.0713173	0.5438633	0.2513658	2.1734597	2.1734597	
59:06.3	574258	6.35303E+12	5.61961E+13	5368.9	0.017578	0.0096472	0.0713128	0.5438633	0.2984844	2.1733221	2.1733221	
04:09.1	574258	6.35303E+12	5.61961E+13	5360.85	0.0179993	0.0101763	0.0712059	0.5568983	0.3148547	2.1700634	2.1700634	
09:12.1	574258	6.35303E+12	5.61961E+13	5360.96	0.0179993	0.0142381	0.0712073	0.5568983	0.4405268	2.170108	2.170108	
14:15.0	574260	6.35303E+12	5.46276E+13	5364.69	0.0179993	0.0117745	0.0733029	0.5568983	0.364303	2.2339708	2.2339708	
19:18.4	574260	6.35303E+12	5.46276E+13	5368.72	0.0179993	0.0091782	0.0733579	0.5568983	0.2839735	2.2356489	2.2356489	
24:21.3	574260	6.35303E+12	5.46276E+13	5366.48	0.0179993	0.008879	0.0733273	0.5568983	0.2747163	2.2347162	2.2347162	
29:24.2	574260	6.35303E+12	5.46276E+13	5367.76	0.0179993	0.0077838	0.0733448	0.5568983	0.2408308	2.2352492	2.2352492	
34:27.1	574261	6.35303E+12	5.36607E+13	5366.92	0.0179993	0.0086752	0.0746547	0.5568983	0.2684107	2.2751678	2.2751678	
39:30.1	574261	6.35303E+12	5.36607E+13	5366.01	0.0179993	0.0080915	0.074642	0.5568983	0.250351	2.2747821	2.2747821	
44:33.0	574261	6.35303E+12	5.36607E+13	5364.41	0.0179993	0.0090579	0.0746197	0.5568983	0.2802514	2.2741038	2.2741038	
49:35.8	574261	6.35303E+12	5.36607E+13	5364.3	0.0179993	0.0089835	0.0746182	0.5568983	0.2779495	2.2740572	2.2740572	
54:38.7	574261	6.35303E+12	5.36607E+13	5377.85	0.0179993	0.0111079	0.0748067	0.5568983	0.3436784	2.2798013	2.2798013	
59:41.4	574264	6.35303E+12	5.43564E+13	5373.51	0.0179993	0.0091005	0.0737896	0.5568983	0.2815695	2.2488057	2.2488057	
04:44.3	574267	6.35303E+12	5.54387E+13	5366.58	0.0197454	0.0086523	0.0722558	0.6109227	0.2677022	2.2020604	2.2020604	

09:47.0	574268	6.35303E+12	5.60115E+13	5357.31	0.0197454	0.008352	0.0713933	0.6109227	0.2584109	2.1757765	2.1757765	
14:50.2	574269	6.35303E+12	5.58958E+13	5342.94	0.0197454	0.0091438	0.0713492	0.6109227	0.2829092	2.1744317	2.1744317	
19:53.4	574270	6.35303E+12	5.6144E+13	5354.22	0.0197454	0.0085778	0.0711837	0.6109227	0.2653971	2.1693883	2.1693883	
24:56.4	574271	6.35303E+12	5.6095E+13	5356.83	0.0197454	0.0083666	0.0712807	0.6109227	0.2588626	2.1723438	2.1723438	
29:59.3	574271	6.35303E+12	5.6095E+13	5351.83	0.0197454	0.0082673	0.0712142	0.6109227	0.2557903	2.1703161	2.1703161	
35:02.8	574272	6.35303E+12	5.54087E+13	5355.01	0.0197454	0.0084139	0.0721391	0.6109227	0.2603261	2.1985034	2.1985034	
40:06.4	574273	6.35303E+12	5.53104E+13	5355.83	0.0197454	0.0088342	0.0722783	0.6109227	0.2733301	2.2027469	2.2027469	
45:09.3	574274	6.35303E+12	5.53441E+13	5354.54	0.0197454	0.0108837	0.072217	0.6109227	0.3367417	2.2008772	2.2008772	
50:12.2	574274	6.35303E+12	5.53441E+13	5352.64	0.0197454	0.0122486	0.0721913	0.6109227	0.3789717	2.2000962	2.2000962	
55:15.6	574274	6.35303E+12	5.53441E+13	5355.99	0.0197454	0.0149968	0.0722365	0.6109227	0.464001	2.2014732	2.2014732	
00:19.1	574274	6.35303E+12	5.53441E+13	5375.12	0.0222325	0.0101231	0.0724945	0.6878735	0.3132087	2.2093362	2.2093362	
05:21.9	574274	6.35303E+12	5.53441E+13	5371.63	0.0222325	0.0092988	0.0724475	0.6878735	0.2877049	2.2079017	2.2079017	
10:25.1	574274	6.35303E+12	5.53441E+13	5367.35	0.0222325	0.0159435	0.0723897	0.6878735	0.4932919	2.2061425	2.2061425	
15:27.9	574274	6.35303E+12	5.53441E+13	5362.88	0.0222325	0.0163429	0.0723295	0.6878735	0.5056493	2.2043052	2.2043052	
20:30.7	574275	6.35303E+12	5.36343E+13	5367	0.0222325	0.0162985	0.0746925	0.6878735	0.5042756	2.2763203	2.2763203	
25:33.4	574275	6.35303E+12	5.36343E+13	5371.56	0.0222325	0.0160846	0.0747559	0.6878735	0.4976575	2.2782544	2.2782544	
30:36.1	574276	6.35303E+12	5.309E+13	5370.52	0.0222325	0.0202582	0.0755079	0.6878735	0.6267887	2.3011697	2.3011697	
35:39.0	574278	6.35303E+12	5.49235E+13	5373.23	0.0222325	0.0194913	0.0730239	0.6878735	0.6030608	2.2254696	2.2254696	
40:41.9	574281	6.35303E+12	5.67946E+13	5385.74	0.0222325	0.0175595	0.0707827	0.6878735	0.5432909	2.1571652	2.1571652	
45:45.1	574281	6.35303E+12	5.67946E+13	5380.67	0.0222325	0.0174214	0.070716	0.6878735	0.5390181	2.1551345	2.1551345	
50:48.4	574281	6.35303E+12	5.67946E+13	5377.85	0.0222325	0.0137409	0.070679	0.6878735	0.4251434	2.154005	2.154005	
55:51.4	574282	6.35303E+12	5.6096E+13	5376.85	0.0222325	0.0182958	0.0715459	0.6878735	0.5660721	2.1804251	2.1804251	
00:54.6	574282	6.35303E+12	5.6096E+13	5379.99	0.0242054	0.0181581	0.0715877	0.7489151	0.5618116	2.1816984	2.1816984	
05:57.8	574283	6.35303E+12	5.56063E+13	5400.03	0.0242054	0.0202376	0.0724871	0.7489151	0.6261513	2.2091081	2.2091081	
11:00.8	574283	6.35303E+12	5.56063E+13	5401.02	0.0242054	0.0201139	0.0725003	0.7489151	0.6223241	2.2095131	2.2095131	
16:04.4	574283	6.35303E+12	5.56063E+13	5410.51	0.0242054	0.0214443	0.0726277	0.7489151	0.6634866	2.2133954	2.2133954	
21:08.0	574284	6.35303E+12	5.64188E+13	5401.01	0.0242054	0.0210331	0.0714561	0.7489151	0.6507641	2.17769	2.17769	
26:11.4	574284	6.35303E+12	5.64188E+13	5401.31	0.0242054	0.0205184	0.0714601	0.7489151	0.6348393	2.1778109	2.1778109	
31:14.5	574285	6.35303E+12	5.57835E+13	5409.35	0.0242054	0.0209267	0.0723816	0.7489151	0.6474721	2.2058933	2.2058933	
36:17.4	574285	6.35303E+12	5.57835E+13	5396.6	0.0242054	0.0200056	0.072211	0.7489151	0.6189733	2.2006939	2.2006939	
41:20.3	574285	6.35303E+12	5.57835E+13	5405.56	0.0242054	0.0208363	0.0723309	0.7489151	0.6446751	2.2043478	2.2043478	
46:23.1	574285	6.35303E+12	5.57835E+13	5401.1	0.0242054	0.020561	0.0722712	0.7489151	0.6361573	2.202529	2.202529	
51:26.0	574285	6.35303E+12	5.57835E+13	5400.14	0.0242054	0.0208137	0.0722583	0.7489151	0.6439759	2.2021375	2.2021375	
56:29.0	574285	6.35303E+12	5.57835E+13	5401.59	0.0242054	0.020787	0.0722777	0.7489151	0.6431498	2.2027288	2.2027288	
01:32.2	574285	6.35303E+12	5.57835E+13	5405.56	0.0252561	0.020855	0.0723309	0.7814237	0.6452537	2.2043478	2.2043478	
06:35.5	574285	6.35303E+12	5.57835E+13	5409.65	0.0252561	0.0210312	0.0723856	0.7814237	0.6507053	2.2060156	2.2060156	
11:38.4	574286	6.35303E+12	5.36818E+13	5410.84	0.0252561	0.0209883	0.075236	0.7814237	0.649378	2.2928844	2.2928844	
16:41.6	574287	6.35303E+12	5.50908E+13	5403.01	0.0252561	0.0209925	0.0732057	0.7814237	0.649508	2.2310097	2.2310097	
21:44.7	574288	6.35303E+12	5.6446E+13	5380.86	0.0252561	0.0210373	0.0711552	0.7814237	0.6508941	2.1685188	2.1685188	
26:47.7	574288	6.35303E+12	5.6446E+13	5384.99	0.0252561	0.0210425	0.0712098	0.7814237	0.651055	2.1701832	2.1701832	
31:50.7	574289	6.35303E+12	5.61643E+13	5388.52	0.0252561	0.022109	0.071614	0.7814237	0.6840525	2.1824996	2.1824996	
36:53.9	574289	6.35303E+12	5.61643E+13	5385.01	0.0252561	0.0221868	0.0715673	0.7814237	0.6864596	2.1810779	2.1810779	
41:57.0	574289	6.35303E+12	5.61643E+13	5382.53	0.0252561	0.0216043	0.0715343	0.7814237	0.668437	2.1800735	2.1800735	
47:00.1	574289	6.35303E+12	5.61643E+13	5379.16	0.0252561	0.0221915	0.0714896	0.7814237	0.686605	2.1787085	2.1787085	
52:03.4	574292	6.35303E+12	5.59818E+13	5379.99	0.0252561	0.0222715	0.0717336	0.7814237	0.6890802	2.1861462	2.1861462	
57:06.3	574293	6.35303E+12	5.63654E+13	5381.68	0.0252561	0.0222386	0.0712679	0.7814237	0.6880623	2.1719525	2.1719525	
02:09.5	574294	6.35303E+12	5.66874E+13	5378.04	0.0264225	0.0216911	0.0708151	0.8175122	0.6711226	2.1581537	2.1581537	

07:12.4	574295	6.35303E+12	5.71185E+13	5388.44	0.0264225	0.0218905	0.0704165	0.8175122	0.6772921	2.1460054	2.1460054
12:15.4	574296	6.35303E+12	5.69506E+13	5391.26	0.0264225	0.0220556	0.070661	0.8175122	0.6824003	2.1534583	2.1534583
17:18.3	574298	6.35303E+12	5.77593E+13	5388.44	0.0264225	0.0244837	0.0696352	0.8175122	0.7575257	2.1221966	2.1221966
22:21.3	574298	6.35303E+12	5.77593E+13	5392.01	0.0264225	0.0226768	0.0696814	0.8175122	0.7016202	2.1236027	2.1236027
27:24.6	574298	6.35303E+12	5.77593E+13	5397.27	0.0264225	0.0261908	0.0697494	0.8175122	0.8103434	2.1256743	2.1256743
32:27.7	574300	6.35303E+12	5.74492E+13	5392.2	0.0264225	0.0269438	0.07006	0.8175122	0.8336412	2.1351406	2.1351406
37:31.8	574301	6.35303E+12	5.7613E+13	5391.27	0.0264225	0.0860346	0.0698488	0.8175122	2.6619105	2.1287047	2.6619105
42:35.9	574301	6.35303E+12	5.7613E+13	5391.55	0.0264225	0.2246863	0.0698524	0.8175122	6.9517941	2.1288153	6.9517941
47:40.3	574302	6.35303E+12	5.77583E+13	5397.52	0.0264225	0.1597185	0.0697538	0.8175122	4.9416904	2.1258102	4.9416904
52:44.3	574302	6.35303E+12	5.77583E+13	5396.44	0.0264225	0.1817049	0.0697399	0.8175122	5.6219496	2.1253849	5.6219496
57:48.1	574305	6.35303E+12	5.8471E+13	5390.94	0.0264225	0.1794976	0.0688196	0.8175122	5.5536557	2.097339	5.5536557
02:52.0	574305	6.35303E+12	5.8471E+13	5391.58	0.0287826	0.2238323	0.0688278	0.8905336	6.9253714	2.097588	6.9253714
07:55.1	574305	6.35303E+12	5.8471E+13	5393.02	0.0287826	0.0385992	0.0688461	0.8905336	1.1942592	2.0981483	2.0981483
12:58.1	574306	6.35303E+12	5.85526E+13	5393.03	0.0287826	0.0287708	0.0687504	0.8905336	0.8901686	2.0952297	2.0952297
18:01.0	574309	6.35303E+12	6.00748E+13	5395.99	0.0287826	0.0257429	0.0670451	0.8905336	0.7964853	2.0432598	2.0432598
23:03.8	574309	6.35303E+12	6.00748E+13	5395.98	0.0287826	0.02657	0.067045	0.8905336	0.8220758	2.043256	2.043256
28:06.6	574310	6.35303E+12	6.02983E+13	5397.49	0.0287826	0.0264104	0.0668152	0.8905336	0.8171378	2.0362532	2.0362532
33:09.8	574311	6.35303E+12	6.01255E+13	5398.95	0.0287826	0.0307645	0.0670253	0.8905336	0.9518536	2.0426553	2.0426553
38:13.1	574312	6.35303E+12	5.99055E+13	5397.51	0.0287826	0.0307598	0.0672535	0.8905336	0.9517082	2.0496101	2.0496101
43:15.9	574312	6.35303E+12	5.99055E+13	5396.26	0.0287826	0.0308105	0.0672379	0.8905336	0.9532769	2.0491354	2.0491354
48:18.6	574314	6.35303E+12	5.98595E+13	5395.6	0.0287826	0.0265074	0.0672813	0.8905336	0.820139	2.0504592	2.0504592
53:21.7	574315	6.35303E+12	5.97623E+13	5391.83	0.0287826	0.029322	0.0673437	0.8905336	0.9072227	2.0523603	2.0523603
58:24.3	574315	6.35303E+12	5.97623E+13	5389.24	0.0287826	0.0267833	0.0673114	0.8905336	0.8286753	2.0513744	2.0513744
03:28.3	574317	6.35303E+12	6.04051E+13	5387.74	0.0305043	0.2178286	0.0665766	0.943803	6.7396169	2.0289816	6.7396169
08:31.2	574317	6.35303E+12	6.04051E+13	5389.07	0.0305043	0.0280361	0.066593	0.943803	0.8674369	2.0294825	2.0294825
13:35.6	574320	6.35303E+12	6.21737E+13	5394.18	0.0305043	0.231619	0.06476	0.943803	7.1662919	1.9736205	7.1662919
18:38.5	574320	6.35303E+12	6.21737E+13	5398.38	0.0305043	0.0502744	0.0648105	0.943803	1.5554899	1.9751572	1.9751572
23:41.4	574320	6.35303E+12	6.21737E+13	5403.1	0.0305043	0.0382162	0.0648671	0.943803	1.1824092	1.9768841	1.9768841
28:44.2	574320	6.35303E+12	6.21737E+13	5406.31	0.0305043	0.0313252	0.0649057	0.943803	0.9692017	1.9780586	1.9780586
33:47.2	574321	6.35303E+12	6.17749E+13	5402.68	0.0305043	0.0288967	0.0652808	0.943803	0.8940639	1.989492	1.989492
38:49.7	574321	6.35303E+12	6.17749E+13	5407.64	0.0305043	0.0287713	0.0653408	0.943803	0.890184	1.9913185	1.9913185
43:52.5	574321	6.35303E+12	6.17749E+13	5407.6	0.0305043	0.0282878	0.0653403	0.943803	0.8752245	1.9913038	1.9913038
48:55.3	574321	6.35303E+12	6.17749E+13	5409.48	0.0305043	0.0284715	0.065363	0.943803	0.8809082	1.9919961	1.9919961
53:58.0	574321	6.35303E+12	6.17749E+13	5414.01	0.0305043	0.0284908	0.0654177	0.943803	0.8815054	1.9936642	1.9936642
59:00.7	574321	6.35303E+12	6.17749E+13	5398.73	0.0305043	0.0273469	0.0652331	0.943803	0.8461131	1.9880375	1.9880375
04:04.0	574321	6.35303E+12	6.17749E+13	5392.99	0.0297972	0.0273754	0.0651637	0.9219254	0.8469949	1.9859238	1.9859238
09:06.9	574321	6.35303E+12	6.17749E+13	5391.48	0.0297972	0.0274988	0.0651455	0.9219254	0.8508129	1.9853677	1.9853677
14:10.1	574321	6.35303E+12	6.17749E+13	5395.84	0.0297972	0.0272488	0.0651982	0.9219254	0.8430779	1.9869732	1.9869732
19:13.1	574321	6.35303E+12	6.17749E+13	5394.88	0.0297972	0.0273184	0.0651866	0.9219254	0.8452313	1.9866197	1.9866197
24:16.0	574321	6.35303E+12	6.17749E+13	5394.01	0.0297972	0.0274422	0.0651761	0.9219254	0.8490617	1.9862994	1.9862994
29:18.8	574321	6.35303E+12	6.17749E+13	5393.45	0.0297972	0.0273455	0.0651693	0.9219254	0.8460698	1.9860931	1.9860931
34:22.0	574322	6.35303E+12	5.8824E+13	5392.88	0.0297972	0.0272903	0.0684313	0.9219254	0.8443619	2.0855052	2.0855052
39:25.3	574322	6.35303E+12	5.8824E+13	5394.38	0.0297972	0.0265887	0.0684503	0.9219254	0.8226544	2.0860853	2.0860853
44:28.3	574323	6.35303E+12	5.85421E+13	5392.66	0.0297972	0.027943	0.068758	0.9219254	0.8645564	2.0954606	2.0954606
49:31.3	574323	6.35303E+12	5.85421E+13	5399.52	0.0297972	0.0271998	0.0688454	0.9219254	0.8415618	2.0981263	2.0981263
54:34.1	574324	6.35303E+12	5.81584E+13	5403.19	0.0297972	0.0281051	0.0693467	0.9219254	0.8695718	2.1134037	2.1134037
59:37.0	574326	6.35303E+12	5.98016E+13	5404.52	0.0297972	0.0309303	0.0674579	0.9219254	0.9569835	2.055839	2.055839

04:39.8	574326	6.35303E+12	5.98016E+13	5400.73	0.0307976	0.0366302	0.0674106	0.9528777	1.1333384	2.0543973	2.0543973
14:45.4	574327	6.35303E+12	5.96067E+13	5402.51	0.0307976	0.0281076	0.0676532	0.9528777	0.8696491	2.0617928	2.0617928
19:48.1	574328	6.35303E+12	5.96752E+13	5405.01	0.0307976	0.0263111	0.0676069	0.9528777	0.8140654	2.0603812	2.0603812
24:52.0	574328	6.35303E+12	5.96752E+13	5405.56	0.0307976	0.0278043	0.0676138	0.9528777	0.860265	2.0605909	2.0605909
29:55.2	574328	6.35303E+12	5.96752E+13	5413.98	0.0307976	0.0275948	0.0677191	0.9528777	0.8537831	2.0638005	2.0638005
34:58.7	574329	6.35303E+12	5.94855E+13	5414.16	0.0307976	0.0277464	0.0679373	0.9528777	0.8584736	2.0704516	2.0704516
40:01.7	574330	6.35303E+12	5.97035E+13	5414.01	0.0307976	0.0277264	0.0676874	0.9528777	0.8578548	2.0628341	2.0628341
50:08.1	574333	6.35303E+12	5.9734E+13	5408.31	0.0307976	0.0275529	0.0675816	0.9528777	0.8524867	2.0596102	2.0596102
55:11.1	574333	6.35303E+12	5.9734E+13	5400.01	0.0307976	0.0275835	0.0674779	0.9528777	0.8534335	2.0564494	2.0564494
00:14.4	574334	6.35303E+12	5.92562E+13	5403.11	0.0296508	0.0278574	0.068061	0.9173958	0.861908	2.0742213	2.0742213
05:17.4	574335	6.35303E+12	5.9018E+13	5400.72	0.0296508	0.0288549	0.0683055	0.9173958	0.8927706	2.0816708	2.0816708
10:20.4	574337	6.35303E+12	6.04407E+13	5401.43	0.0296508	0.0276696	0.0667064	0.9173958	0.8560974	2.0329364	2.0329364
15:23.6	574337	6.35303E+12	6.04407E+13	5403.84	0.0296508	0.0274339	0.0667361	0.9173958	0.8488049	2.0338434	2.0338434
20:26.4	574340	6.35303E+12	6.01388E+13	5404.02	0.0296508	0.0269979	0.0670734	0.9173958	0.835315	2.044123	2.044123
25:29.5	574342	6.35303E+12	6.0482E+13	5407.99	0.0296508	0.0274831	0.0667418	0.9173958	0.8503271	2.0340152	2.0340152
30:32.3	574342	6.35303E+12	6.0482E+13	5405.55	0.0296508	0.0264784	0.0667116	0.9173958	0.8192417	2.0330975	2.0330975
35:35.1	574343	6.35303E+12	5.99395E+13	5400.01	0.0296508	0.0271096	0.0672465	0.9173958	0.838771	2.0493965	2.0493965
40:37.9	574343	6.35303E+12	5.99395E+13	5399.02	0.0296508	0.0269728	0.0672341	0.9173958	0.8345384	2.0490207	2.0490207
50:43.2	574344	6.35303E+12	5.95861E+13	5394.85	0.0296508	0.0269754	0.0675807	0.9173958	0.8346189	2.0595816	2.0595816
55:45.9	574344	6.35303E+12	5.95861E+13	5398.35	0.0296508	0.027175	0.0676245	0.9173958	0.8407945	2.0609177	2.0609177
00:50.4	574345	6.35303E+12	5.83668E+13	5398.44	0.0287107	0.2314886	0.0690384	0.8883091	7.1622573	2.1040074	7.1622573
05:53.3	574346	6.35303E+12	5.84022E+13	5394.51	0.0287107	0.0273792	0.0689463	0.8883091	0.8471124	2.1012014	2.1012014
10:57.2	574347	6.35303E+12	5.86008E+13	5396.65	0.0287107	0.0274463	0.0687399	0.8883091	0.8491885	2.0949115	2.0949115
16:00.2	574347	6.35303E+12	5.86008E+13	5399.98	0.0287107	0.0276066	0.0687824	0.8883091	0.8541482	2.0962041	2.0962041
21:03.3	574348	6.35303E+12	5.87322E+13	5397.6	0.0287107	0.0272933	0.0685982	0.8883091	0.8444547	2.0905929	2.0905929
26:08.2	574348	6.35303E+12	5.87322E+13	5396.94	0.0287107	0.2304047	0.0685898	0.8883091	7.1287214	2.0903373	7.1287214
31:11.2	574349	6.35303E+12	5.84595E+13	5395.06	0.0287107	0.0373191	0.0688857	0.8883091	1.154653	2.0993542	2.0993542
36:14.1	574350	6.35303E+12	5.91267E+13	5395.1	0.0287107	0.0277184	0.0681089	0.8883091	0.8576073	2.0756815	2.0756815
41:17.0	574350	6.35303E+12	5.91267E+13	5395.85	0.0287107	0.0254041	0.0681184	0.8883091	0.7860029	2.0759701	2.0759701
46:19.8	574351	6.35303E+12	5.92508E+13	5395.02	0.0287107	0.0261363	0.0679653	0.8883091	0.8086571	2.071303	2.071303
51:22.9	574351	6.35303E+12	5.92508E+13	5393.06	0.0287107	0.0253255	0.0679406	0.8883091	0.783571	2.0705505	2.0705505
01:28.4	574351	6.35303E+12	5.92508E+13	5390.01	0.0299929	0.02562	0.0679022	0.9279803	0.7926828	2.0693795	2.0693795
06:31.2	574351	6.35303E+12	5.92508E+13	5374.44	0.0299929	0.0230599	0.067706	0.9279803	0.7134733	2.0634017	2.0634017
11:34.1	574351	6.35303E+12	5.92508E+13	5371.81	0.0299929	0.0231322	0.0676729	0.9279803	0.7157103	2.062392	2.062392
16:37.1	574352	6.35303E+12	5.79249E+13	5372.6	0.0299929	0.0247667	0.0692321	0.9279803	0.7662817	2.1099115	2.1099115
26:42.4	574353	6.35303E+12	5.95341E+13	5384.99	0.0299929	0.0253659	0.0675161	0.9279803	0.7848209	2.0576131	2.0576131
31:45.3	574353	6.35303E+12	5.95341E+13	5393.61	0.0299929	0.025794	0.0676241	0.9279803	0.7980664	2.0609068	2.0609068
41:50.8	574353	6.35303E+12	5.95341E+13	5401.49	0.0299929	0.0254275	0.0677229	0.9279803	0.7867268	2.0639177	2.0639177
46:53.9	574356	6.35303E+12	6.01278E+13	5393.39	0.0299929	0.023825	0.0669538	0.9279803	0.7371455	2.0404768	2.0404768
51:57.5	574356	6.35303E+12	6.01278E+13	5401.9	0.0299929	0.0253189	0.0670594	0.9279803	0.7833668	2.0436963	2.0436963
57:00.7	574357	6.35303E+12	5.98782E+13	5404.01	0.0299929	0.0224156	0.0673653	0.9279803	0.6935387	2.0530169	2.0530169
02:03.8	574357	6.35303E+12	5.98782E+13	5410.44	0.036492	0.0222551	0.0674454	1.1290625	0.6885728	2.0554597	2.0554597
07:07.6	574357	6.35303E+12	5.98782E+13	5413.48	0.036492	0.0220381	0.0674833	1.1290625	0.6818588	2.0566147	2.0566147
12:11.1	574359	6.35303E+12	5.99023E+13	5412.99	0.036492	0.0222681	0.0674501	1.1290625	0.688975	2.0556012	2.0556012
17:14.5	574360	6.35303E+12	6.0023E+13	5413.64	0.036492	0.0223594	0.0673224	1.1290625	0.6917998	2.0517109	2.0517109
22:17.6	574360	6.35303E+12	6.0023E+13	5409.57	0.036492	0.0232117	0.0672718	1.1290625	0.71817	2.0501684	2.0501684
27:20.8	574360	6.35303E+12	6.0023E+13	5403.2	0.036492	0.022951	0.0671926	1.1290625	0.7101039	2.0477543	2.0477543

32:24.8	574361	6.35303E+12	5.95038E+13	5409.65	0.036492	0.0250046	0.0678598	1.1290625	0.7736423	2.068088	2.068088
37:27.9	574361	6.35303E+12	5.95038E+13	5414.99	0.036492	0.0365942	0.0679268	1.1290625	1.1322245	2.0701294	2.0701294
42:31.0	574362	6.35303E+12	5.87448E+13	5422.88	0.036492	0.0243161	0.0689047	1.1290625	0.7523401	2.0999322	2.0999322
47:34.5	574362	6.35303E+12	5.87448E+13	5432.58	0.036492	0.0229003	0.0690279	1.1290625	0.7085353	2.1036884	2.1036884
52:37.7	574362	6.35303E+12	5.87448E+13	5428.01	0.036492	0.0245215	0.0689699	1.1290625	0.7586952	2.1019188	2.1019188
57:42.1	574363	6.35303E+12	5.80502E+13	5427.15	0.036492	0.0332235	0.0697841	1.1290625	1.0279351	2.1267343	2.1267343
02:45.1	574364	6.35303E+12	5.78645E+13	5427.23	0.0274366	0.0490236	0.0700091	0.8488884	1.5167902	2.1335902	2.1335902
07:48.2	574364	6.35303E+12	5.78645E+13	5441.99	0.0274366	0.0440935	0.0701995	0.8488884	1.3642529	2.1393928	2.1393928
12:51.1	574365	6.35303E+12	5.73396E+13	5428.97	0.0274366	0.0247736	0.0706726	0.8488884	0.7664952	2.1538115	2.1538115
17:54.2	574367	6.35303E+12	5.84533E+13	5439.06	0.0274366	0.0251483	0.069455	0.8488884	0.7780884	2.1167024	2.1167024
22:58.5	574367	6.35303E+12	5.84533E+13	5434.48	0.0274366	0.0235975	0.0693965	0.8488884	0.7301067	2.1149201	2.1149201
28:01.7	574368	6.35303E+12	5.81378E+13	5438.3	0.0274366	0.0218651	0.0698221	0.8488884	0.6765062	2.1278923	2.1278923
33:04.7	574368	6.35303E+12	5.81378E+13	5439.66	0.0274366	0.0215412	0.0698396	0.8488884	0.6664847	2.1284244	2.1284244
38:08.0	574369	6.35303E+12	5.7527E+13	5442.57	0.0274366	0.021035	0.0706189	0.8488884	0.6508229	2.1521741	2.1521741
43:11.1	574370	6.35303E+12	5.73316E+13	5444.99	0.0274366	0.0203824	0.0708911	0.8488884	0.6306315	2.1604697	2.1604697
48:14.4	574370	6.35303E+12	5.73316E+13	5471.73	0.0274366	0.0203027	0.0712392	0.8488884	0.6281655	2.1710796	2.1710796
53:17.3	574370	6.35303E+12	5.73316E+13	5469.28	0.0274366	0.0199351	0.0712073	0.8488884	0.616792	2.1701075	2.1701075
58:21.3	574373	6.35303E+12	5.75391E+13	5468.81	0.0274366	0.0202047	0.0709444	0.8488884	0.6251334	2.1620944	2.1620944
03:24.3	574373	6.35303E+12	5.75391E+13	5471.06	0.0211425	0.0198863	0.0709736	0.654149	0.6152821	2.1629839	2.1629839
08:27.3	574374	6.35303E+12	5.70787E+13	5464.23	0.0211425	0.0196411	0.0714567	0.654149	0.6076956	2.177708	2.177708
13:30.2	574374	6.35303E+12	5.70787E+13	5456.01	0.0211425	0.0200366	0.0713492	0.654149	0.6199324	2.1744321	2.1744321
18:33.0	574375	6.35303E+12	5.67247E+13	5460.16	0.0211425	0.0197672	0.0718491	0.654149	0.6115972	2.1896661	2.1896661
23:35.9	574376	6.35303E+12	5.68162E+13	5459.27	0.0211425	0.0218005	0.0717217	0.654149	0.6745075	2.185782	2.185782
28:38.8	574376	6.35303E+12	5.68162E+13	5454.55	0.0211425	0.0198778	0.0716596	0.654149	0.6150191	2.1838922	2.1838922
33:41.8	574377	6.35303E+12	5.63276E+13	5458.01	0.0211425	0.0200894	0.0723272	0.654149	0.621566	2.2042367	2.2042367
38:44.5	574377	6.35303E+12	5.63276E+13	5466.4	0.0211425	0.0223136	0.0724384	0.654149	0.6903828	2.2076251	2.2076251
43:47.4	574377	6.35303E+12	5.63276E+13	5465.31	0.0211425	0.0216094	0.0724239	0.654149	0.6685948	2.2071849	2.2071849
53:53.8	574378	6.35303E+12	5.65074E+13	5467.7	0.0211425	0.0211707	0.072225	0.654149	0.6550215	2.2011227	2.2011227
58:56.5	574379	6.35303E+12	5.75462E+13	5464.7	0.0211425	0.0200281	0.0708824	0.654149	0.6196694	2.1602037	2.1602037
04:31.5	574384	6.35303E+12	5.65611E+13	5475.86	0.0182998	0.0190671	0.0722642	0.5661958	0.5899361	2.2023153	2.2023153
09:34.6	574384	6.35303E+12	5.65611E+13	5473.44	0.0182998	0.0190221	0.0722322	0.5661958	0.5885438	2.201342	2.201342
19:40.1	574384	6.35303E+12	5.65611E+13	5478.95	0.0182998	0.0187179	0.0723049	0.5661958	0.5791318	2.2035581	2.2035581
24:43.3	574384	6.35303E+12	5.65611E+13	5485.86	0.0182998	0.0185384	0.0723961	0.5661958	0.5735781	2.2063372	2.2063372
29:46.2	574385	6.35303E+12	5.52675E+13	5483.01	0.0182998	0.0181898	0.0740521	0.5661958	0.5627924	2.2568058	2.2568058
34:49.1	574386	6.35303E+12	5.5002E+13	5487.88	0.0182998	0.018495	0.0744757	0.5661958	0.5722353	2.2697143	2.2697143
39:52.0	574387	6.35303E+12	5.4816E+13	5489.7	0.0182998	0.0189422	0.0747532	0.5661958	0.5860717	2.278171	2.278171
44:54.7	574387	6.35303E+12	5.4816E+13	5485.01	0.0182998	0.0185212	0.0746893	0.5661958	0.5730459	2.2762247	2.2762247
49:57.6	574387	6.35303E+12	5.4816E+13	5494.4	0.0182998	0.0186646	0.0748172	0.5661958	0.5774827	2.2801215	2.2801215
55:00.6	574387	6.35303E+12	5.4816E+13	5492.41	0.0182998	0.0186275	0.0747901	0.5661958	0.5763349	2.2792957	2.2792957
00:04.1	574388	6.35303E+12	5.41076E+13	5491.83	0.0173139	0.018643	0.0757612	0.5356921	0.5768144	2.3088909	2.3088909
05:07.1	574388	6.35303E+12	5.41076E+13	5492.55	0.0173139	0.0186361	0.0757711	0.5356921	0.5766009	2.3091936	2.3091936
10:10.2	574388	6.35303E+12	5.41076E+13	5499.47	0.0173139	0.0186041	0.0758666	0.5356921	0.5756109	2.3121029	2.3121029
15:13.2	574390	6.35303E+12	5.36713E+13	5499.81	0.0173139	0.0185912	0.0764881	0.5356921	0.5752117	2.3310446	2.3310446
20:16.0	574393	6.35303E+12	5.4543E+13	5532.69	0.0173139	0.0190842	0.0757157	0.5356921	0.5904651	2.3075042	2.3075042
30:21.8	574393	6.35303E+12	5.4543E+13	5536.93	0.0173139	0.0198275	0.0757737	0.5356921	0.6134629	2.3092726	2.3092726
35:25.0	574393	6.35303E+12	5.4543E+13	5564.48	0.0173139	0.019795	0.0761508	0.5356921	0.6124573	2.3207628	2.3207628
40:28.0	574394	6.35303E+12	5.38779E+13	5538.44	0.0173139	0.020088	0.0767299	0.5356921	0.6215227	2.3384139	2.3384139

45:31.1	574395	6.35303E+12	5.53825E+13	5520.08	0.0173139	0.0197988	0.074398	0.5356921	0.6125749	2.2673468	2.2673468	
50:33.9	574395	6.35303E+12	5.53825E+13	5520.48	0.0173139	0.0198422	0.0744034	0.5356921	0.6139177	2.2675111	2.2675111	
55:36.8	574395	6.35303E+12	5.53825E+13	5515.98	0.0173139	0.0194883	0.0743428	0.5356921	0.602968	2.2656627	2.2656627	
00:39.8	574395	6.35303E+12	5.53825E+13	5518.69	0.0179626	0.019462	0.0743793	0.5557628	0.6021543	2.2667759	2.2667759	
05:43.2	574395	6.35303E+12	5.53825E+13	5531.68	0.0179626	0.0194192	0.0745544	0.5557628	0.60083	2.2721114	2.2721114	
10:46.2	574395	6.35303E+12	5.53825E+13	5530.89	0.0179626	0.0192349	0.0745437	0.5557628	0.5951278	2.2717869	2.2717869	
15:49.8	574396	6.35303E+12	5.44713E+13	5541.2	0.0179626	0.0191897	0.075932	0.5557628	0.5937293	2.3140947	2.3140947	
20:52.7	574396	6.35303E+12	5.44713E+13	5544.69	0.0179626	0.0191963	0.0759798	0.5557628	0.5939335	2.3155521	2.3155521	
25:55.6	574396	6.35303E+12	5.44713E+13	5552.98	0.0179626	0.0192925	0.0760934	0.5557628	0.59691	2.3190142	2.3190142	
30:58.6	574397	6.35303E+12	5.38389E+13	5536.99	0.0179626	0.0189288	0.0767654	0.5557628	0.5856571	2.3394943	2.3394943	
36:02.2	574397	6.35303E+12	5.38389E+13	5549.99	0.0179626	0.0191736	0.0769456	0.5557628	0.5932312	2.3449871	2.3449871	
41:05.2	574397	6.35303E+12	5.38389E+13	5578.73	0.0179626	0.019072	0.0773441	0.5557628	0.5900877	2.3571303	2.3571303	
46:08.4	574397	6.35303E+12	5.38389E+13	5587.27	0.0179626	0.0191605	0.0774625	0.5557628	0.5928259	2.3607386	2.3607386	
51:11.5	574397	6.35303E+12	5.38389E+13	5577.62	0.0179626	0.019671	0.0773287	0.5557628	0.6086207	2.3566613	2.3566613	
56:14.6	574397	6.35303E+12	5.38389E+13	5578.43	0.0179626	0.019726	0.0773399	0.5557628	0.6103224	2.3570036	2.3570036	
01:18.0	574398	6.35303E+12	5.24135E+13	5585.77	0.0181708	0.020031	0.0795478	0.5622046	0.6197591	2.42429	2.42429	
06:21.5	574399	6.35303E+12	5.22154E+13	5570.36	0.0181708	0.0201913	0.0796293	0.5622046	0.6247188	2.4267736	2.4267736	
11:24.3	574400	6.35303E+12	5.19602E+13	5563.2	0.0181708	0.0200017	0.0799175	0.5622046	0.6188526	2.4355582	2.4355582	
16:27.3	574400	6.35303E+12	5.19602E+13	5579.23	0.0181708	0.0200965	0.0801478	0.5622046	0.6217857	2.4425761	2.4425761	
21:30.3	574400	6.35303E+12	5.19602E+13	5571.91	0.0181708	0.0200908	0.0800426	0.5622046	0.6216094	2.4393714	2.4393714	
26:33.2	574401	6.35303E+12	5.14241E+13	5570.27	0.0181708	0.0202515	0.0808533	0.5622046	0.6265814	2.4640783	2.4640783	
31:36.5	574402	6.35303E+12	5.15991E+13	5562.53	0.0181708	0.0202163	0.0804671	0.5622046	0.6254923	2.4523071	2.4523071	
36:39.4	574402	6.35303E+12	5.15991E+13	5598.28	0.0181708	0.0209438	0.0809843	0.5622046	0.6480012	2.4680679	2.4680679	
41:42.1	574404	6.35303E+12	5.22163E+13	5622.51	0.0181708	0.0204391	0.0803735	0.5622046	0.6323858	2.4494541	2.4494541	
46:45.3	574405	6.35303E+12	5.26766E+13	5610.46	0.0181708	0.022443	0.0795004	0.5622046	0.6943864	2.4228448	2.4228448	
51:48.2	574406	6.35303E+12	5.44332E+13	5697.34	0.0181708	0.0205015	0.0781261	0.5622046	0.6343164	2.3809636	2.3809636	
56:50.9	574407	6.35303E+12	5.44179E+13	5660.07	0.0181708	0.020423	0.077637	0.5622046	0.6318876	2.3660567	2.3660567	
06:56.4	574408	6.35303E+12	5.43366E+13	5661.93	0.0189944	0.0199466	0.0777787	0.5876867	0.6171478	2.3703744	2.3703744	
11:59.9	574409	6.35303E+12	5.45039E+13	5688.4	0.0189944	0.0202274	0.0779024	0.5876867	0.6258358	2.3741451	2.3741451	
17:03.3	574409	6.35303E+12	5.45039E+13	5705.82	0.0189944	0.0204858	0.0781409	0.5876867	0.6338307	2.3814156	2.3814156	
22:06.7	574409	6.35303E+12	5.45039E+13	5684.26	0.0189944	0.0228673	0.0778457	0.5876867	0.7075143	2.3724172	2.3724172	
27:09.6	574410	6.35303E+12	5.4739E+13	5675.94	0.0189944	0.0210179	0.0773979	0.5876867	0.6502938	2.3587711	2.3587711	
32:12.9	574410	6.35303E+12	5.4739E+13	5704.8	0.0189944	0.0219318	0.0777915	0.5876867	0.6785699	2.3707646	2.3707646	
37:15.9	574410	6.35303E+12	5.4739E+13	5701.98	0.0189944	0.0220176	0.077753	0.5876867	0.6812245	2.3695926	2.3695926	
42:18.6	574410	6.35303E+12	5.4739E+13	5732.34	0.0189944	0.0217753	0.078167	0.5876867	0.6737278	2.3822095	2.3822095	
47:21.8	574410	6.35303E+12	5.4739E+13	5753.01	0.0189944	0.0233293	0.0784489	0.5876867	0.7218085	2.3907994	2.3907994	
52:25.1	574410	6.35303E+12	5.4739E+13	5756.81	0.0189944	0.0238745	0.0785007	0.5876867	0.738677	2.3923786	2.3923786	
57:27.9	574412	6.35303E+12	5.33495E+13	5791.51	0.0189944	0.0451717	0.0810308	0.5876867	1.3976124	2.4694857	2.4694857	
02:31.0	574412	6.35303E+12	5.33495E+13	5778.34	0.0239869	0.0254874	0.0808465	0.7421547	0.7885802	2.46387	2.46387	
07:34.0	574412	6.35303E+12	5.33495E+13	5695.4	0.0239869	0.0228529	0.0796861	0.7421547	0.7070687	2.4285046	2.4285046	
12:36.8	574412	6.35303E+12	5.33495E+13	5717.23	0.0239869	0.0236822	0.0799915	0.7421547	0.7327273	2.4378128	2.4378128	
22:41.7	574413	6.35303E+12	5.25253E+13	5730.11	0.0239869	0.0225552	0.0814296	0.7421547	0.6978579	2.4816407	2.4816407	
27:44.8	574413	6.35303E+12	5.25253E+13	5715.55	0.0239869	0.0259265	0.0812227	0.7421547	0.8021659	2.475335	2.475335	
32:47.7	574414	6.35303E+12	5.19701E+13	5734.99	0.0239869	0.025733	0.0823697	0.7421547	0.796179	2.5102894	2.5102894	
37:50.9	574414	6.35303E+12	5.19701E+13	5743.05	0.0239869	0.0260107	0.0824854	0.7421547	0.8047711	2.5138174	2.5138174	
42:53.7	574416	6.35303E+12	5.19215E+13	5725.93	0.0239869	0.0259129	0.0823165	0.7421547	0.8017451	2.5086707	2.5086707	
47:56.5	574419	6.35303E+12	5.263E+13	5733.81	0.0239869	0.0228376	0.0813201	0.7421547	0.7065953	2.4783037	2.4783037	

52:59.1	574420	6.35303E+12	5.25895E+13	5702.24	0.0239869	0.0369356	0.0809348	0.7421547	1.1427875	2.4665598	2.4665598	
58:01.8	574421	6.35303E+12	5.25734E+13	5674.41	0.0239869	0.0239106	0.0805643	0.7421547	0.739794	2.4552707	2.4552707	
03:04.8	574422	6.35303E+12	5.2543E+13	5686.55	0.0273845	0.0222843	0.0807834	0.8472764	0.6894762	2.4619458	2.4619458	
08:08.0	574424	6.35303E+12	5.28202E+13	5686.98	0.0273845	0.022201	0.0803655	0.8472764	0.6868989	2.4492125	2.4492125	
13:10.8	574424	6.35303E+12	5.28202E+13	5696.24	0.0273845	0.0222756	0.0804964	0.8472764	0.6892071	2.4532005	2.4532005	
18:13.9	574424	6.35303E+12	5.28202E+13	5678.52	0.0273845	0.0287661	0.080246	0.8472764	0.8900231	2.445569	2.445569	
23:16.6	574426	6.35303E+12	5.30049E+13	5680.01	0.0273845	0.0495148	0.0799874	0.8472764	1.5319879	2.4376872	2.4376872	
28:20.7	574427	6.35303E+12	5.28466E+13	5679.28	0.0273845	0.2410973	0.0802166	0.8472764	7.4595505	2.4446732	7.4595505	
33:24.6	574427	6.35303E+12	5.28466E+13	5698.99	0.0273845	0.2334656	0.080495	0.8472764	7.2234257	2.4531574	7.2234257	
38:27.3	574427	6.35303E+12	5.28466E+13	5702.85	0.0273845	0.0497981	0.0805495	0.8472764	1.5407532	2.454819	2.454819	
43:30.1	574428	6.35303E+12	5.2354E+13	5722.4	0.0273845	0.0284052	0.0815862	0.8472764	0.8788569	2.4864117	2.4864117	
48:33.4	574428	6.35303E+12	5.2354E+13	5723.27	0.0273845	0.0286907	0.0815986	0.8472764	0.8876903	2.4867897	2.4867897	
53:36.4	574428	6.35303E+12	5.2354E+13	5711.78	0.0273845	0.0289323	0.0814347	0.8472764	0.8951654	2.4817972	2.4817972	
58:39.1	574429	6.35303E+12	5.15634E+13	5700.85	0.0273845	0.0244206	0.0825252	0.8472764	0.7555734	2.5150298	2.5150298	
03:41.9	574429	6.35303E+12	5.15634E+13	5699.99	0.0280847	0.022925	0.0825128	0.8689406	0.7092995	2.5146504	2.5146504	
08:44.7	574429	6.35303E+12	5.15634E+13	5715.88	0.0280847	0.0237192	0.0827428	0.8689406	0.733872	2.5216605	2.5216605	
13:47.4	574430	6.35303E+12	5.12815E+13	5716.7	0.0280847	0.0238876	0.0832095	0.8689406	0.7390823	2.5358831	2.5358831	
18:50.2	574430	6.35303E+12	5.12815E+13	5707.94	0.0280847	0.0242522	0.0830819	0.8689406	0.7503631	2.5319972	2.5319972	
23:53.1	574430	6.35303E+12	5.12815E+13	5728.45	0.0280847	0.024234	0.0833805	0.8689406	0.7498	2.5410953	2.5410953	
28:55.9	574430	6.35303E+12	5.12815E+13	5736.02	0.0280847	0.0243241	0.0834907	0.8689406	0.7525877	2.5444533	2.5444533	
33:59.1	574430	6.35303E+12	5.12815E+13	5740.86	0.0280847	0.0252158	0.0835611	0.8689406	0.7801769	2.5466002	2.5466002	
44:04.4	574430	6.35303E+12	5.12815E+13	5732.1	0.0280847	0.0252418	0.0834336	0.8689406	0.7809813	2.5427144	2.5427144	
49:07.5	574431	6.35303E+12	4.97074E+13	5725.7	0.0280847	0.0487379	0.0859796	0.8689406	1.5079506	2.6203068	2.6203068	
54:10.5	574432	6.35303E+12	4.99455E+13	5720.02	0.0280847	0.0292058	0.0854849	0.8689406	0.9036275	2.6052295	2.6052295	
59:14.1	574432	6.35303E+12	4.99455E+13	5706.01	0.0280847	0.0484988	0.0852755	0.8689406	1.5005529	2.5988485	2.5988485	
04:17.2	574433	6.35303E+12	4.98413E+13	5720.99	0.02809	0.0273041	0.0856781	0.8691046	0.8447889	2.6111164	2.6111164	
09:20.1	574435	6.35303E+12	4.97656E+13	5725.87	0.02809	0.0243389	0.0858817	0.8691046	0.7530456	2.6173216	2.6173216	
14:23.0	574435	6.35303E+12	4.97656E+13	5733.32	0.02809	0.0253075	0.0859934	0.8691046	0.7830141	2.620727	2.620727	
19:26.3	574437	6.35303E+12	4.98823E+13	5729.99	0.02809	0.0279034	0.0857423	0.8691046	0.8633312	2.6130745	2.6130745	
24:29.2	574438	6.35303E+12	4.9928E+13	5727.98	0.02809	0.0267925	0.0856339	0.8691046	0.82896	2.6097702	2.6097702	
29:32.2	574439	6.35303E+12	4.96328E+13	5746.56	0.02809	0.0491793	0.0864226	0.8691046	1.5216075	2.6338056	2.6338056	
34:35.1	574441	6.35303E+12	5.04581E+13	5735.82	0.02809	0.0276204	0.0848502	0.8691046	0.8545752	2.5858866	2.5858866	
39:38.1	574441	6.35303E+12	5.04581E+13	5745.02	0.02809	0.0274064	0.0849863	0.8691046	0.847954	2.5900343	2.5900343	
44:40.9	574442	6.35303E+12	5.28842E+13	5751.06	0.02809	0.0493127	0.0811728	0.8691046	1.5257349	2.4738132	2.4738132	
49:44.5	574442	6.35303E+12	5.28842E+13	5741.52	0.02809	0.0353384	0.0810381	0.8691046	1.0933701	2.4697096	2.4697096	
54:47.4	574442	6.35303E+12	5.28842E+13	5741.39	0.02809	0.027241	0.0810363	0.8691046	0.8428365	2.4696537	2.4696537	
59:50.5	574443	6.35303E+12	5.28228E+13	5739.18	0.02809	0.0260944	0.0810993	0.8691046	0.8073607	2.4715738	2.4715738	
04:53.3	574443	6.35303E+12	5.28228E+13	5735.16	0.0306575	0.0263345	0.0810425	0.9485431	0.8147894	2.4698426	2.4698426	
09:56.1	574443	6.35303E+12	5.28228E+13	5753.15	0.0306575	0.0251812	0.0812967	0.9485431	0.7791063	2.47759	2.47759	
14:59.6	574443	6.35303E+12	5.28228E+13	5760.65	0.0306575	0.0254094	0.0814027	0.9485431	0.7861668	2.4808199	2.4808199	
20:02.9	574443	6.35303E+12	5.28228E+13	5758.01	0.0306575	0.0257154	0.0813654	0.9485431	0.7956345	2.4796829	2.4796829	
25:05.9	574444	6.35303E+12	5.21447E+13	5763.51	0.0306575	0.0255742	0.0825021	0.9485431	0.7912657	2.5143244	2.5143244	
30:08.6	574445	6.35303E+12	5.19166E+13	5760.01	0.0306575	0.0285722	0.0828144	0.9485431	0.8840239	2.5238421	2.5238421	
35:11.4	574446	6.35303E+12	5.17083E+13	5750.9	0.0306575	0.0351964	0.0830164	0.9485431	1.0889766	2.5299985	2.5299985	
40:15.1	574446	6.35303E+12	5.17083E+13	5762.47	0.0306575	0.0283874	0.0831834	0.9485431	0.8783062	2.5350885	2.5350885	
45:17.8	574446	6.35303E+12	5.17083E+13	5753.72	0.0306575	0.027278	0.0830571	0.9485431	0.8439813	2.5312392	2.5312392	
50:20.6	574448	6.35303E+12	5.19511E+13	5754.06	0.0306575	0.0271803	0.0826737	0.9485431	0.8409585	2.5195561	2.5195561	

datetime	block_height	network_diff	est_network_hashrate	BTC_price	day_ahead_LMP	real_time_LMP	breakeven_mining_cost	day_ahead_LMP_rev	real_time_LMP_rev	mining_rev	realized_rev
19:54.2	574204	6.35303E+12	5.38327E+13	5320.43	0.00578	0.004853	0.0737715	0.1788332	0.1501518	2.2482519	2.248252
24:57.5	574204	6.35303E+12	5.38327E+13	5320.01	0.00578	0.0059132	0.0737656	0.1788332	0.1829544	2.2480744	2.248074
30:00.6	574204	6.35303E+12	5.38327E+13	5319.98	0.00578	0.0058605	0.0737652	0.1788332	0.1813239	2.2480617	2.248062
35:04.1	574205	6.35303E+12	5.30839E+13	5323.01	0.00578	0.0046039	0.0748484	0.1788332	0.1424447	2.2810714	2.281071
40:07.2	574205	6.35303E+12	5.30839E+13	5321.94	0.00578	0.0032873	0.0748333	0.1788332	0.1017091	2.2806129	2.280613
45:10.6	574206	6.35303E+12	5.44532E+13	5326.51	0.00578	0.0019272	0.0730143	0.1788332	0.0596276	2.2251767	2.225177
50:13.5	574206	6.35303E+12	5.44532E+13	5326.54	0.00578	0.0070844	0.0730147	0.1788332	0.2191913	2.2251893	2.225189
55:16.9	574207	6.35303E+12	5.39845E+13	5328.24	0.00578	0.0006523	0.0736721	0.1788332	0.0201822	2.2452223	2.245222
00:20.2	574207	6.35303E+12	5.39845E+13	5325.77	0.0008315	0.0022674	0.0736379	0.0257266	0.0701534	2.2441815	2.244182
05:23.2	574208	6.35303E+12	5.34662E+13	5325.77	0.0008315	-0.0037312	0.0743518	0.0257266	-0.1154433	2.2659373	2.265937
10:26.1	574208	6.35303E+12	5.34662E+13	5325.01	0.0008315	-0.0087112	0.0743412	0.0257266	-0.2695245	2.2656139	2.265614
15:29.1	574209	6.35303E+12	5.33477E+13	5321.31	0.0008315	0.0006042	0.0744545	0.0257266	0.0186939	2.2690675	2.269068
20:32.0	574209	6.35303E+12	5.33477E+13	5321.01	0.0008315	0.0008759	0.0744503	0.0257266	0.0271003	2.2689395	2.26894
25:36.1	574210	6.35303E+12	5.36221E+13	5326.26	0.0008315	-0.0192181	0.0741425	0.0257266	-0.594608	2.2595592	2.259559
30:39.1	574212	6.35303E+12	5.54528E+13	5327.73	0.0008315	-0.0318283	0.0717145	0.0257266	-0.9847676	2.1855639	2.185564
35:42.2	574213	6.35303E+12	5.51131E+13	5321.02	0.0008315	-0.0308899	0.0720657	0.0257266	-0.9557335	2.1962672	2.196267
40:45.0	574215	6.35303E+12	5.58834E+13	5323.1	0.0008315	-0.0302146	0.0711001	0.0257266	-0.9348397	2.1668382	2.166838
45:47.9	574215	6.35303E+12	5.58834E+13	5323.1	0.0008315	-0.0268742	0.0711001	0.0257266	-0.8314877	2.1668382	2.166838
50:51.0	574215	6.35303E+12	5.58834E+13	5326.69	0.0008315	-0.0311753	0.071148	0.0257266	-0.9645638	2.1682995	2.1683
55:53.8	574215	6.35303E+12	5.58834E+13	5326.69	0.0008315	-0.0321213	0.071148	0.0257266	-0.993833	2.1682995	2.1683
00:56.7	574216	6.35303E+12	5.54406E+13	5328.81	0.0002678	-0.0312479	0.0717448	0.082857	-0.96681	2.1864882	2.186488
06:00.2	574216	6.35303E+12	5.54406E+13	5330.34	0.0002678	-0.0031224	0.0717654	0.082857	-0.0966071	2.187116	2.187116
11:03.3	574219	6.35303E+12	5.59245E+13	5326.73	0.0002678	-0.0192773	0.0710963	0.082857	-0.5964397	2.1667245	2.166725
16:06.7	574220	6.35303E+12	5.59914E+13	5330.77	0.0002678	-0.0176475	0.0710652	0.082857	-0.5460137	2.1657754	2.165775
21:09.7	574220	6.35303E+12	5.59914E+13	5343.69	0.0002678	-0.0277873	0.0712374	0.082857	-0.8597391	2.1710246	2.171025
26:12.7	574225	6.35303E+12	5.59876E+13	5336.9	0.0002678	-0.030291	0.0711518	0.082857	-0.9372035	2.1684142	2.168414
31:15.7	574226	6.35303E+12	5.60441E+13	5333.74	0.0002678	-0.0263247	0.0710379	0.082857	-0.8144862	2.1649441	2.164944
36:18.6	574227	6.35303E+12	5.56725E+13	5331.57	0.0002678	-0.0194362	0.071483	0.082857	-0.6013561	2.1785089	2.178509
41:21.5	574227	6.35303E+12	5.56725E+13	5332.07	0.0002678	-0.0199701	0.0714897	0.082857	-0.6178749	2.1787132	2.178713
46:24.4	574227	6.35303E+12	5.56725E+13	5343.99	0.0002678	-0.0196127	0.0716495	0.082857	-0.6068169	2.1835838	2.183584
51:27.4	574228	6.35303E+12	5.52451E+13	5343.99	0.0002678	-0.0293809	0.0722038	0.082857	-0.909045	2.2004762	2.200476
56:30.6	574229	6.35303E+12	5.5892E+13	5328.81	0.0002678	-0.0237092	0.0711654	0.082857	-0.7335626	2.1688293	2.168829
01:33.6	574229	6.35303E+12	5.5892E+13	5339.09	0.0001906	-0.0188617	0.0713027	0.0058972	-0.583581	2.1730133	2.173013
06:36.6	574229	6.35303E+12	5.5892E+13	5341.16	0.0001906	-0.0309174	0.0713303	0.0058972	-0.9565844	2.1738558	2.173856
11:39.5	574230	6.35303E+12	5.53347E+13	5346.19	0.0001906	-0.0303878	0.0721165	0.0058972	-0.9401985	2.1978165	2.197817
16:43.0	574230	6.35303E+12	5.53347E+13	5351.52	0.0001906	-0.0302747	0.0721884	0.0058972	-0.9366992	2.2000077	2.200008
21:45.9	574231	6.35303E+12	5.49411E+13	5348.15	0.0001906	-0.0280594	0.0726599	0.0058972	-0.8681578	2.2143761	2.214376
26:48.7	574231	6.35303E+12	5.49411E+13	5345.36	0.0001906	-0.0282238	0.072622	0.0058972	-0.8732444	2.2132209	2.213221
31:52.1	574231	6.35303E+12	5.49411E+13	5345.35	0.0001906	-0.0268535	0.0726219	0.0058972	-0.8308473	2.2132168	2.213217
36:55.6	574232	6.35303E+12	5.47061E+13	5345.57	0.0001906	-0.0274178	0.0729368	0.0058972	-0.8483067	2.222815	2.222815
41:58.8	574232	6.35303E+12	5.47061E+13	5346.06	0.0001906	-0.0274027	0.0729435	0.0058972	-0.8478395	2.2230187	2.223019
47:01.8	574232	6.35303E+12	5.47061E+13	5364.94	0.0001906	-0.028909	0.0732011	0.0058972	-0.8944445	2.2308695	2.23087
52:04.7	574232	6.35303E+12	5.47061E+13	5358.68	0.0001906	-0.028169	0.0731157	0.0058972	-0.8715489	2.2282664	2.228266
57:07.9	574232	6.35303E+12	5.47061E+13	5363.38	0.0001906	-0.0263077	0.0731798	0.0058972	-0.8139602	2.2302208	2.230221
02:11.0	574233	6.35303E+12	5.35475E+13	5374.99	0.002727	-0.0263014	0.074925	0.0843734	-0.8137653	2.283406	2.283406
07:14.0	574233	6.35303E+12	5.35475E+13	5371.65	0.002727	-0.0028313	0.0748784	0.0843734	-0.0876004	2.2819871	2.281987
12:17.0	574233	6.35303E+12	5.35475E+13	5364.6	0.002727	-0.0008554	0.0747801	0.0843734	-0.0264661	2.2789921	2.278992
17:20.3	574233	6.35303E+12	5.35475E+13	5366.68	0.002727	-0.0182652	0.0748091	0.0843734	-0.5651253	2.2798757	2.279876
22:23.4	574234	6.35303E+12	5.31615E+13	5358.76	0.002727	-0.0019519	0.0752411	0.0843734	-0.0603918	2.2930408	2.293041

27:26.4	574234	6.35303E+12	5.31615E+13	5358.18	0.002727	-0.0147848	0.075233	0.0843734	-0.4574417	2.2927926	2.292793	
32:29.3	574234	6.35303E+12	5.31615E+13	5349.69	0.002727	-0.0033411	0.0751138	0.0843734	-0.1033736	2.2891597	2.28916	
37:32.1	574235	6.35303E+12	5.26774E+13	5347.97	0.002727	-0.016204	0.0757796	0.0843734	-0.5013518	2.3094528	2.309453	
42:35.1	574236	6.35303E+12	5.29706E+13	5347.88	0.002727	-0.031637	0.075359	0.0843734	-0.9788488	2.2966332	2.296633	
47:38.0	574237	6.35303E+12	5.26741E+13	5352.24	0.002727	-0.0303036	0.075845	0.0843734	-0.9375934	2.3114455	2.311446	
52:40.8	574238	6.35303E+12	5.2719E+13	5350.15	0.002727	-0.0054995	0.0757508	0.0843734	-0.1701545	2.308573	2.308573	
57:43.7	574238	6.35303E+12	5.2719E+13	5357.76	0.002727	-0.0016084	0.0758585	0.0843734	-0.0497639	2.3118566	2.311857	
02:46.6	574239	6.35303E+12	5.28168E+13	5351.07	0.0122937	-0.0317924	0.0756235	0.3803671	-0.9836569	2.3046947	2.304695	
07:49.3	574240	6.35303E+12	5.25658E+13	5350.11	0.0122937	-0.0305799	0.075971	0.3803671	-0.9461421	2.3152833	2.315283	
12:52.7	574242	6.35303E+12	5.34165E+13	5352.35	0.0122937	-2.70E-06	0.0747924	0.3803671	-8.35E-05	2.2793657	2.279366	
17:55.6	574243	6.35303E+12	5.35108E+13	5355.51	0.0122937	0.0003845	0.0747047	0.3803671	0.0118964	2.2766932	2.276693	
22:58.3	574245	6.35303E+12	5.38531E+13	5358.7	0.0122937	0.000944	0.074274	0.3803671	0.0292074	2.2635674	2.263567	
28:01.2	574246	6.35303E+12	5.41667E+13	5358.74	0.0122937	-0.0033438	0.0738446	0.3803671	-0.1034572	2.2504797	2.25048	
33:04.2	574246	6.35303E+12	5.41667E+13	5361.99	0.0122937	-0.001393	0.0738894	0.3803671	-0.0430994	2.2518446	2.251845	
38:07.1	574246	6.35303E+12	5.41667E+13	5364.93	0.0122937	0.0048462	0.0739299	0.3803671	0.1499414	2.2530793	2.253079	
43:10.0	574247	6.35303E+12	5.37144E+13	5365.93	0.0122937	-0.0155818	0.0745663	0.3803671	-0.4821009	2.2724742	2.272474	
48:12.9	574249	6.35303E+12	5.43573E+13	5360.33	0.0122937	-0.0014069	0.0736074	0.3803671	-0.0435295	2.2432526	2.243253	
53:15.7	574251	6.35303E+12	5.52479E+13	5359.19	0.0122937	0.0018241	0.0724055	0.3803671	0.0564377	2.2066234	2.206623	
58:18.7	574252	6.35303E+12	5.50584E+13	5357.99	0.0122937	0.0017661	0.0726385	0.3803671	0.0546431	2.2137229	2.213723	
03:21.9	574252	6.35303E+12	5.50584E+13	5360.64	0.0171962	0.0051394	0.0726744	0.5320504	0.159013	2.2148178	2.214818	
08:26.1	574253	6.35303E+12	5.55506E+13	5362.51	0.0171962	0.1603687	0.0720555	0.5320504	4.9618076	2.195957	4.961808	
13:29.5	574254	6.35303E+12	5.55733E+13	5360.24	0.0171962	0.01377	0.0719957	0.5320504	0.4260438	2.1941337	2.194134	
18:32.5	574255	6.35303E+12	5.5978E+13	5358.19	0.0171962	0.0100579	0.0714478	0.5320504	0.3111914	2.1774367	2.177437	
23:35.5	574257	6.35303E+12	5.59531E+13	5367.35	0.0171962	0.0107012	0.0716018	0.5320504	0.3310951	2.1821286	2.182129	
28:38.4	574257	6.35303E+12	5.59531E+13	5368.93	0.0171962	0.0084507	0.0716229	0.5320504	0.2614647	2.182771	2.182771	
33:41.3	574257	6.35303E+12	5.59531E+13	5368.01	0.0171962	0.0069194	0.0716106	0.5320504	0.2140862	2.182397	2.182397	
38:44.2	574258	6.35303E+12	5.61961E+13	5368.01	0.0171962	0.0068217	0.071301	0.5320504	0.2110634	2.1729618	2.172962	
43:47.2	574258	6.35303E+12	5.61961E+13	5363.48	0.0171962	0.0079017	0.0712408	0.5320504	0.2444786	2.1711281	2.171128	
48:50.1	574258	6.35303E+12	5.61961E+13	5363.48	0.0171962	0.0076457	0.0712408	0.5320504	0.236558	2.1711281	2.171128	
53:56.7	574258	6.35303E+12	5.61961E+13	5368.74	0.0171962	0.0078845	0.0713107	0.5320504	0.2439464	2.1732573	2.173257	
58:59.6	574258	6.35303E+12	5.61961E+13	5368.9	0.0171962	0.0094093	0.0713128	0.5320504	0.2911237	2.1733221	2.173322	
04:02.6	574258	6.35303E+12	5.61961E+13	5360.85	0.0175577	0.0099461	0.0712059	0.5432352	0.3077323	2.1700634	2.170063	
09:05.6	574258	6.35303E+12	5.61961E+13	5360.96	0.0175577	0.0140156	0.0712073	0.5432352	0.4336427	2.170108	2.170108	
14:08.7	574260	6.35303E+12	5.46276E+13	5364.69	0.0175577	0.0115262	0.0733029	0.5432352	0.3566206	2.2339708	2.233971	
19:11.6	574260	6.35303E+12	5.46276E+13	5368.72	0.0175577	0.0089289	0.0733579	0.5432352	0.2762602	2.2356489	2.235649	
24:14.7	574260	6.35303E+12	5.46276E+13	5366.48	0.0175577	0.0086263	0.0733273	0.5432352	0.2668977	2.2347162	2.234716	
29:17.6	574260	6.35303E+12	5.46276E+13	5367.76	0.0175577	0.007468	0.0733448	0.5432352	0.2310599	2.2352492	2.235249	
34:20.8	574261	6.35303E+12	5.36607E+13	5366.92	0.0175577	0.0084062	0.0746547	0.5432352	0.2600878	2.2751678	2.275168	
39:23.6	574261	6.35303E+12	5.36607E+13	5366.01	0.0175577	0.007763	0.074642	0.5432352	0.2401872	2.2747821	2.274782	
44:26.5	574261	6.35303E+12	5.36607E+13	5364.41	0.0175577	0.0087491	0.0746197	0.5432352	0.2706972	2.2741038	2.274104	
49:29.5	574261	6.35303E+12	5.36607E+13	5364.3	0.0175577	0.0087159	0.0746182	0.5432352	0.2696699	2.2740572	2.274057	
54:32.3	574261	6.35303E+12	5.36607E+13	5377.85	0.0175577	0.0108497	0.0748067	0.5432352	0.3356897	2.2798013	2.279801	
59:35.3	574264	6.35303E+12	5.43564E+13	5373.82	0.0175577	0.008836	0.0737939	0.5432352	0.2733858	2.2489354	2.248935	
04:38.1	574267	6.35303E+12	5.54387E+13	5366.58	0.0193084	0.0083686	0.0722558	0.5974019	0.2589245	2.2020604	2.20206	
09:40.9	574268	6.35303E+12	5.60115E+13	5356.55	0.0193084	0.0080606	0.0713832	0.5974019	0.249395	2.1754678	2.175468	
14:43.6	574269	6.35303E+12	5.58958E+13	5342.94	0.0193084	0.0088646	0.0713492	0.5974019	0.2742707	2.1744317	2.174432	
19:46.6	574270	6.35303E+12	5.6144E+13	5354.22	0.0193084	0.0082941	0.0711837	0.5974019	0.2566195	2.1693883	2.169388	
24:49.9	574271	6.35303E+12	5.6095E+13	5356.83	0.0193084	0.0080762	0.0712807	0.5974019	0.2498776	2.1723438	2.172344	
29:52.8	574271	6.35303E+12	5.6095E+13	5351.83	0.0193084	0.0079524	0.0712142	0.5974019	0.2460473	2.1703161	2.170316	
34:55.7	574272	6.35303E+12	5.54087E+13	5355.01	0.0193084	0.0081254	0.0721391	0.5974019	0.2513999	2.1985034	2.198503	

39:58.5	574273	6.35303E+12	5.53104E+13	5355.83	0.0193084	0.0085607	0.0722783	0.5974019	0.2648681	2.2027469	2.202747	
45:01.9	574274	6.35303E+12	5.53441E+13	5354.54	0.0193084	0.0106324	0.072217	0.5974019	0.3289665	2.2008772	2.200877	
50:05.0	574274	6.35303E+12	5.53441E+13	5352.64	0.0193084	0.0119823	0.0721913	0.5974019	0.3707324	2.2000962	2.200096	
55:07.9	574274	6.35303E+12	5.53441E+13	5355.99	0.0193084	0.0171955	0.0722365	0.5974019	0.5320288	2.2014732	2.201473	
00:10.9	574274	6.35303E+12	5.53441E+13	5375.12	0.021824	0.014679	0.0724945	0.6752346	0.4541683	2.2093362	2.209336	
05:13.9	574274	6.35303E+12	5.53441E+13	5371.63	0.021824	0.0098275	0.0724475	0.6752346	0.3040628	2.2079017	2.207902	
10:17.8	574274	6.35303E+12	5.53441E+13	5366.65	0.021824	0.0157044	0.0723803	0.6752346	0.4858941	2.2058548	2.205855	
15:20.8	574274	6.35303E+12	5.53441E+13	5362.88	0.021824	0.0161219	0.0723295	0.6752346	0.4988116	2.2043052	2.204305	
20:23.7	574275	6.35303E+12	5.36343E+13	5367	0.021824	0.016142	0.0746925	0.6752346	0.4994335	2.2763203	2.27632	
25:26.5	574275	6.35303E+12	5.36343E+13	5371.56	0.021824	0.0159439	0.0747559	0.6752346	0.4933043	2.2782544	2.278254	
30:29.4	574276	6.35303E+12	5.309E+13	5370.52	0.021824	0.0201562	0.0755079	0.6752346	0.6236328	2.3011697	2.30117	
35:32.1	574278	6.35303E+12	5.49235E+13	5373.23	0.021824	0.0193584	0.0730239	0.6752346	0.5989489	2.2254696	2.22547	
40:35.0	574281	6.35303E+12	5.67946E+13	5385.74	0.021824	0.0173956	0.0707827	0.6752346	0.5382199	2.1571652	2.157165	
45:37.8	574281	6.35303E+12	5.67946E+13	5380.67	0.021824	0.0172587	0.070716	0.6752346	0.5339842	2.1551345	2.155135	
50:40.6	574281	6.35303E+12	5.67946E+13	5377.85	0.021824	0.0135506	0.070679	0.6752346	0.4192556	2.154005	2.154005	
55:43.6	574282	6.35303E+12	5.6096E+13	5376.85	0.021824	0.0181589	0.0715459	0.6752346	0.5618364	2.1804251	2.180425	
00:46.5	574282	6.35303E+12	5.6096E+13	5379.99	0.0237731	0.0180514	0.0715877	0.7355397	0.5585103	2.1816984	2.181698	
05:49.7	574283	6.35303E+12	5.56063E+13	5400.03	0.0237731	0.0201106	0.0724871	0.7355397	0.622222	2.2091081	2.209108	
10:52.9	574283	6.35303E+12	5.56063E+13	5401.02	0.0237731	0.0199693	0.0725003	0.7355397	0.6178501	2.2095131	2.209513	
15:55.8	574283	6.35303E+12	5.56063E+13	5411.08	0.0237731	0.0212877	0.0726354	0.7355397	0.6586414	2.2136286	2.213629	
20:59.8	574284	6.35303E+12	5.64188E+13	5401.02	0.0237731	0.0208648	0.0714563	0.7355397	0.6455569	2.177694	2.177694	
26:03.1	574284	6.35303E+12	5.64188E+13	5401.31	0.0237731	0.0203588	0.0714601	0.7355397	0.6299013	2.1778109	2.177811	
31:06.6	574285	6.35303E+12	5.57835E+13	5409.35	0.0237731	0.0207637	0.0723816	0.7355397	0.6424289	2.2058933	2.205893	
36:09.6	574285	6.35303E+12	5.57835E+13	5396.6	0.0237731	0.0198566	0.072211	0.7355397	0.6143632	2.2006939	2.200694	
41:12.5	574285	6.35303E+12	5.57835E+13	5405.56	0.0237731	0.0206568	0.0723309	0.7355397	0.6391214	2.2043478	2.204348	
46:15.4	574285	6.35303E+12	5.57835E+13	5401.1	0.0237731	0.0203991	0.0722712	0.7355397	0.6311482	2.202529	2.202529	
51:18.8	574285	6.35303E+12	5.57835E+13	5400.14	0.0237731	0.0206351	0.0722583	0.7355397	0.63845	2.2021375	2.202138	
56:21.7	574285	6.35303E+12	5.57835E+13	5401.59	0.0237731	0.0206066	0.0722777	0.7355397	0.6375682	2.2027288	2.202729	
01:25.2	574285	6.35303E+12	5.57835E+13	5405.56	0.0248369	0.0206776	0.0723309	0.7684537	0.6397649	2.2043478	2.204348	
06:28.3	574285	6.35303E+12	5.57835E+13	5409.65	0.0248369	0.0208352	0.0723856	0.7684537	0.6446411	2.2060156	2.206016	
11:31.3	574286	6.35303E+12	5.36818E+13	5410.84	0.0248369	0.0207924	0.075236	0.7684537	0.6433169	2.2928844	2.292884	
16:34.7	574287	6.35303E+12	5.50908E+13	5403.01	0.0248369	0.020789	0.0732057	0.7684537	0.6432117	2.2310097	2.23101	
21:38.0	574287	6.35303E+12	5.50908E+13	5380.86	0.0248369	0.0208418	0.0729056	0.7684537	0.6448453	2.2218635	2.221864	
26:41.1	574288	6.35303E+12	5.6446E+13	5384.99	0.0248369	0.0208444	0.0712098	0.7684537	0.6449257	2.1701832	2.170183	
31:44.2	574289	6.35303E+12	5.61643E+13	5388.52	0.0248369	0.0219035	0.071614	0.7684537	0.6776943	2.1824996	2.1825	
36:47.6	574289	6.35303E+12	5.61643E+13	5385.01	0.0248369	0.0219719	0.0715673	0.7684537	0.6798106	2.1810779	2.181078	
41:50.8	574289	6.35303E+12	5.61643E+13	5382.53	0.0248369	0.0214093	0.0715343	0.7684537	0.6624037	2.1800735	2.180074	
46:53.8	574289	6.35303E+12	5.61643E+13	5379.16	0.0248369	0.0219768	0.0714896	0.7684537	0.6799622	2.1787085	2.178709	
51:56.9	574292	6.35303E+12	5.59818E+13	5379.99	0.0248369	0.0220687	0.0717336	0.7684537	0.6828056	2.1861462	2.186146	
57:00.0	574293	6.35303E+12	5.63654E+13	5381.68	0.0248369	0.0220272	0.0712679	0.7684537	0.6815216	2.1719525	2.171953	
02:02.8	574294	6.35303E+12	5.66874E+13	5378.04	0.026102	0.0214717	0.0708151	0.8075959	0.6643344	2.1581537	2.158154	
07:05.8	574295	6.35303E+12	5.71185E+13	5388.44	0.026102	0.0216698	0.0704165	0.8075959	0.6704636	2.1460054	2.146005	
12:09.0	574296	6.35303E+12	5.69506E+13	5391.26	0.026102	0.0218279	0.070661	0.8075959	0.6753552	2.1534583	2.153458	
17:12.0	574298	6.35303E+12	5.77593E+13	5388.44	0.026102	0.0242173	0.0696352	0.8075959	0.7492833	2.1221966	2.122197	
22:15.5	574298	6.35303E+12	5.77593E+13	5392.01	0.026102	0.0224338	0.0696814	0.8075959	0.6941018	2.1236027	2.123603	
27:18.5	574298	6.35303E+12	5.77593E+13	5397.27	0.026102	0.0259045	0.0697494	0.8075959	0.8014852	2.1256743	2.125674	
32:21.8	574300	6.35303E+12	5.74492E+13	5392.2	0.026102	0.0266314	0.07006	0.8075959	0.8239755	2.1351406	2.135141	
37:25.9	574301	6.35303E+12	5.7613E+13	5391.27	0.026102	0.0850755	0.0698488	0.8075959	2.632236	2.1287047	2.632236	
42:30.2	574301	6.35303E+12	5.7613E+13	5391.55	0.026102	0.2222933	0.0698524	0.8075959	6.8777547	2.1288153	6.877755	
47:34.8	574302	6.35303E+12	5.77583E+13	5397.52	0.026102	0.1579206	0.0697538	0.8075959	4.8860634	2.1258102	4.886063	

52:39.0	574302	6.35303E+12	5.77583E+13	5396.44	0.026102	0.1798101	0.0697399	0.8075959	5.5633245	2.1253849	5.563325
57:42.9	574305	6.35303E+12	5.8471E+13	5390.94	0.026102	0.1776521	0.0688196	0.8075959	5.496556	2.097339	5.496556
02:47.4	574305	6.35303E+12	5.8471E+13	5391.58	0.0283817	0.2214449	0.0688278	0.8781298	6.8515052	2.097588	6.851505
07:50.3	574305	6.35303E+12	5.8471E+13	5393.02	0.0283817	0.0381924	0.0688461	0.8781298	1.1816729	2.0981483	2.098148
12:53.3	574306	6.35303E+12	5.85526E+13	5393.03	0.0283817	0.0284554	0.0687504	0.8781298	0.8804101	2.0952297	2.09523
17:56.2	574309	6.35303E+12	6.00748E+13	5395.99	0.0283817	0.0254553	0.0670451	0.8781298	0.787587	2.0432598	2.04326
22:59.6	574309	6.35303E+12	6.00748E+13	5395.98	0.0283817	0.0262791	0.067045	0.8781298	0.8130754	2.043256	2.043256
28:03.3	574310	6.35303E+12	6.02983E+13	5397.49	0.0283817	0.0261018	0.0668152	0.8781298	0.8075897	2.0362532	2.036253
33:06.3	574311	6.35303E+12	6.01255E+13	5398.95	0.0283817	0.0304073	0.0670253	0.8781298	0.9408019	2.0426553	2.042655
38:09.3	574312	6.35303E+12	5.99055E+13	5397.51	0.0283817	0.0304044	0.0672535	0.8781298	0.9407121	2.0496101	2.04961
43:12.3	574312	6.35303E+12	5.99055E+13	5396.26	0.0283817	0.0304455	0.0672379	0.8781298	0.9419838	2.0491354	2.049135
48:15.1	574314	6.35303E+12	5.98595E+13	5395.6	0.0283817	0.0262044	0.0672813	0.8781298	0.8107641	2.0504592	2.050459
53:18.0	574315	6.35303E+12	5.97623E+13	5391.83	0.0283817	0.0289928	0.0673437	0.8781298	0.8970372	2.0523603	2.05236
58:21.0	574315	6.35303E+12	5.97623E+13	5389.24	0.0283817	0.0264685	0.0673114	0.8781298	0.8189354	2.0513744	2.051374
03:26.0	574317	6.35303E+12	6.04051E+13	5387.74	0.0300741	0.2152297	0.0665766	0.9304927	6.6592069	2.0289816	6.659207
08:29.4	574317	6.35303E+12	6.04051E+13	5389.07	0.0300741	0.0276958	0.066593	0.9304927	0.8569081	2.0294825	2.029483
13:33.7	574320	6.35303E+12	6.21737E+13	5394.18	0.0300741	0.228944	0.06476	0.9304927	7.0835274	1.9736205	7.083527
18:36.6	574320	6.35303E+12	6.21737E+13	5398.38	0.0300741	0.049694	0.0648105	0.9304927	1.5375324	1.9751572	1.975157
23:39.6	574320	6.35303E+12	6.21737E+13	5403.1	0.0300741	0.0377784	0.0648671	0.9304927	1.1688637	1.9768841	1.976884
28:42.4	574320	6.35303E+12	6.21737E+13	5406.31	0.0300741	0.0309783	0.0649057	0.9304927	0.9584686	1.9780586	1.978059
33:45.1	574321	6.35303E+12	6.17749E+13	5402.68	0.0300741	0.0285783	0.0652808	0.9304927	0.8842126	1.989492	1.989492
38:48.0	574321	6.35303E+12	6.17749E+13	5407.64	0.0300741	0.028437	0.0653408	0.9304927	0.8798408	1.9913185	1.991319
43:51.4	574321	6.35303E+12	6.17749E+13	5407.6	0.0300741	0.0279646	0.0653403	0.9304927	0.8652247	1.9913038	1.991304
48:54.4	574321	6.35303E+12	6.17749E+13	5409.48	0.0300741	0.0281608	0.065363	0.9304927	0.8712952	1.9919961	1.991996
53:57.3	574321	6.35303E+12	6.17749E+13	5414.01	0.0300741	0.0281735	0.0654177	0.9304927	0.8716881	1.9936642	1.993664
59:00.1	574321	6.35303E+12	6.17749E+13	5398.73	0.0300741	0.0270448	0.0652331	0.9304927	0.8367661	1.9880375	1.988038
04:03.7	574321	6.35303E+12	6.17749E+13	5392.99	0.0293844	0.0270641	0.0651637	0.9091533	0.8373633	1.9859238	1.985924
09:06.9	574321	6.35303E+12	6.17749E+13	5391.48	0.0293844	0.027187	0.0651455	0.9091533	0.8411658	1.9853677	1.985368
14:10.4	574321	6.35303E+12	6.17749E+13	5395.84	0.0293844	0.0269481	0.0651982	0.9091533	0.8337742	1.9869732	1.986973
19:13.3	574321	6.35303E+12	6.17749E+13	5394.88	0.0293844	0.0270086	0.0651866	0.9091533	0.8356461	1.9866197	1.98662
24:16.5	574321	6.35303E+12	6.17749E+13	5394.01	0.0293844	0.027136	0.0651761	0.9091533	0.8395878	1.9862994	1.986299
29:19.7	574321	6.35303E+12	6.17749E+13	5393.45	0.0293844	0.0270192	0.0651693	0.9091533	0.835974	1.9860931	1.986093
34:22.8	574322	6.35303E+12	5.8824E+13	5392.88	0.0293844	0.0269702	0.0684313	0.9091533	0.834458	2.0855052	2.085505
39:26.1	574322	6.35303E+12	5.8824E+13	5394.38	0.0293844	0.0262735	0.0684503	0.9091533	0.8129021	2.0860853	2.086085
44:29.0	574323	6.35303E+12	5.85421E+13	5392.66	0.0293844	0.0276092	0.068758	0.9091533	0.8542286	2.0954606	2.095461
49:31.9	574323	6.35303E+12	5.85421E+13	5399.52	0.0293844	0.0268734	0.0688454	0.9091533	0.831463	2.0981263	2.098126
54:34.7	574324	6.35303E+12	5.81584E+13	5403.19	0.0293844	0.0277725	0.0693467	0.9091533	0.8592812	2.1134037	2.113404
59:37.5	574326	6.35303E+12	5.98016E+13	5404.52	0.0293844	0.0305521	0.0674579	0.9091533	0.945282	2.055839	2.055839
04:40.2	574326	6.35303E+12	5.98016E+13	5400.73	0.0303728	0.0361938	0.0674106	0.9397344	1.1198362	2.0543973	2.054397
09:43.0	574327	6.35303E+12	5.96067E+13	5400.79	0.0303728	0.0289272	0.0676317	0.9397344	0.8950076	2.0611364	2.061136
14:45.8	574327	6.35303E+12	5.96067E+13	5402.51	0.0303728	0.0277593	0.0676532	0.9397344	0.8588727	2.0617928	2.061793
19:48.6	574328	6.35303E+12	5.96752E+13	5405.01	0.0303728	0.0260079	0.0676069	0.9397344	0.8046844	2.0603812	2.060381
24:53.1	574328	6.35303E+12	5.96752E+13	5405.56	0.0303728	0.027473	0.0676138	0.9397344	0.8500146	2.0605909	2.060591
29:56.2	574328	6.35303E+12	5.96752E+13	5413.98	0.0303728	0.0272669	0.0677191	0.9397344	0.8436379	2.0638005	2.063801
34:59.4	574329	6.35303E+12	5.94855E+13	5414.16	0.0303728	0.027398	0.0679373	0.9397344	0.8476941	2.0704516	2.070452
40:02.3	574330	6.35303E+12	5.97035E+13	5414.01	0.0303728	0.0273913	0.0676874	0.9397344	0.8474868	2.0628341	2.062834
45:05.1	574331	6.35303E+12	5.96567E+13	5411.51	0.0303728	0.0260921	0.0677092	0.9397344	0.8072896	2.0634981	2.063498
50:08.5	574333	6.35303E+12	5.9734E+13	5408.31	0.0303728	0.0272287	0.0675816	0.9397344	0.842456	2.0596102	2.05961
55:11.1	574333	6.35303E+12	5.9734E+13	5400.01	0.0303728	0.0272351	0.0674779	0.9397344	0.842654	2.0564494	2.056449
05:16.6	574335	6.35303E+12	5.9018E+13	5400.72	0.0292151	0.0284932	0.0683055	0.9039152	0.8815796	2.0816708	2.081671

10:20.2	574337	6.35303E+12	6.04407E+13	5401.43	0.0292151	0.0273247	0.0667064	0.9039152	0.8454262	2.0329364	2.032936	
15:23.2	574337	6.35303E+12	6.04407E+13	5403.84	0.0292151	0.0270874	0.0667361	0.9039152	0.8380842	2.0338434	2.033843	
20:26.3	574340	6.35303E+12	6.01388E+13	5404.02	0.0292151	0.0266421	0.0670734	0.9039152	0.8243066	2.044123	2.044123	
30:31.9	574342	6.35303E+12	6.0482E+13	5405.55	0.0292151	0.0261271	0.0667116	0.9039152	0.8083725	2.0330975	2.033098	
35:34.8	574343	6.35303E+12	5.99395E+13	5400.01	0.0292151	0.0267626	0.0672465	0.9039152	0.8280348	2.0493965	2.049397	
40:37.9	574343	6.35303E+12	5.99395E+13	5399.02	0.0292151	0.0266166	0.0672341	0.9039152	0.8235176	2.0490207	2.049021	
45:41.0	574344	6.35303E+12	5.95861E+13	5399.01	0.0292151	0.0272594	0.0676328	0.9039152	0.8434058	2.0611697	2.06117	
50:43.8	574344	6.35303E+12	5.95861E+13	5394.85	0.0292151	0.0266036	0.0675807	0.9039152	0.8231154	2.0595816	2.059582	
55:46.5	574344	6.35303E+12	5.95861E+13	5398.35	0.0292151	0.0268144	0.0676245	0.9039152	0.8296375	2.0609177	2.060918	
00:51.0	574345	6.35303E+12	5.83668E+13	5398.44	0.0282594	0.2283316	0.0690384	0.8743458	7.0645797	2.1040074	7.06458	
05:53.8	574346	6.35303E+12	5.84022E+13	5394.51	0.0282594	0.0270103	0.0689463	0.8743458	0.8356987	2.1012014	2.101201	
10:57.1	574347	6.35303E+12	5.86008E+13	5396.65	0.0282594	0.0270877	0.0687399	0.8743458	0.8380934	2.0949115	2.094912	
16:00.5	574347	6.35303E+12	5.86008E+13	5399.98	0.0282594	0.0272394	0.0687824	0.8743458	0.842787	2.0962041	2.096204	
21:03.5	574348	6.35303E+12	5.87322E+13	5397.6	0.0282594	0.0269131	0.0685982	0.8743458	0.8326913	2.0905929	2.090593	
26:07.8	574348	6.35303E+12	5.87322E+13	5396.94	0.0282594	0.2272329	0.0685898	0.8743458	7.0305859	2.0903373	7.030586	
31:11.2	574349	6.35303E+12	5.84595E+13	5395.06	0.0282594	0.0368119	0.0688857	0.8743458	1.1389602	2.0993542	2.099354	
36:14.2	574350	6.35303E+12	5.91267E+13	5396.77	0.0282594	0.0273647	0.06813	0.8743458	0.8466638	2.0763241	2.076324	
41:17.0	574350	6.35303E+12	5.91267E+13	5395.88	0.0282594	0.0250754	0.0681188	0.8743458	0.7758329	2.0759816	2.075982	
46:20.3	574351	6.35303E+12	5.92508E+13	5395.8	0.0282594	0.0257701	0.0679751	0.8743458	0.7973269	2.0716025	2.071603	
51:23.3	574351	6.35303E+12	5.92508E+13	5393.06	0.0282594	0.0249811	0.0679406	0.8743458	0.7729152	2.0705505	2.070551	
56:25.9	574351	6.35303E+12	5.92508E+13	5391.33	0.0282594	0.0252147	0.0679188	0.8743458	0.7801428	2.0698863	2.069886	
01:28.7	574351	6.35303E+12	5.92508E+13	5390.01	0.0294875	0.0252863	0.0679022	0.9123433	0.7823581	2.0693795	2.06938	
06:31.8	574351	6.35303E+12	5.92508E+13	5374.44	0.0294875	0.0227695	0.067706	0.9123433	0.7044883	2.0634017	2.063402	
11:34.6	574351	6.35303E+12	5.92508E+13	5371.81	0.0294875	0.0228204	0.0676729	0.9123433	0.7060632	2.062392	2.062392	
16:37.4	574352	6.35303E+12	5.79249E+13	5372.6	0.0294875	0.024445	0.0692321	0.9123433	0.7563283	2.1099115	2.109912	
21:40.3	574353	6.35303E+12	5.95341E+13	5377.77	0.0294875	0.0231413	0.0674255	0.9123433	0.7159918	2.0548543	2.054854	
26:43.1	574353	6.35303E+12	5.95341E+13	5384.99	0.0294875	0.0250495	0.0675161	0.9123433	0.7750315	2.0576131	2.057613	
31:45.9	574353	6.35303E+12	5.95341E+13	5393.61	0.0294875	0.0254698	0.0676241	0.9123433	0.7880356	2.0609068	2.060907	
36:48.6	574353	6.35303E+12	5.95341E+13	5395.02	0.0294875	0.0254096	0.0676418	0.9123433	0.786173	2.0614455	2.061446	
41:51.5	574353	6.35303E+12	5.95341E+13	5401.49	0.0294875	0.0250828	0.0677229	0.9123433	0.7760618	2.0639177	2.063918	
46:55.3	574356	6.35303E+12	6.01278E+13	5393.39	0.0294875	0.0235193	0.0669538	0.9123433	0.7276871	2.0404768	2.040477	
51:58.7	574356	6.35303E+12	6.01278E+13	5401.9	0.0294875	0.0249891	0.0670594	0.9123433	0.7731628	2.0436963	2.043696	
57:01.6	574357	6.35303E+12	5.98782E+13	5404.01	0.0294875	0.0221317	0.0673653	0.9123433	0.6847548	2.0530169	2.053017	
02:04.6	574357	6.35303E+12	5.98782E+13	5410.44	0.0358722	0.021966	0.0674454	1.1098859	0.679628	2.0554597	2.05546	
07:08.5	574357	6.35303E+12	5.98782E+13	5413.48	0.0358722	0.0217579	0.0674833	1.1098859	0.6731894	2.0566147	2.056615	
12:11.9	574359	6.35303E+12	5.99023E+13	5412.99	0.0358722	0.0219837	0.0674501	1.1098859	0.6801757	2.0556012	2.055601	
17:15.2	574360	6.35303E+12	6.0023E+13	5413.64	0.0358722	0.0220791	0.0673224	1.1098859	0.6831274	2.0517109	2.051711	
22:18.3	574360	6.35303E+12	6.0023E+13	5409.57	0.0358722	0.0229158	0.0672718	1.1098859	0.7090149	2.0501684	2.050168	
27:22.6	574360	6.35303E+12	6.0023E+13	5403.2	0.0358722	0.0226755	0.0671926	1.1098859	0.70158	2.0477543	2.047754	
32:25.6	574361	6.35303E+12	5.95038E+13	5409.65	0.0358722	0.0247112	0.0678598	1.1098859	0.7645645	2.068088	2.068088	
37:29.5	574361	6.35303E+12	5.95038E+13	5414.99	0.0358722	0.0361625	0.0679268	1.1098859	1.1188678	2.0701294	2.070129	
42:32.7	574362	6.35303E+12	5.87448E+13	5422.88	0.0358722	0.0240264	0.0689047	1.1098859	0.7433768	2.0999322	2.099932	
47:36.4	574362	6.35303E+12	5.87448E+13	5432.58	0.0358722	0.0226338	0.0690279	1.1098859	0.7002898	2.1036884	2.103688	
52:39.7	574362	6.35303E+12	5.87448E+13	5428.01	0.0358722	0.0242397	0.0689699	1.1098859	0.7499763	2.1019188	2.101919	
57:42.7	574363	6.35303E+12	5.80502E+13	5427.15	0.0358722	0.032838	0.0697841	1.1098859	1.0160077	2.1267343	2.126734	
02:45.9	574364	6.35303E+12	5.78645E+13	5427.23	0.0269724	0.048486	0.0700091	0.8345261	1.5001568	2.1335902	2.13359	
07:49.0	574364	6.35303E+12	5.78645E+13	5441.99	0.0269724	0.0436141	0.0701995	0.8345261	1.3494203	2.1393928	2.139393	
12:51.9	574365	6.35303E+12	5.73396E+13	5428.97	0.0269724	0.0245126	0.0706726	0.8345261	0.7584198	2.1538115	2.153812	
17:54.9	574367	6.35303E+12	5.84533E+13	5439.06	0.0269724	0.0248829	0.069455	0.8345261	0.7698769	2.1167024	2.116702	
22:58.1	574367	6.35303E+12	5.84533E+13	5434.48	0.0269724	0.023353	0.0693965	0.8345261	0.7225418	2.1149201	2.11492	

28:01.3	574368	6.35303E+12	5.81378E+13	5438.3	0.0269724	0.0216344	0.0698221	0.8345261	0.6693683	2.1278923	2.127892
33:04.7	574368	6.35303E+12	5.81378E+13	5439.66	0.0269724	0.0213325	0.0698396	0.8345261	0.6600276	2.1284244	2.128424
38:08.1	574369	6.35303E+12	5.7527E+13	5442.57	0.0269724	0.0208171	0.0706189	0.8345261	0.6440811	2.1521741	2.152174
43:11.1	574370	6.35303E+12	5.73316E+13	5444.99	0.0269724	0.0201683	0.0708911	0.8345261	0.6240072	2.1604697	2.16047
48:14.1	574370	6.35303E+12	5.73316E+13	5466.35	0.0269724	0.0200828	0.0711692	0.8345261	0.6213618	2.1689449	2.168945
53:17.4	574370	6.35303E+12	5.73316E+13	5469.28	0.0269724	0.0197299	0.0712073	0.8345261	0.6104431	2.1701075	2.170108
58:20.4	574373	6.35303E+12	5.75391E+13	5468.81	0.0269724	0.0200014	0.0709444	0.8345261	0.6188433	2.1620944	2.162094
03:23.6	574373	6.35303E+12	5.75391E+13	5471.06	0.0207906	0.0196896	0.0709736	0.6432612	0.6091962	2.1629839	2.162984
08:26.7	574374	6.35303E+12	5.70787E+13	5464.23	0.0207906	0.0194455	0.0714567	0.6432612	0.6016438	2.177708	2.177708
13:29.7	574374	6.35303E+12	5.70787E+13	5456.01	0.0207906	0.0198243	0.0713492	0.6432612	0.6133638	2.1744321	2.174432
23:35.9	574376	6.35303E+12	5.68162E+13	5459.27	0.0207906	0.0215706	0.0717217	0.6432612	0.6673944	2.185782	2.185782
28:38.8	574376	6.35303E+12	5.68162E+13	5454.55	0.0207906	0.0196633	0.0716596	0.6432612	0.6083825	2.1838922	2.183892
38:44.6	574377	6.35303E+12	5.63276E+13	5466.4	0.0207906	0.0221114	0.0724384	0.6432612	0.6841267	2.2076251	2.207625
43:47.3	574377	6.35303E+12	5.63276E+13	5465.31	0.0207906	0.0214445	0.0724239	0.6432612	0.6634928	2.2071849	2.207185
48:50.6	574378	6.35303E+12	5.65074E+13	5471.97	0.0207906	0.0214515	0.0722814	0.6432612	0.6637094	2.2028417	2.202842
53:53.3	574378	6.35303E+12	5.65074E+13	5467.7	0.0207906	0.0210118	0.072225	0.6432612	0.6501051	2.2011227	2.201123
58:56.2	574379	6.35303E+12	5.75462E+13	5464.7	0.0207906	0.019883	0.0708824	0.6432612	0.61518	2.1602037	2.160204
04:31.8	574384	6.35303E+12	5.65611E+13	5475.86	0.01793	0.0189255	0.0722642	0.5547542	0.585555	2.2023153	2.202315
09:34.9	574384	6.35303E+12	5.65611E+13	5473.44	0.01793	0.0188962	0.0722322	0.5547542	0.5846484	2.201342	2.201342
14:37.8	574384	6.35303E+12	5.65611E+13	5475.01	0.01793	0.018951	0.0722529	0.5547542	0.5863439	2.2019735	2.201974
19:40.7	574384	6.35303E+12	5.65611E+13	5478.95	0.01793	0.0186057	0.0723049	0.5547542	0.5756604	2.2035581	2.203558
24:43.7	574384	6.35303E+12	5.65611E+13	5485.86	0.01793	0.0184337	0.0723961	0.5547542	0.5703387	2.2063372	2.206337
29:46.4	574385	6.35303E+12	5.52675E+13	5483.01	0.01793	0.0180784	0.0740521	0.5547542	0.5593457	2.2568058	2.256806
34:49.2	574386	6.35303E+12	5.5002E+13	5487.88	0.01793	0.0183673	0.0744757	0.5547542	0.5682843	2.2697143	2.269714
39:52.0	574387	6.35303E+12	5.4816E+13	5489.7	0.01793	0.0188157	0.0747532	0.5547542	0.5821578	2.278171	2.278171
44:55.2	574387	6.35303E+12	5.4816E+13	5485.01	0.01793	0.0183954	0.0746893	0.5547542	0.5691537	2.2762247	2.276225
49:58.0	574387	6.35303E+12	5.4816E+13	5494.4	0.01793	0.0185406	0.0748172	0.5547542	0.5736462	2.2801215	2.280122
55:00.7	574387	6.35303E+12	5.4816E+13	5492.41	0.01793	0.018494	0.0747901	0.5547542	0.5722044	2.2792957	2.279296
00:04.0	574388	6.35303E+12	5.41076E+13	5491.83	0.0169796	0.0185045	0.0757612	0.5253488	0.5725292	2.3088909	2.308891
05:07.0	574388	6.35303E+12	5.41076E+13	5492.5	0.0169796	0.0185003	0.0757704	0.5253488	0.5723993	2.3091726	2.309173
10:10.3	574388	6.35303E+12	5.41076E+13	5499.47	0.0169796	0.0184926	0.0758666	0.5253488	0.572161	2.3121029	2.312103
15:13.1	574390	6.35303E+12	5.36713E+13	5499.81	0.0169796	0.0184921	0.0764881	0.5253488	0.5721456	2.3310446	2.331045
20:15.9	574393	6.35303E+12	5.4543E+13	5532.69	0.0169796	0.0189826	0.0757157	0.5253488	0.5873216	2.3075042	2.307504
25:19.0	574393	6.35303E+12	5.4543E+13	5532.49	0.0169796	0.0194997	0.075713	0.5253488	0.6033207	2.3074208	2.307421
30:22.4	574393	6.35303E+12	5.4543E+13	5536.93	0.0169796	0.01969	0.0757737	0.5253488	0.6092086	2.3092726	2.309273
35:25.7	574393	6.35303E+12	5.4543E+13	5564.48	0.0169796	0.0196471	0.0761508	0.5253488	0.6078813	2.3207628	2.320763
40:28.5	574394	6.35303E+12	5.38779E+13	5538.44	0.0169796	0.0199408	0.0767299	0.5253488	0.6169684	2.3384139	2.338414
45:31.4	574395	6.35303E+12	5.53825E+13	5520.08	0.0169796	0.0196539	0.074398	0.5253488	0.6080917	2.2673468	2.267347
50:34.1	574395	6.35303E+12	5.53825E+13	5520.48	0.0169796	0.0197095	0.0744034	0.5253488	0.6098119	2.2675111	2.267511
55:37.0	574395	6.35303E+12	5.53825E+13	5515.98	0.0169796	0.0193539	0.0743428	0.5253488	0.5988097	2.2656627	2.265663
00:39.8	574395	6.35303E+12	5.53825E+13	5518.69	0.0176483	0.0193487	0.0743793	0.5460384	0.5986488	2.2667759	2.266776
05:43.2	574395	6.35303E+12	5.53825E+13	5531.68	0.0176483	0.0192845	0.0745544	0.5460384	0.5966624	2.2721114	2.272111
10:46.2	574395	6.35303E+12	5.53825E+13	5528.2	0.0176483	0.0191026	0.0745075	0.5460384	0.5910344	2.270682	2.270682
15:49.5	574396	6.35303E+12	5.44713E+13	5541.2	0.0176483	0.0190542	0.075932	0.5460384	0.5895369	2.3140947	2.314095
20:52.5	574396	6.35303E+12	5.44713E+13	5544.69	0.0176483	0.0190808	0.0759798	0.5460384	0.59036	2.3155521	2.315552
25:55.5	574396	6.35303E+12	5.44713E+13	5552.98	0.0176483	0.019178	0.0760934	0.5460384	0.5933673	2.3190142	2.319014
30:59.2	574397	6.35303E+12	5.38389E+13	5536.99	0.0176483	0.018807	0.0767654	0.5460384	0.5818886	2.3394943	2.339494
41:05.7	574397	6.35303E+12	5.38389E+13	5578.73	0.0176483	0.0189594	0.0773441	0.5460384	0.5866038	2.3571303	2.35713
46:09.1	574397	6.35303E+12	5.38389E+13	5587.27	0.0176483	0.0190541	0.0774625	0.5460384	0.5895339	2.3607386	2.360739
51:12.8	574397	6.35303E+12	5.38389E+13	5577.62	0.0176483	0.0195343	0.0773287	0.5460384	0.6043912	2.3566613	2.356661

56:15.8	574397	6.35303E+12	5.38389E+13	5578.43	0.0176483	0.0195897	0.0773399	0.5460384	0.6061053	2.3570036	2.357004	
01:18.8	574398	6.35303E+12	5.24135E+13	5585.77	0.0178528	0.0199086	0.0795478	0.5523656	0.6159721	2.42429	2.42429	
06:21.7	574399	6.35303E+12	5.22154E+13	5570.36	0.0178528	0.0200685	0.0796293	0.5523656	0.6209194	2.4267736	2.426774	
11:24.5	574400	6.35303E+12	5.19602E+13	5563.2	0.0178528	0.0198898	0.0799175	0.5523656	0.6153904	2.4355582	2.435558	
16:27.7	574400	6.35303E+12	5.19602E+13	5579.23	0.0178528	0.0199775	0.0801478	0.5523656	0.6181039	2.4425761	2.442576	
21:30.9	574400	6.35303E+12	5.19602E+13	5571.91	0.0178528	0.0199738	0.0800426	0.5523656	0.6179894	2.4393714	2.439371	
26:33.7	574401	6.35303E+12	5.14241E+13	5570.27	0.0178528	0.0201313	0.0808533	0.5523656	0.6228624	2.4640783	2.464078	
31:36.6	574402	6.35303E+12	5.15991E+13	5562.53	0.0178528	0.0200901	0.0804671	0.5523656	0.6215877	2.4523071	2.452307	
36:39.5	574402	6.35303E+12	5.15991E+13	5598.28	0.0178528	0.0208431	0.0809843	0.5523656	0.6448855	2.4680679	2.468068	
41:42.6	574404	6.35303E+12	5.22163E+13	5622.51	0.0178528	0.0203289	0.0803735	0.5523656	0.6289762	2.4494541	2.449454	
46:45.4	574405	6.35303E+12	5.26766E+13	5610.46	0.0178528	0.0223107	0.0795004	0.5523656	0.6902931	2.4228448	2.422845	
51:48.0	574406	6.35303E+12	5.44332E+13	5697.34	0.0178528	0.0203729	0.0781261	0.5523656	0.6303375	2.3809636	2.380964	
56:51.2	574407	6.35303E+12	5.44179E+13	5660.07	0.0178528	0.0202985	0.077637	0.5523656	0.6280356	2.3660567	2.366057	
01:53.8	574407	6.35303E+12	5.44179E+13	5667.78	0.018673	0.019187	0.0777427	0.5777426	0.5936458	2.3692797	2.36928	
06:56.8	574408	6.35303E+12	5.43366E+13	5661.93	0.018673	0.0198179	0.0777787	0.5777426	0.6131658	2.3703744	2.370374	
11:59.7	574409	6.35303E+12	5.45039E+13	5688.4	0.018673	0.0201109	0.0779024	0.5777426	0.6222312	2.3741451	2.374145	
17:02.5	574409	6.35303E+12	5.45039E+13	5705.82	0.018673	0.0203436	0.0781409	0.5777426	0.629431	2.3814156	2.381416	
22:05.5	574409	6.35303E+12	5.45039E+13	5684.26	0.018673	0.0227072	0.0778457	0.5777426	0.7025608	2.3724172	2.372417	
27:08.6	574410	6.35303E+12	5.4739E+13	5675.94	0.018673	0.020882	0.0773979	0.5777426	0.6460891	2.3587711	2.358771	
32:12.0	574410	6.35303E+12	5.4739E+13	5704.8	0.018673	0.0217919	0.0777915	0.5777426	0.6742414	2.3707646	2.370765	
37:15.1	574410	6.35303E+12	5.4739E+13	5701.98	0.018673	0.0218761	0.077753	0.5777426	0.6768465	2.3695926	2.369593	
42:18.0	574410	6.35303E+12	5.4739E+13	5732.34	0.018673	0.0216156	0.078167	0.5777426	0.6687867	2.3822095	2.38221	
47:21.3	574410	6.35303E+12	5.4739E+13	5753.01	0.018673	0.0231724	0.0784489	0.5777426	0.7169541	2.3907994	2.390799	
52:24.4	574410	6.35303E+12	5.4739E+13	5756.81	0.018673	0.0236957	0.0785007	0.5777426	0.733145	2.3923786	2.392379	
07:33.5	574412	6.35303E+12	5.33495E+13	5695.4	0.0236366	0.0226621	0.0796861	0.7313164	0.7011654	2.4285046	2.428505	
12:36.5	574412	6.35303E+12	5.33495E+13	5717.23	0.0236366	0.0234957	0.0799915	0.7313164	0.726957	2.4378128	2.437813	
17:39.6	574413	6.35303E+12	5.25253E+13	5714.11	0.0236366	0.0236965	0.0812022	0.7313164	0.7331697	2.4747113	2.474711	
22:42.4	574413	6.35303E+12	5.25253E+13	5730.11	0.0236366	0.0223574	0.0814296	0.7313164	0.691738	2.4816407	2.481641	
27:45.2	574413	6.35303E+12	5.25253E+13	5715.55	0.0236366	0.0257048	0.0812227	0.7313164	0.7953065	2.475335	2.475335	
32:48.0	574414	6.35303E+12	5.19701E+13	5734.99	0.0236366	0.0255095	0.0823697	0.7313164	0.7892639	2.5102894	2.510289	
37:50.7	574414	6.35303E+12	5.19701E+13	5743.05	0.0236366	0.0257825	0.0824854	0.7313164	0.7977106	2.5138174	2.513817	
47:55.8	574419	6.35303E+12	5.263E+13	5733.81	0.0236366	0.0226332	0.0813201	0.7313164	0.7002712	2.4783037	2.478304	
52:58.6	574420	6.35303E+12	5.25895E+13	5702.24	0.0236366	0.0365861	0.0809348	0.7313164	1.1319739	2.4665598	2.46656	
03:05.1	574422	6.35303E+12	5.2543E+13	5687.09	0.0270381	0.0220677	0.080791	0.8365588	0.6827746	2.4621796	2.46218	
08:08.3	574424	6.35303E+12	5.28202E+13	5689.31	0.0270381	0.021979	0.0803985	0.8365588	0.6800303	2.4502159	2.450216	
13:11.1	574424	6.35303E+12	5.28202E+13	5696.24	0.0270381	0.0220696	0.0804964	0.8365588	0.6828334	2.4532005	2.453201	
18:13.9	574424	6.35303E+12	5.28202E+13	5678.52	0.0270381	0.0284763	0.080246	0.8365588	0.8810567	2.445569	2.445569	
23:16.6	574426	6.35303E+12	5.30049E+13	5680.01	0.0270381	0.0489843	0.0799874	0.8365588	1.5155742	2.4376872	2.437687	
28:21.0	574427	6.35303E+12	5.28466E+13	5679.28	0.0270381	0.2387125	0.0802166	0.8365588	7.3857647	2.4446732	7.385765	
33:25.0	574427	6.35303E+12	5.28466E+13	5698.99	0.0270381	0.2311826	0.080495	0.8365588	7.1527896	2.4531574	7.15279	
38:27.9	574427	6.35303E+12	5.28466E+13	5702.85	0.0270381	0.0493653	0.0805495	0.8365588	1.5273624	2.454819	2.454819	
43:31.1	574428	6.35303E+12	5.2354E+13	5722.4	0.0270381	0.0281258	0.0815862	0.8365588	0.8702123	2.4864117	2.486412	
48:33.8	574428	6.35303E+12	5.2354E+13	5716.73	0.0270381	0.0284039	0.0815053	0.8365588	0.8788167	2.483948	2.483948	
53:36.7	574428	6.35303E+12	5.2354E+13	5711.78	0.0270381	0.02865	0.0814347	0.8365588	0.886431	2.4817972	2.481797	
58:39.3	574429	6.35303E+12	5.15634E+13	5700.85	0.0270381	0.0241868	0.0825252	0.8365588	0.7483396	2.5150298	2.51503	
03:42.5	574429	6.35303E+12	5.15634E+13	5699.99	0.0277604	0.0226736	0.0825128	0.8589068	0.7015212	2.5146504	2.51465	
08:45.2	574429	6.35303E+12	5.15634E+13	5715.88	0.0277604	0.0234588	0.0827428	0.8589068	0.7258153	2.5216605	2.521661	
13:48.0	574430	6.35303E+12	5.12815E+13	5716.7	0.0277604	0.0236299	0.0832095	0.8589068	0.7311091	2.5358831	2.535883	
18:51.3	574430	6.35303E+12	5.12815E+13	5707.94	0.0277604	0.0239638	0.0830819	0.8589068	0.74144	2.5319972	2.531997	
23:54.2	574430	6.35303E+12	5.12815E+13	5728.45	0.0277604	0.0239508	0.0833805	0.8589068	0.7410378	2.5410953	2.541095	

28:57.1	574430	6.35303E+12	5.12815E+13	5736.02	0.0277604	0.0240308	0.0834907	0.8589068	0.743513	2.5444533	2.544453
33:59.8	574430	6.35303E+12	5.12815E+13	5740.86	0.0277604	0.0248987	0.0835611	0.8589068	0.7703658	2.5466002	2.5466
39:02.8	574430	6.35303E+12	5.12815E+13	5735.65	0.0277604	0.02456	0.0834853	0.8589068	0.7598864	2.5442891	2.544289
44:05.8	574430	6.35303E+12	5.12815E+13	5732.1	0.0277604	0.0249204	0.0834336	0.8589068	0.7710372	2.5427144	2.542714
49:08.6	574431	6.35303E+12	4.97074E+13	5725.7	0.0277604	0.0480883	0.0859796	0.8589068	1.487852	2.6203068	2.620307
54:11.5	574432	6.35303E+12	4.99455E+13	5720.02	0.0277604	0.0288004	0.0854849	0.8589068	0.8910844	2.6052295	2.60523
59:14.4	574432	6.35303E+12	4.99455E+13	5706.01	0.0277604	0.0478212	0.0852755	0.8589068	1.4795879	2.5988485	2.598849
04:17.3	574433	6.35303E+12	4.98413E+13	5720.99	0.027778	0.0269386	0.0856781	0.8594513	0.8334803	2.6111164	2.611116
09:20.0	574435	6.35303E+12	4.97656E+13	5725.87	0.027778	0.0240209	0.0858817	0.8594513	0.7432066	2.6173216	2.617322
14:23.2	574435	6.35303E+12	4.97656E+13	5733.32	0.027778	0.0249794	0.0859934	0.8594513	0.7728626	2.620727	2.620727
19:26.0	574437	6.35303E+12	4.98823E+13	5729.99	0.027778	0.0275281	0.0857423	0.8594513	0.8517194	2.6130745	2.613075
29:31.7	574439	6.35303E+12	4.96328E+13	5746.56	0.027778	0.0485069	0.0864226	0.8594513	1.5008035	2.6338056	2.633806
34:35.2	574441	6.35303E+12	5.04581E+13	5735.82	0.027778	0.0272909	0.0848502	0.8594513	0.8443804	2.5858866	2.585887
39:38.2	574441	6.35303E+12	5.04581E+13	5745.02	0.027778	0.0271114	0.0849863	0.8594513	0.8388267	2.5900343	2.590034
44:40.9	574442	6.35303E+12	5.28842E+13	5751.06	0.027778	0.0487904	0.0811728	0.8594513	1.509575	2.4738132	2.473813
54:46.1	574442	6.35303E+12	5.28842E+13	5741.39	0.027778	0.0269661	0.0810363	0.8594513	0.8343311	2.4696537	2.469654
59:49.2	574443	6.35303E+12	5.28228E+13	5739.18	0.027778	0.0258253	0.0810993	0.8594513	0.7990348	2.4715738	2.471574
04:52.0	574443	6.35303E+12	5.28228E+13	5735.16	0.0303126	0.0260635	0.0810425	0.9378718	0.8064047	2.4698426	2.469843
09:54.9	574443	6.35303E+12	5.28228E+13	5753.15	0.0303126	0.0249105	0.0812967	0.9378718	0.7707309	2.47759	2.47759
14:57.9	574443	6.35303E+12	5.28228E+13	5760.65	0.0303126	0.0251299	0.0814027	0.9378718	0.7775191	2.4808199	2.48082
20:00.9	574443	6.35303E+12	5.28228E+13	5758.01	0.0303126	0.0254432	0.0813654	0.9378718	0.7872126	2.4796829	2.479683
30:06.6	574445	6.35303E+12	5.19166E+13	5760.01	0.0303126	0.0282726	0.0828144	0.9378718	0.8747542	2.5238421	2.523842
35:09.9	574446	6.35303E+12	5.17083E+13	5750.9	0.0303126	0.0348358	0.0830164	0.9378718	1.0778197	2.5299985	2.529999
40:13.0	574446	6.35303E+12	5.17083E+13	5762.47	0.0303126	0.0280725	0.0831834	0.9378718	0.8685632	2.5350885	2.535089
45:15.9	574446	6.35303E+12	5.17083E+13	5753.72	0.0303126	0.026982	0.0830571	0.9378718	0.8348231	2.5312392	2.531239
50:18.7	574448	6.35303E+12	5.19511E+13	5754.06	0.0303126	0.0268925	0.0826737	0.9378718	0.832054	2.5195561	2.519556
00:24.0	574448	6.35303E+12	5.19511E+13	5721.44	0.0294253	0.0271858	0.082205	0.9104188	0.8411287	2.5052726	2.505273
05:27.0	574448	6.35303E+12	5.19511E+13	5706.98	0.0294253	0.0253359	0.0819973	0.9104188	0.7838927	2.4989409	2.498941
10:30.3	574449	6.35303E+12	5.17328E+13	5701.52	0.0294253	0.0259191	0.0822646	0.9104188	0.801937	2.5070865	2.507087
15:33.5	574450	6.35303E+12	5.16724E+13	5720.36	0.0294253	0.0262614	0.0826329	0.9104188	0.8125277	2.5183117	2.518312
20:36.3	574450	6.35303E+12	5.16724E+13	5715.9	0.0294253	0.0259411	0.0825685	0.9104188	0.8026176	2.5163482	2.516348
25:39.3	574450	6.35303E+12	5.16724E+13	5710.01	0.0294253	0.02602	0.0824834	0.9104188	0.8050588	2.5137552	2.513755
30:42.6	574450	6.35303E+12	5.16724E+13	5720.01	0.0294253	0.0257416	0.0826278	0.9104188	0.7964451	2.5181576	2.518158
35:45.4	574450	6.35303E+12	5.16724E+13	5725.31	0.0294253	0.0263149	0.0827044	0.9104188	0.814183	2.5204908	2.520491
40:48.2	574452	6.35303E+12	5.09821E+13	5714.39	0.0294253	0.0264506	0.0836643	0.9104188	0.8183816	2.5497457	2.549746
45:51.1	574454	6.35303E+12	5.11925E+13	5720.01	0.0294253	0.0252602	0.0834024	0.9104188	0.7815506	2.5417623	2.541762
50:54.1	574454	6.35303E+12	5.11925E+13	5704.48	0.0294253	0.0244985	0.0831759	0.9104188	0.7579836	2.5348614	2.534861
55:57.1	574454	6.35303E+12	5.11925E+13	5713.35	0.0294253	0.0241693	0.0833053	0.9104188	0.7477981	2.5388029	2.538803
00:59.9	574454	6.35303E+12	5.11925E+13	5714.69	0.0318592	0.0253433	0.0833248	0.9857236	0.7841217	2.5393983	2.539398
06:03.5	574454	6.35303E+12	5.11925E+13	5710.33	0.0318592	0.0243257	0.0832612	0.9857236	0.7526372	2.5374609	2.537461
11:07.4	574454	6.35303E+12	5.11925E+13	5705.52	0.0318592	0.0246413	0.0831911	0.9857236	0.7624018	2.5353235	2.535324

datetime	block_height	network_diff	est_network_hashrate	BTC_price	day_ahead_LMP	real_time_LMP	breakeven_mining_cost	day_ahead_LMP_rev	real_time_LMP_rev	mining_rev	realized_rev
22:20.9	574204	6.35303E+12	5.38327E+13	5320.02	0.0054942	0.0058423	0.0737658	0.1699905	0.1807608	2.2480786	2.2480786
27:24.1	574204	6.35303E+12	5.38327E+13	5320.01	0.0054942	0.0062269	0.0737656	0.1699905	0.1926603	2.2480744	2.2480744
32:27.2	574204	6.35303E+12	5.38327E+13	5321.94	0.0054942	0.0045157	0.0737924	0.1699905	0.1397158	2.24889	2.24889
37:30.3	574205	6.35303E+12	5.30839E+13	5321.95	0.0054942	0.0035338	0.0748335	0.1699905	0.1093358	2.2806172	2.2806172
42:33.3	574205	6.35303E+12	5.30839E+13	5326.19	0.0054942	0.002277	0.0748931	0.1699905	0.0704504	2.2824342	2.2824342
47:36.1	574206	6.35303E+12	5.44532E+13	5328.27	0.0054942	0.0051513	0.0730384	0.1699905	0.1593812	2.225912	2.225912
52:39.2	574206	6.35303E+12	5.44532E+13	5328.65	0.0054942	0.0072185	0.0730436	0.1699905	0.2233404	2.2260707	2.2260707
57:42.1	574207	6.35303E+12	5.39845E+13	5327.68	0.0054942	0.0010915	0.0736643	0.1699905	0.033771	2.2449863	2.2449863
02:45.4	574207	6.35303E+12	5.39845E+13	5327.22	0.0007072	0.0026959	0.073658	0.0218808	0.0834111	2.2447925	2.2447925
07:48.3	574208	6.35303E+12	5.34662E+13	5325.01	0.0007072	-0.0034108	0.0743412	0.0218808	-0.1055302	2.2656139	2.2656139
12:51.5	574208	6.35303E+12	5.34662E+13	5325.01	0.0007072	-0.0088288	0.0743412	0.0218808	-0.2731631	2.2656139	2.2656139
17:54.3	574209	6.35303E+12	5.33477E+13	5321.01	0.0007072	0.0005301	0.0744503	0.0218808	0.0164013	2.2689395	2.2689395
22:57.3	574209	6.35303E+12	5.33477E+13	5327.95	0.0007072	0.0007828	0.0745474	0.0218808	0.0242198	2.2718988	2.2718988
28:01.3	574211	6.35303E+12	5.42133E+13	5325.19	0.0007072	-0.0182739	0.0733191	0.0218808	-0.5653945	2.2344662	2.2344662
33:04.8	574212	6.35303E+12	5.54528E+13	5323.43	0.0007072	-0.0301375	0.0716566	0.0218808	-0.9324543	2.1838	2.1838
38:07.8	574214	6.35303E+12	5.533E+13	5323.35	0.0007072	-0.0305618	0.0718145	0.0218808	-0.9455821	2.1886119	2.1886119
43:10.7	574215	6.35303E+12	5.58834E+13	5323.1	0.0007072	-0.0284827	0.0711001	0.0218808	-0.8812547	2.1668382	2.1668382
48:13.5	574215	6.35303E+12	5.58834E+13	5326.55	0.0007072	-0.0254853	0.0711461	0.0218808	-0.7885152	2.1682425	2.1682425
53:16.6	574215	6.35303E+12	5.58834E+13	5328.3	0.0007072	-0.0291736	0.0711695	0.0218808	-0.9026312	2.1689549	2.1689549
58:19.3	574216	6.35303E+12	5.54406E+13	5326.69	0.0007072	-0.0300521	0.0717163	0.0218808	-0.929812	2.1856184	2.1856184
03:22.6	574216	6.35303E+12	5.54406E+13	5330.35	0.0001184	-0.0293821	0.0717656	0.0036633	-0.9090822	2.1871201	2.1871201
08:25.6	574218	6.35303E+12	5.58377E+13	5330.78	0.0001184	-0.0030017	0.071261	0.0036633	-0.0928726	2.1717421	2.1717421
13:28.5	574220	6.35303E+12	5.59914E+13	5329.45	0.0001184	-0.0183569	0.0710476	0.0036633	-0.5679625	2.1652392	2.1652392
18:31.4	574220	6.35303E+12	5.59914E+13	5348.41	0.0001184	-0.0168349	0.0713003	0.0036633	-0.5208718	2.1729422	2.1729422
23:34.2	574223	6.35303E+12	5.60912E+13	5338.35	0.0001184	-0.0262408	0.0710397	0.0036633	-0.8118904	2.164998	2.164998
28:37.1	574226	6.35303E+12	5.60441E+13	5328.39	0.0001184	-0.0286978	0.0709666	0.0036633	-0.8879099	2.1627725	2.1627725
33:39.9	574226	6.35303E+12	5.60441E+13	5333.1	0.0001184	-0.0249271	0.0710294	0.0036633	-0.7712445	2.1646843	2.1646843
38:43.2	574227	6.35303E+12	5.56725E+13	5332.07	0.0001184	-0.0184168	0.0714897	0.0036633	-0.5698158	2.1787132	2.1787132
43:45.9	574227	6.35303E+12	5.56725E+13	5339.02	0.0001184	-0.0190364	0.0715829	0.0036633	-0.5889862	2.181553	2.181553
48:49.2	574228	6.35303E+12	5.52451E+13	5343.15	0.0001184	-0.0188272	0.0721925	0.0036633	-0.5825136	2.2001303	2.2001303
53:52.1	574229	6.35303E+12	5.5892E+13	5338.61	0.0001184	-0.0278877	0.0712963	0.0036633	-0.8628454	2.1728179	2.1728179
58:55.4	574229	6.35303E+12	5.5892E+13	5336.51	0.0001184	-0.0228802	0.0712682	0.0036633	-0.7079134	2.1719632	2.1719632
03:58.2	574229	6.35303E+12	5.5892E+13	5340.15	4.90E-06	-0.018324	0.0713168	0.0001516	-0.5669446	2.1734447	2.1734447
09:01.3	574229	6.35303E+12	5.5892E+13	5341.69	4.90E-06	-0.0302504	0.0713374	0.0001516	-0.9359474	2.1740715	2.1740715
14:04.8	574230	6.35303E+12	5.53347E+13	5346.1	4.90E-06	-0.0297233	0.0721153	0.0001516	-0.9196389	2.1977795	2.1977795
19:07.8	574230	6.35303E+12	5.53347E+13	5347.19	4.90E-06	-0.0295915	0.07213	0.0001516	-0.915561	2.1982276	2.1982276
24:10.8	574231	6.35303E+12	5.49411E+13	5341.77	4.90E-06	-0.0275611	0.0725732	0.0001516	-0.8527404	2.2117345	2.2117345
29:13.7	574231	6.35303E+12	5.49411E+13	5342.48	4.90E-06	-0.0276163	0.0725829	0.0001516	-0.8544483	2.2120284	2.2120284
34:16.7	574232	6.35303E+12	5.47061E+13	5349.99	4.90E-06	-0.0261726	0.0729971	0.0001516	-0.8097802	2.2246529	2.2246529
39:19.5	574232	6.35303E+12	5.47061E+13	5346.06	4.90E-06	-0.0268168	0.0729435	0.0001516	-0.8297118	2.2230187	2.2230187
44:22.9	574232	6.35303E+12	5.47061E+13	5350.69	4.90E-06	-0.027105	0.0730067	0.0001516	-0.8386287	2.224944	2.224944
49:25.9	574232	6.35303E+12	5.47061E+13	5361.36	4.90E-06	-0.0282087	0.0731523	0.0001516	-0.8727772	2.2293808	2.2293808
54:28.5	574232	6.35303E+12	5.47061E+13	5358.36	4.90E-06	-0.0275544	0.0731113	0.0001516	-0.8525331	2.2281334	2.2281334
59:31.3	574232	6.35303E+12	5.47061E+13	5369.47	4.90E-06	-0.025414	0.0732629	0.0001516	-0.7863092	2.2327532	2.2327532
04:34.2	574233	6.35303E+12	5.35475E+13	5382.49	0.0022439	-0.0254873	0.0750295	0.0694263	-0.7885771	2.2865921	2.2865921
09:37.0	574233	6.35303E+12	5.35475E+13	5358.81	0.0022439	-0.0031512	0.0746994	0.0694263	-0.0974981	2.2765324	2.2765324

14:39.6	574233	6.35303E+12	5.35475E+13	5359.15	0.0022439	-0.0011741	0.0747042	0.0694263	-0.0363267	2.2766768	2.2766768	
19:42.4	574233	6.35303E+12	5.35475E+13	5359.66	0.0022439	-0.0181019	0.0747113	0.0694263	-0.5600728	2.2768935	2.2768935	
24:45.0	574234	6.35303E+12	5.31615E+13	5358.18	0.0022439	-0.0021049	0.075233	0.0694263	-0.0651256	2.2927926	2.2927926	
29:47.7	574234	6.35303E+12	5.31615E+13	5351.99	0.0022439	-0.0142703	0.0751461	0.0694263	-0.4415231	2.2901439	2.2901439	
34:50.4	574234	6.35303E+12	5.31615E+13	5344.84	0.0022439	-0.003526	0.0750457	0.0694263	-0.1090944	2.2870844	2.2870844	
39:53.2	574236	6.35303E+12	5.29706E+13	5349.94	0.0022439	-0.0156274	0.075388	0.0694263	-0.4835118	2.2975179	2.2975179	
44:56.5	574237	6.35303E+12	5.26741E+13	5348.56	0.0022439	-0.0298903	0.0757929	0.0694263	-0.9248059	2.3098563	2.3098563	
49:59.5	574238	6.35303E+12	5.2719E+13	5357.05	0.0022439	-0.0286539	0.0758485	0.0694263	-0.8865517	2.3115503	2.3115503	
55:02.4	574238	6.35303E+12	5.2719E+13	5351.76	0.0022439	-0.00581	0.0757736	0.0694263	-0.1797614	2.3092677	2.3092677	
00:05.4	574239	6.35303E+12	5.28168E+13	5350.18	0.0110575	-0.0017958	0.0756109	0.342119	-0.0555621	2.3043114	2.3043114	
05:08.0	574239	6.35303E+12	5.28168E+13	5347.41	0.0110575	-0.0296719	0.0755718	0.342119	-0.9180486	2.3031184	2.3031184	
10:10.8	574240	6.35303E+12	5.25658E+13	5348.27	0.0110575	-0.0286608	0.0759448	0.342119	-0.8867652	2.314487	2.314487	
15:13.5	574243	6.35303E+12	5.35108E+13	5354.34	0.0110575	-0.0000324	0.0746884	0.342119	-0.0100246	2.2761958	2.2761958	
20:16.2	574245	6.35303E+12	5.38531E+13	5358.41	0.0110575	0.0006207	0.07427	0.342119	0.0192045	2.2634449	2.2634449	
25:18.9	574245	6.35303E+12	5.38531E+13	5356.02	0.0110575	-0.0034312	0.0742369	0.342119	-0.1061613	2.2624353	2.2624353	
30:21.7	574246	6.35303E+12	5.41667E+13	5359.34	0.0110575	-0.001958	0.0738528	0.342119	-0.0605805	2.2507317	2.2507317	
35:24.4	574246	6.35303E+12	5.41667E+13	5361.98	0.0110575	0.0041538	0.0738892	0.342119	0.1285186	2.2518404	2.2518404	
40:27.4	574246	6.35303E+12	5.41667E+13	5366.53	0.0110575	-0.0150598	0.0739519	0.342119	-0.4659502	2.2537513	2.2537513	
45:30.2	574248	6.35303E+12	5.41479E+13	5365.93	0.0110575	-0.0019635	0.0739693	0.342119	-0.0607507	2.2542821	2.2542821	
50:33.1	574251	6.35303E+12	5.52479E+13	5359.19	0.0110575	0.0009998	0.0724055	0.342119	0.0309338	2.2066234	2.2066234	
55:35.9	574251	6.35303E+12	5.52479E+13	5360.66	0.0110575	0.0009997	0.0724254	0.342119	0.0309307	2.2072286	2.2072286	
00:38.6	574252	6.35303E+12	5.50584E+13	5358.27	0.0155437	0.004066	0.0726423	0.4809221	0.125802	2.2138386	2.2138386	
05:43.2	574252	6.35303E+12	5.50584E+13	5360.85	0.0155437	0.1479624	0.0726772	0.4809221	4.5779567	2.2149045	4.5779567	
10:46.3	574253	6.35303E+12	5.55506E+13	5361.66	0.0155437	0.012018	0.0720441	0.4809221	0.3718369	2.1956089	2.1956089	
15:49.2	574255	6.35303E+12	5.5978E+13	5358.19	0.0155437	0.0085462	0.0714478	0.4809221	0.2644194	2.1774367	2.1774367	
20:52.2	574256	6.35303E+12	5.57331E+13	5364.52	0.0155437	0.0091729	0.0718465	0.4809221	0.2838095	2.1895872	2.1895872	
25:55.1	574257	6.35303E+12	5.59531E+13	5368.93	0.0155437	0.0070653	0.0716229	0.4809221	0.2186004	2.182771	2.182771	
30:57.9	574257	6.35303E+12	5.59531E+13	5369.93	0.0155437	0.0057038	0.0716362	0.4809221	0.1764756	2.1831776	2.1831776	
36:00.9	574257	6.35303E+12	5.59531E+13	5368.01	0.0155437	0.0056384	0.0716106	0.4809221	0.1744521	2.182397	2.182397	
41:04.6	574258	6.35303E+12	5.61961E+13	5363.48	0.0155437	0.0066693	0.0712408	0.4809221	0.2063481	2.1711281	2.1711281	
46:07.7	574258	6.35303E+12	5.61961E+13	5363.48	0.0155437	0.0064452	0.0712408	0.4809221	0.1994145	2.1711281	2.1711281	
51:10.7	574258	6.35303E+12	5.61961E+13	5363.48	0.0155437	0.006606	0.0712408	0.4809221	0.2043896	2.1711281	2.1711281	
56:17.1	574258	6.35303E+12	5.61961E+13	5368.91	0.0155437	0.0080226	0.0713129	0.4809221	0.2482192	2.1733261	2.1733261	
01:19.9	574258	6.35303E+12	5.61961E+13	5365.45	0.0157861	0.0085946	0.071267	0.4884219	0.2659169	2.1719255	2.1719255	
06:22.6	574258	6.35303E+12	5.61961E+13	5361.34	0.0157861	0.0124213	0.0712124	0.4884219	0.384315	2.1702618	2.1702618	
11:25.7	574259	6.35303E+12	5.4583E+13	5360.85	0.0157861	0.0100146	0.0733103	0.4884219	0.3098517	2.2341966	2.2341966	
16:28.4	574260	6.35303E+12	5.46276E+13	5368.73	0.0157861	0.007654	0.0733581	0.4884219	0.2368148	2.2356531	2.2356531	
21:31.1	574260	6.35303E+12	5.46276E+13	5368.72	0.0157861	0.0073542	0.0733579	0.4884219	0.2275389	2.2356489	2.2356489	
26:34.2	574260	6.35303E+12	5.46276E+13	5367.86	0.0157861	0.0065783	0.0733462	0.4884219	0.2035326	2.2352908	2.2352908	
31:37.2	574260	6.35303E+12	5.46276E+13	5369.51	0.0157861	0.0072755	0.0733687	0.4884219	0.225104	2.2359779	2.2359779	
36:43.9	574261	6.35303E+12	5.36607E+13	5367.41	0.0157861	0.0067775	0.0746615	0.4884219	0.2096959	2.2753756	2.2753756	
41:47.1	574261	6.35303E+12	5.36607E+13	5361.03	0.0157861	0.0075486	0.0745727	0.4884219	0.2335537	2.2726709	2.2726709	
46:49.9	574261	6.35303E+12	5.36607E+13	5363.23	0.0157861	0.007421	0.0746033	0.4884219	0.2296057	2.2736036	2.2736036	
51:52.9	574261	6.35303E+12	5.36607E+13	5367.99	0.0157861	0.0094254	0.0746695	0.4884219	0.2916219	2.2756214	2.2756214	
56:56.1	574262	6.35303E+12	5.24328E+13	5378.51	0.0157861	0.0074337	0.076568	0.4884219	0.2299987	2.3334773	2.3334773	
01:58.9	574266	6.35303E+12	5.51716E+13	5368.99	0.0175072	0.0070568	0.0726383	0.5416728	0.2183374	2.2137171	2.2137171	
07:01.5	574268	6.35303E+12	5.60115E+13	5366.55	0.0175072	0.0067409	0.0715165	0.5416728	0.2085634	2.1795291	2.1795291	

12:04.4	574269	6.35303E+12	5.58958E+13	5356.64	0.0175072	0.0075027	0.0715322	0.5416728	0.2321335	2.1800073	2.1800073
17:07.9	574270	6.35303E+12	5.6144E+13	5353.05	0.0175072	0.0070444	0.0711682	0.5416728	0.2179537	2.1689142	2.1689142
22:10.7	574271	6.35303E+12	5.6095E+13	5352.41	0.0175072	0.0068769	0.0712219	0.5416728	0.2127713	2.1705513	2.1705513
27:13.7	574271	6.35303E+12	5.6095E+13	5350.73	0.0175072	0.0068185	0.0711995	0.5416728	0.2109644	2.1698701	2.1698701
32:17.1	574271	6.35303E+12	5.6095E+13	5352.02	0.0175072	0.0070024	0.0712167	0.5416728	0.2166543	2.1703932	2.1703932
37:20.0	574273	6.35303E+12	5.53104E+13	5353.7	0.0175072	0.0074003	0.0722496	0.5416728	0.2289653	2.2018709	2.2018709
42:23.0	574273	6.35303E+12	5.53104E+13	5354.2	0.0175072	0.0093641	0.0722563	0.5416728	0.2897253	2.2020766	2.2020766
47:25.7	574274	6.35303E+12	5.53441E+13	5354.14	0.0175072	0.0106524	0.0722116	0.5416728	0.3295853	2.2007128	2.2007128
52:29.0	574274	6.35303E+12	5.53441E+13	5355.15	0.0175072	0.0155577	0.0722252	0.5416728	0.4813552	2.2011279	2.2011279
57:31.7	574274	6.35303E+12	5.53441E+13	5366.51	0.0175072	0.0134928	0.0723784	0.5416728	0.4174672	2.2057972	2.2057972
02:34.7	574274	6.35303E+12	5.53441E+13	5367.34	0.0201513	0.0088181	0.0723896	0.6234812	0.272832	2.2061384	2.2061384
07:37.6	574274	6.35303E+12	5.53441E+13	5369.11	0.0201513	0.0080448	0.0724135	0.6234812	0.2489061	2.2068659	2.2068659
12:40.5	574274	6.35303E+12	5.53441E+13	5361.12	0.0201513	0.0141938	0.0723057	0.6234812	0.4391562	2.2035818	2.2035818
17:43.1	574274	6.35303E+12	5.53441E+13	5366.11	0.0201513	0.0148287	0.072373	0.6234812	0.4588	2.2056328	2.2056328
22:45.8	574275	6.35303E+12	5.36343E+13	5369.98	0.0201513	0.0148955	0.0747339	0.6234812	0.4608668	2.2775843	2.2775843
27:48.5	574275	6.35303E+12	5.36343E+13	5368.01	0.0201513	0.0147788	0.0747065	0.6234812	0.4572561	2.2767487	2.2767487
32:51.2	574277	6.35303E+12	5.50501E+13	5373.94	0.0201513	0.0189124	0.0728657	0.6234812	0.5851497	2.2206488	2.2206488
37:54.0	574279	6.35303E+12	5.54528E+13	5377.71	0.0201513	0.0181814	0.0723873	0.6234812	0.5625325	2.2060669	2.2060669
42:56.7	574281	6.35303E+12	5.67946E+13	5384.52	0.0201513	0.016267	0.0707666	0.6234812	0.503301	2.1566766	2.1566766
47:59.4	574281	6.35303E+12	5.67946E+13	5380.73	0.0201513	0.0160892	0.0707168	0.6234812	0.4977998	2.1551586	2.1551586
53:02.7	574282	6.35303E+12	5.6096E+13	5375.54	0.0201513	0.0124623	0.0715284	0.6234812	0.3855836	2.1798939	2.1798939
58:06.1	574282	6.35303E+12	5.6096E+13	5378.27	0.0201513	0.0169571	0.0715648	0.6234812	0.5246527	2.1810009	2.1810009
03:10.1	574283	6.35303E+12	5.56063E+13	5389.1	0.0221974	0.0169284	0.0723403	0.6867876	0.5237647	2.2046367	2.2046367
08:13.3	574283	6.35303E+12	5.56063E+13	5401.6	0.0221974	0.0188882	0.0725081	0.6867876	0.5844009	2.2097504	2.2097504
13:16.5	574283	6.35303E+12	5.56063E+13	5411.61	0.0221974	0.0187623	0.0726425	0.6867876	0.5805056	2.2138454	2.2138454
18:19.3	574284	6.35303E+12	5.64188E+13	5399.02	0.0221974	0.0199987	0.0714298	0.6867876	0.6187598	2.1768876	2.1768876
23:22.1	574284	6.35303E+12	5.64188E+13	5401.6	0.0221974	0.0195923	0.0714639	0.6867876	0.6061858	2.1779279	2.1779279
28:25.0	574284	6.35303E+12	5.64188E+13	5405.99	0.0221974	0.0190804	0.071522	0.6867876	0.5903476	2.1796979	2.1796979
33:27.8	574285	6.35303E+12	5.57835E+13	5406.94	0.0221974	0.0194306	0.0723493	0.6867876	0.6011828	2.2049105	2.2049105
38:30.5	574285	6.35303E+12	5.57835E+13	5401.12	0.0221974	0.0186435	0.0722714	0.6867876	0.5768299	2.2025372	2.2025372
43:34.1	574285	6.35303E+12	5.57835E+13	5404.01	0.0221974	0.0194016	0.0723101	0.6867876	0.6002855	2.2037157	2.2037157
48:36.8	574285	6.35303E+12	5.57835E+13	5404.26	0.0221974	0.0191729	0.0723135	0.6867876	0.5932095	2.2038176	2.2038176
53:39.9	574285	6.35303E+12	5.57835E+13	5400.01	0.0221974	0.0194297	0.0722566	0.6867876	0.6011549	2.2020845	2.2020845
03:46.2	574285	6.35303E+12	5.57835E+13	5405.7	0.0234026	0.0195553	0.0723327	0.7240764	0.605041	2.2044049	2.2044049
08:49.1	574286	6.35303E+12	5.36818E+13	5416.95	0.0234026	0.0197148	0.0753209	0.7240764	0.6099759	2.2954736	2.2954736
13:52.7	574287	6.35303E+12	5.50908E+13	5406.6	0.0234026	0.0197013	0.0732543	0.7240764	0.6095582	2.2324921	2.2324921
18:55.9	574287	6.35303E+12	5.50908E+13	5394.62	0.0234026	0.0196918	0.073092	0.7240764	0.6092643	2.2275453	2.2275453
23:59.1	574288	6.35303E+12	5.6446E+13	5372.85	0.0234026	0.0197114	0.0710493	0.7240764	0.6098707	2.1652907	2.1652907
29:02.3	574288	6.35303E+12	5.6446E+13	5385.99	0.0234026	0.0197446	0.071223	0.7240764	0.6108979	2.1705862	2.1705862
34:05.2	574289	6.35303E+12	5.61643E+13	5382.26	0.0234026	0.0207871	0.0715308	0.7240764	0.6431529	2.1799641	2.1799641
39:08.3	574289	6.35303E+12	5.61643E+13	5380.01	0.0234026	0.0209181	0.0715009	0.7240764	0.647206	2.1790528	2.1790528
44:11.8	574289	6.35303E+12	5.61643E+13	5375.01	0.0234026	0.0204072	0.0714344	0.7240764	0.6313988	2.1770277	2.1770277
49:15.0	574290	6.35303E+12	5.56905E+13	5379.99	0.0234026	0.020967	0.0721089	0.7240764	0.648719	2.1975834	2.1975834
54:18.0	574292	6.35303E+12	5.59818E+13	5380.19	0.0234026	0.0210779	0.0717363	0.7240764	0.6521502	2.1862275	2.1862275
59:20.8	574293	6.35303E+12	5.63654E+13	5377.35	0.0234026	0.0210797	0.0712105	0.7240764	0.6522059	2.1702049	2.1702049
09:26.9	574295	6.35303E+12	5.71185E+13	5388.44	0.024677	0.0208048	0.0704165	0.7635064	0.6437005	2.1460054	2.1460054
14:29.9	574298	6.35303E+12	5.77593E+13	5389.19	0.024677	0.0209776	0.0696449	0.7635064	0.6490469	2.122492	2.122492

19:32.9	574298	6.35303E+12	5.77593E+13	5388.39	0.024677	0.0233134	0.0696346	0.7635064	0.7213166	2.122177	2.122177	
24:36.5	574298	6.35303E+12	5.77593E+13	5391.23	0.024677	0.0216334	0.0696713	0.7635064	0.6693374	2.1232955	2.1232955	
29:39.5	574298	6.35303E+12	5.77593E+13	5399.68	0.024677	0.0249963	0.0697805	0.7635064	0.7733855	2.1266234	2.1266234	
34:42.6	574300	6.35303E+12	5.74492E+13	5391.27	0.024677	0.02573	0.0700479	0.7635064	0.7960862	2.1347724	2.1347724	
39:48.1	574301	6.35303E+12	5.7613E+13	5391.51	0.024677	0.0821753	0.0698519	0.7635064	2.5425038	2.1287995	2.5425038	
44:52.1	574302	6.35303E+12	5.77583E+13	5394.15	0.024677	0.2145119	0.0697103	0.7635064	6.6369982	2.124483	6.6369982	
49:55.9	574302	6.35303E+12	5.77583E+13	5395.41	0.024677	0.1523162	0.0697265	0.7635064	4.7126632	2.1249792	4.7126632	
54:59.6	574304	6.35303E+12	5.7411E+13	5395.02	0.024677	0.1730318	0.0701433	0.7635064	5.3536039	2.1376815	5.3536039	
00:04.8	574305	6.35303E+12	5.8471E+13	5392.07	0.0272334	0.1708133	0.068834	0.8426014	5.2849635	2.0977787	5.2849635	
05:08.7	574305	6.35303E+12	5.8471E+13	5393.61	0.0272334	0.2130182	0.0688537	0.8426014	6.5907831	2.0983778	6.5907831	
10:11.7	574305	6.35303E+12	5.8471E+13	5393.59	0.0272334	0.03673	0.0688534	0.8426014	1.1364262	2.09837	2.09837	
20:17.3	574309	6.35303E+12	6.00748E+13	5397.01	0.0272334	0.0252878	0.0670578	0.8426014	0.7824045	2.0436461	2.0436461	
25:20.4	574309	6.35303E+12	6.00748E+13	5396.19	0.0272334	0.02513	0.0670476	0.8426014	0.7775222	2.0433356	2.0433356	
30:23.2	574310	6.35303E+12	6.02983E+13	5397.48	0.0272334	0.029264	0.0668151	0.8426014	0.9054282	2.0362495	2.0362495	
35:25.9	574311	6.35303E+12	6.01255E+13	5402.84	0.0272334	0.0292724	0.0670736	0.8426014	0.9056881	2.044127	2.044127	
40:29.3	574312	6.35303E+12	5.99055E+13	5397.41	0.0272334	0.0293249	0.0672522	0.8426014	0.9073124	2.0495721	2.0495721	
45:32.2	574312	6.35303E+12	5.99055E+13	5395.01	0.0272334	0.0252257	0.0672223	0.8426014	0.7804832	2.0486608	2.0486608	
50:35.3	574314	6.35303E+12	5.98595E+13	5392.41	0.0272334	0.02791	0.0672416	0.8426014	0.8635354	2.0492469	2.0492469	
55:38.1	574315	6.35303E+12	5.97623E+13	5391.82	0.0272334	0.025482	0.0673436	0.8426014	0.7884131	2.0523565	2.0523565	
00:42.4	574315	6.35303E+12	5.97623E+13	5387.9	0.0290471	0.2072917	0.0672946	0.8987173	6.4136052	2.0508644	6.4136052	
05:45.3	574317	6.35303E+12	6.04051E+13	5388.49	0.0290471	0.0266619	0.0665859	0.8987173	0.8249192	2.0292641	2.0292641	
10:49.2	574319	6.35303E+12	6.0775E+13	5387.98	0.0290471	0.2202776	0.0661742	0.8987173	6.8153889	2.0167195	6.8153889	
20:54.5	574320	6.35303E+12	6.21737E+13	5399.05	0.0290471	0.0363805	0.0648185	0.8987173	1.1256127	1.9754023	1.9754023	
25:57.3	574320	6.35303E+12	6.21737E+13	5405.74	0.0290471	0.0298668	0.0648988	0.8987173	0.9240788	1.97785	1.97785	
31:00.3	574321	6.35303E+12	6.17749E+13	5405.41	0.0290471	0.027565	0.0653138	0.8987173	0.8528611	1.9904973	1.9904973	
36:03.1	574321	6.35303E+12	6.17749E+13	5401.49	0.0290471	0.0274552	0.0652665	0.8987173	0.8494639	1.9890538	1.9890538	
41:06.0	574321	6.35303E+12	6.17749E+13	5409.99	0.0290471	0.0270176	0.0653692	0.8987173	0.8359245	1.9921839	1.9921839	
46:08.7	574321	6.35303E+12	6.17749E+13	5408.8	0.0290471	0.0271924	0.0653548	0.8987173	0.8413329	1.9917457	1.9917457	
51:11.6	574321	6.35303E+12	6.17749E+13	5412.57	0.0290471	0.0272177	0.0654003	0.8987173	0.8421156	1.9931339	1.9931339	
56:14.3	574321	6.35303E+12	6.17749E+13	5407.34	0.0290471	0.0261354	0.0653371	0.8987173	0.8086293	1.991208	1.991208	
01:17.2	574321	6.35303E+12	6.17749E+13	5400.73	0.0285414	0.0261745	0.0652573	0.8830709	0.809839	1.9887739	1.9887739	
06:20.9	574321	6.35303E+12	6.17749E+13	5395.3	0.0285414	0.0262962	0.0651917	0.8830709	0.8136044	1.9867744	1.9867744	
11:24.4	574321	6.35303E+12	6.17749E+13	5397.81	0.0285414	0.0260871	0.065222	0.8830709	0.8071349	1.9876987	1.9876987	
16:27.4	574321	6.35303E+12	6.17749E+13	5397.93	0.0285414	0.026146	0.0652234	0.8830709	0.8089572	1.9877429	1.9877429	
21:30.3	574321	6.35303E+12	6.17749E+13	5392.62	0.0285414	0.0262574	0.0651593	0.8830709	0.812404	1.9857875	1.9857875	
26:33.0	574321	6.35303E+12	6.17749E+13	5393.89	0.0285414	0.0261514	0.0651746	0.8830709	0.8091243	1.9862552	1.9862552	
31:35.8	574322	6.35303E+12	5.8824E+13	5396.27	0.0285414	0.0261091	0.0684743	0.8830709	0.8078156	2.0868162	2.0868162	
36:38.8	574322	6.35303E+12	5.8824E+13	5393.1	0.0285414	0.0254329	0.0684341	0.8830709	0.7868939	2.0855903	2.0855903	
41:41.8	574322	6.35303E+12	5.8824E+13	5393.7	0.0285414	0.0267382	0.0684417	0.8830709	0.8272799	2.0858223	2.0858223	
46:44.7	574323	6.35303E+12	5.85421E+13	5398.48	0.0285414	0.0260142	0.0688322	0.8830709	0.8048793	2.0977221	2.0977221	
51:47.6	574323	6.35303E+12	5.85421E+13	5406.39	0.0285414	0.0268842	0.068933	0.8830709	0.8317971	2.1007958	2.1007958	
56:50.6	574324	6.35303E+12	5.81584E+13	5403.98	0.0285414	0.0295804	0.0693569	0.8830709	0.9152176	2.1137127	2.1137127	
01:53.4	574326	6.35303E+12	5.98016E+13	5406.62	0.029578	0.0350032	0.0674841	0.9151433	1.082999	2.0566378	2.0566378	
06:56.4	574326	6.35303E+12	5.98016E+13	5402.77	0.029578	0.028005	0.067436	0.9151433	0.8664747	2.0551733	2.0551733	
11:59.3	574327	6.35303E+12	5.96067E+13	5401.77	0.029578	0.0268725	0.067644	0.9151433	0.8314352	2.0615104	2.0615104	
17:02.0	574327	6.35303E+12	5.96067E+13	5403.81	0.029578	0.0251518	0.0676695	0.9151433	0.7781967	2.0622889	2.0622889	
22:04.9	574328	6.35303E+12	5.96752E+13	5405.43	0.029578	0.0265695	0.0676122	0.9151433	0.8220603	2.0605413	2.0605413	

27:08.1	574328	6.35303E+12	5.96752E+13	5405.62	0.029578	0.0263765	0.0676145	0.9151433	0.8160889	2.0606137	2.0606137	
32:11.0	574329	6.35303E+12	5.94855E+13	5414.16	0.029578	0.0265315	0.0679373	0.9151433	0.8208846	2.0704516	2.0704516	
37:14.1	574330	6.35303E+12	5.97035E+13	5414.16	0.029578	0.0264993	0.0676893	0.9151433	0.8198883	2.0628912	2.0628912	
52:22.4	574333	6.35303E+12	5.9734E+13	5406.27	0.029578	0.0263688	0.0675561	0.9151433	0.8158507	2.0588333	2.0588333	
02:28.0	574334	6.35303E+12	5.92562E+13	5400.02	0.028458	0.0275794	0.0680221	0.8804905	0.8533066	2.0730351	2.0730351	
07:31.0	574335	6.35303E+12	5.9018E+13	5400.05	0.028458	0.0264065	0.068297	0.8804905	0.8170171	2.0814126	2.0814126	
12:34.3	574337	6.35303E+12	6.04407E+13	5403.81	0.028458	0.0264328	0.0667358	0.8804905	0.8178308	2.0338321	2.0338321	
17:37.3	574338	6.35303E+12	6.00814E+13	5403.9	0.028458	0.0262088	0.067136	0.8804905	0.8109003	2.0460298	2.0460298	
22:40.4	574340	6.35303E+12	6.01388E+13	5404.53	0.028458	0.0258082	0.0670798	0.8804905	0.7985057	2.0443159	2.0443159	
27:43.7	574342	6.35303E+12	6.0482E+13	5405.01	0.028458	0.0262698	0.066705	0.8804905	0.8127876	2.0328944	2.0328944	
32:46.8	574342	6.35303E+12	6.0482E+13	5405.02	0.028458	0.0252935	0.0667051	0.8804905	0.7825809	2.0328982	2.0328982	
37:49.9	574343	6.35303E+12	5.99395E+13	5399.97	0.028458	0.02589	0.067246	0.8804905	0.8010366	2.0493813	2.0493813	
42:52.7	574344	6.35303E+12	5.95861E+13	5399.01	0.028458	0.0257766	0.0676328	0.8804905	0.797528	2.0611697	2.0611697	
47:55.6	574344	6.35303E+12	5.95861E+13	5399.01	0.028458	0.0264346	0.0676328	0.8804905	0.8178865	2.0611697	2.0611697	
58:00.7	574344	6.35303E+12	5.95861E+13	5398.35	0.028458	0.0259627	0.0676245	0.8804905	0.8032859	2.0609177	2.0609177	
03:05.1	574346	6.35303E+12	5.84022E+13	5395.14	0.0276119	0.2213191	0.0689544	0.8543122	6.847613	2.1014468	6.847613	
08:08.7	574347	6.35303E+12	5.86008E+13	5392.22	0.0276119	0.0261815	0.0686835	0.8543122	0.8100556	2.0931918	2.0931918	
23:17.2	574348	6.35303E+12	5.87322E+13	5396.18	0.0276119	0.0261474	0.0685802	0.8543122	0.8090006	2.0900429	2.0900429	
28:21.2	574349	6.35303E+12	5.84595E+13	5396.23	0.0276119	0.220695	0.0689007	0.8543122	6.8283033	2.0998095	6.8283033	
33:24.2	574349	6.35303E+12	5.84595E+13	5395.06	0.0276119	0.0357404	0.0688857	0.8543122	1.105808	2.0993542	2.0993542	
38:27.1	574350	6.35303E+12	5.91267E+13	5395.03	0.0276119	0.0265231	0.0681081	0.8543122	0.8206247	2.0756546	2.0756546	
43:30.0	574351	6.35303E+12	5.92508E+13	5395.02	0.0276119	0.024313	0.0679653	0.8543122	0.7522442	2.071303	2.071303	
48:32.9	574351	6.35303E+12	5.92508E+13	5394.15	0.0276119	0.0250697	0.0679543	0.8543122	0.7756565	2.070969	2.070969	
53:35.7	574351	6.35303E+12	5.92508E+13	5390.52	0.0276119	0.0242897	0.0679086	0.8543122	0.7515233	2.0695753	2.0695753	
58:38.6	574351	6.35303E+12	5.92508E+13	5391.4	0.0276119	0.0244875	0.0679197	0.8543122	0.7576432	2.0699132	2.0699132	
03:41.5	574351	6.35303E+12	5.92508E+13	5383.02	0.0288024	0.0245448	0.0678141	0.8911463	0.7594161	2.0666958	2.0666958	
08:44.3	574351	6.35303E+12	5.92508E+13	5371.99	0.0288024	0.0220851	0.0676752	0.8911463	0.683313	2.0624611	2.0624611	
13:47.2	574351	6.35303E+12	5.92508E+13	5376.84	0.0288024	0.0221515	0.0677362	0.8911463	0.6853674	2.0643232	2.0643232	
18:50.0	574353	6.35303E+12	5.95341E+13	5372.72	0.0288024	0.0237019	0.0673622	0.8911463	0.7333368	2.0529247	2.0529247	
23:53.2	574353	6.35303E+12	5.95341E+13	5379.06	0.0288024	0.0224086	0.0674417	0.8911463	0.6933221	2.0553472	2.0553472	
28:56.2	574353	6.35303E+12	5.95341E+13	5386.27	0.0288024	0.0242596	0.0675321	0.8911463	0.750592	2.0581021	2.0581021	
33:59.0	574353	6.35303E+12	5.95341E+13	5393.51	0.0288024	0.0246517	0.0676229	0.8911463	0.7627236	2.0608686	2.0608686	
39:01.9	574353	6.35303E+12	5.95341E+13	5397.98	0.0288024	0.024574	0.0676789	0.8911463	0.7603196	2.0625766	2.0625766	
44:04.8	574354	6.35303E+12	5.92005E+13	5401.73	0.0288024	0.024264	0.0681077	0.8911463	0.7507282	2.0756429	2.0756429	
49:08.5	574356	6.35303E+12	6.01278E+13	5395.44	0.0288024	0.0227333	0.0669792	0.8911463	0.7033683	2.0412523	2.0412523	
54:11.6	574356	6.35303E+12	6.01278E+13	5400.19	0.0288024	0.0241575	0.0670382	0.8911463	0.7474331	2.0430494	2.0430494	
59:14.8	574357	6.35303E+12	5.98782E+13	5407.34	0.0288024	0.0213869	0.0674068	0.8911463	0.6617107	2.054282	2.054282	
04:17.8	574357	6.35303E+12	5.98782E+13	5412.65	0.0349955	0.0212221	0.067473	1.0827608	0.6566118	2.0562993	2.0562993	
09:21.0	574358	6.35303E+12	5.94067E+13	5412.99	0.0349955	0.0210166	0.0680127	1.0827608	0.6502536	2.0727494	2.0727494	
14:24.8	574359	6.35303E+12	5.99023E+13	5410.59	0.0349955	0.0212588	0.0674202	1.0827608	0.6577473	2.0546898	2.0546898	
24:31.9	574360	6.35303E+12	6.0023E+13	5404.27	0.0349955	0.0221652	0.0672059	1.0827608	0.6857913	2.0481598	2.0481598	
29:35.1	574361	6.35303E+12	5.95038E+13	5406.99	0.0349955	0.0219022	0.0678264	1.0827608	0.6776541	2.0670711	2.0670711	
34:38.4	574361	6.35303E+12	5.95038E+13	5410.01	0.0349955	0.0238654	0.0678643	1.0827608	0.7383955	2.0682256	2.0682256	
39:41.8	574361	6.35303E+12	5.95038E+13	5424.76	0.0349955	0.0349014	0.0680493	1.0827608	1.0798493	2.0738645	2.0738645	
44:45.3	574362	6.35303E+12	5.87448E+13	5432.99	0.0349955	0.0231509	0.0690331	1.0827608	0.7162888	2.1038472	2.1038472	
49:48.4	574362	6.35303E+12	5.87448E+13	5431.52	0.0349955	0.0217775	0.0690145	1.0827608	0.6737959	2.103278	2.103278	
54:51.6	574363	6.35303E+12	5.80502E+13	5426.35	0.0349955	0.0233238	0.0697738	1.0827608	0.7216384	2.1264208	2.1264208	

59:54.6	574363	6.35303E+12	5.80502E+13	5426.04	0.0349955	0.0316189	0.0697699	1.0827608	0.9782888	2.1262994	2.1262994
10:00.2	574364	6.35303E+12	5.78645E+13	5442.45	0.026266	0.0418451	0.0702054	0.81267	1.2946874	2.1395736	2.1395736
20:06.7	574367	6.35303E+12	5.84533E+13	5443.24	0.026266	0.0238876	0.0695083	0.81267	0.7390823	2.1183292	2.1183292
25:10.0	574368	6.35303E+12	5.81378E+13	5430.99	0.026266	0.0224401	0.0697283	0.81267	0.6942967	2.125032	2.125032
30:13.1	574368	6.35303E+12	5.81378E+13	5447.49	0.026266	0.0208024	0.0699401	0.81267	0.6436263	2.1314881	2.1314881
35:16.2	574369	6.35303E+12	5.7527E+13	5441.28	0.026266	0.0204883	0.0706021	0.81267	0.633908	2.151664	2.151664
40:20.4	574369	6.35303E+12	5.7527E+13	5444.99	0.026266	0.0193386	0.0706503	0.81267	0.5983363	2.153131	2.153131
45:23.4	574370	6.35303E+12	5.73316E+13	5445.99	0.026266	0.0193386	0.0709041	0.81267	0.5983363	2.1608665	2.1608665
50:26.5	574370	6.35303E+12	5.73316E+13	5466.65	0.026266	0.0188979	0.0711731	0.81267	0.584701	2.169064	2.169064
55:29.5	574372	6.35303E+12	5.7029E+13	5473.18	0.026266	0.0188979	0.0716362	0.81267	0.584701	2.1831762	2.1831762
00:32.4	574373	6.35303E+12	5.75391E+13	5470.2	0.0201854	0.0187891	0.0709624	0.6245363	0.5813348	2.1626439	2.1626439
05:35.4	574373	6.35303E+12	5.75391E+13	5471.01	0.0201854	0.0185387	0.0709729	0.6245363	0.5735874	2.1629641	2.1629641
15:40.8	574374	6.35303E+12	5.70787E+13	5460.95	0.0201854	0.0185472	0.0714138	0.6245363	0.5738504	2.1764008	2.1764008
25:46.4	574376	6.35303E+12	5.68162E+13	5458.6	0.0201854	0.0186796	0.0717129	0.6245363	0.5779468	2.1855137	2.1855137
35:51.9	574377	6.35303E+12	5.63276E+13	5460.02	0.0201854	0.0210142	0.0723538	0.6245363	0.6501793	2.2050485	2.2050485
40:54.8	574377	6.35303E+12	5.63276E+13	5466.78	0.0201854	0.0203564	0.0724434	0.6245363	0.629827	2.2077785	2.2077785
45:57.7	574378	6.35303E+12	5.65074E+13	5473.24	0.0201854	0.0203336	0.0722982	0.6245363	0.6291216	2.2033529	2.2033529
51:01.0	574378	6.35303E+12	5.65074E+13	5471.65	0.0201854	0.0199115	0.0722772	0.6245363	0.6160618	2.2027129	2.2027129
56:04.1	574378	6.35303E+12	5.65074E+13	5469.64	0.0201854	0.0188807	0.0722507	0.6245363	0.5841689	2.2019037	2.2019037
01:36.7	574383	6.35303E+12	5.72964E+13	5478.36	0.017735	0.0180056	0.0713693	0.5487209	0.5570933	2.1750424	2.1750424
06:39.8	574384	6.35303E+12	5.65611E+13	5470.62	0.017735	0.0179751	0.072195	0.5487209	0.5561496	2.2002079	2.2002079
11:42.7	574384	6.35303E+12	5.65611E+13	5479.43	0.017735	0.018023	0.0723113	0.5487209	0.5576316	2.2037511	2.2037511
16:45.6	574384	6.35303E+12	5.65611E+13	5474.09	0.017735	0.0177163	0.0722408	0.5487209	0.5481423	2.2016035	2.2016035
21:48.3	574384	6.35303E+12	5.65611E+13	5484.78	0.017735	0.0175711	0.0723819	0.5487209	0.5436498	2.2059028	2.2059028
26:51.4	574384	6.35303E+12	5.65611E+13	5487.23	0.017735	0.0172277	0.0724142	0.5487209	0.533025	2.2068882	2.2068882
31:54.2	574385	6.35303E+12	5.52675E+13	5489.21	0.017735	0.0175138	0.0741359	0.5487209	0.541877	2.2593577	2.2593577
36:57.2	574386	6.35303E+12	5.5002E+13	5489.86	0.017735	0.0178899	0.0745026	0.5487209	0.5535135	2.2705332	2.2705332
47:03.0	574387	6.35303E+12	5.4816E+13	5496.27	0.017735	0.0176629	0.0748427	0.5487209	0.5464901	2.2808975	2.2808975
52:06.0	574387	6.35303E+12	5.4816E+13	5491.99	0.017735	0.0176411	0.0747844	0.5487209	0.5458156	2.2791214	2.2791214
57:08.7	574388	6.35303E+12	5.41076E+13	5492.11	0.017735	0.0176457	0.0757651	0.5487209	0.545958	2.3090086	2.3090086
02:11.8	574388	6.35303E+12	5.41076E+13	5492.89	0.0168293	0.0176283	0.0757758	0.5206985	0.5454196	2.3093366	2.3093366
07:15.3	574388	6.35303E+12	5.41076E+13	5495.29	0.0168293	0.0176447	0.0758089	0.5206985	0.545927	2.3103456	2.3103456
12:18.3	574389	6.35303E+12	5.34819E+13	5494.94	0.0168293	0.0176619	0.076691	0.5206985	0.5464592	2.3372263	2.3372263
17:21.0	574392	6.35303E+12	5.44667E+13	5498.94	0.0168293	0.0181464	0.0753591	0.5206985	0.5614496	2.2966372	2.2966372
22:23.8	574393	6.35303E+12	5.4543E+13	5516.61	0.0168293	0.0186975	0.0754956	0.5206985	0.5785006	2.3007978	2.3007978
27:27.0	574393	6.35303E+12	5.4543E+13	5541.73	0.0168293	0.0186527	0.0758394	0.5206985	0.5771145	2.3112745	2.3112745
32:29.9	574393	6.35303E+12	5.4543E+13	5543.62	0.0168293	0.0188333	0.0758653	0.5206985	0.5827023	2.3120627	2.3120627
37:33.5	574394	6.35303E+12	5.38779E+13	5540.34	0.0168293	0.0187852	0.0767563	0.5206985	0.5812141	2.3392162	2.3392162
42:36.4	574394	6.35303E+12	5.38779E+13	5499.34	0.0168293	0.0191027	0.0761882	0.5206985	0.5910375	2.3219053	2.3219053
47:39.2	574395	6.35303E+12	5.53825E+13	5524.89	0.0168293	0.0188485	0.0744629	0.5206985	0.5831726	2.2693225	2.2693225
52:42.0	574395	6.35303E+12	5.53825E+13	5516.19	0.0168293	0.0188647	0.0743456	0.5206985	0.5836738	2.265749	2.265749
57:44.9	574395	6.35303E+12	5.53825E+13	5519.38	0.0168293	0.0185184	0.0743886	0.5206985	0.5729593	2.2670593	2.2670593
02:47.9	574395	6.35303E+12	5.53825E+13	5528.44	0.0175068	0.0184732	0.0745107	0.5416604	0.5715608	2.2707806	2.2707806
07:50.8	574395	6.35303E+12	5.53825E+13	5533.27	0.0175068	0.0184058	0.0745758	0.5416604	0.5694755	2.2727645	2.2727645
12:53.8	574396	6.35303E+12	5.44713E+13	5531.02	0.0175068	0.0182413	0.0757925	0.5416604	0.5643858	2.3098433	2.3098433
17:56.8	574396	6.35303E+12	5.44713E+13	5545.02	0.0175068	0.0181908	0.0759843	0.5416604	0.5628234	2.3156899	2.3156899
22:59.7	574396	6.35303E+12	5.44713E+13	5547.84	0.0175068	0.018208	0.0760229	0.5416604	0.5633555	2.3168676	2.3168676

28:03.3	574397	6.35303E+12	5.38389E+13	5554.01	0.0175068	0.0183035	0.0770014	0.5416604	0.5663103	2.3466856	2.3466856
33:06.2	574397	6.35303E+12	5.38389E+13	5549.85	0.0175068	0.0179475	0.0769437	0.5416604	0.5552957	2.3449279	2.3449279
38:09.0	574397	6.35303E+12	5.38389E+13	5562.7	0.0175068	0.0181763	0.0771218	0.5416604	0.5623747	2.3503573	2.3503573
43:11.9	574397	6.35303E+12	5.38389E+13	5576.66	0.0175068	0.0180946	0.0773154	0.5416604	0.5598469	2.3562557	2.3562557
48:15.5	574397	6.35303E+12	5.38389E+13	5591.65	0.0175068	0.0182001	0.0775232	0.5416604	0.5631111	2.3625893	2.3625893
53:18.6	574397	6.35303E+12	5.38389E+13	5576.07	0.0175068	0.0186904	0.0773072	0.5416604	0.578281	2.3560064	2.3560064
58:21.9	574398	6.35303E+12	5.24135E+13	5579.93	0.0175068	0.0187504	0.0794646	0.5416604	0.5801374	2.4217554	2.4217554
03:24.7	574399	6.35303E+12	5.22154E+13	5582.01	0.0177324	0.0190536	0.0797958	0.5486405	0.5895184	2.431849	2.431849
08:28.1	574399	6.35303E+12	5.22154E+13	5562.69	0.0177324	0.0191988	0.0795196	0.5486405	0.5940109	2.4234321	2.4234321
13:30.8	574400	6.35303E+12	5.19602E+13	5575.84	0.0177324	0.0190126	0.0800991	0.5486405	0.5882498	2.441092	2.441092
18:33.6	574400	6.35303E+12	5.19602E+13	5579.19	0.0177324	0.019119	0.0801472	0.5486405	0.5915419	2.4425586	2.4425586
23:36.6	574401	6.35303E+12	5.14241E+13	5571.19	0.0177324	0.01914	0.0808667	0.5486405	0.5921916	2.4644852	2.4644852
28:39.9	574401	6.35303E+12	5.14241E+13	5570.27	0.0177324	0.0192996	0.0808533	0.5486405	0.5971296	2.4640783	2.4640783
33:43.3	574402	6.35303E+12	5.15991E+13	5576.77	0.0177324	0.0192744	0.0806731	0.5486405	0.5963499	2.458585	2.458585
38:46.1	574403	6.35303E+12	5.16659E+13	5613.91	0.0177324	0.0199884	0.0811054	0.5486405	0.6184411	2.4717605	2.4717605
43:49.0	574404	6.35303E+12	5.22163E+13	5628.79	0.0177324	0.0195167	0.0804633	0.5486405	0.6038467	2.45219	2.45219
48:51.9	574405	6.35303E+12	5.26766E+13	5629.74	0.0177324	0.0214372	0.0797736	0.5486405	0.663267	2.4311707	2.4311707
53:54.6	574406	6.35303E+12	5.44332E+13	5687.49	0.0177324	0.0195852	0.077991	0.5486405	0.6059661	2.3768473	2.3768473
58:57.5	574407	6.35303E+12	5.44179E+13	5665.95	0.0177324	0.0195061	0.0777176	0.5486405	0.6035187	2.3685147	2.3685147
04:00.3	574407	6.35303E+12	5.44179E+13	5670.39	0.0185341	0.0184448	0.0777785	0.5734451	0.5706821	2.3703707	2.3703707
09:03.2	574408	6.35303E+12	5.43366E+13	5671.73	0.0185341	0.0190636	0.0779133	0.5734451	0.5898278	2.3744772	2.3744772
14:06.4	574409	6.35303E+12	5.45039E+13	5709.88	0.0185341	0.0193304	0.0781965	0.5734451	0.5980826	2.3831101	2.3831101
19:09.3	574409	6.35303E+12	5.45039E+13	5681.29	0.0185341	0.0195839	0.077805	0.5734451	0.6059259	2.3711776	2.3711776
24:12.6	574409	6.35303E+12	5.45039E+13	5681.4	0.0185341	0.021853	0.0778065	0.5734451	0.6761318	2.3712235	2.3712235
29:16.5	574410	6.35303E+12	5.4739E+13	5706.78	0.0185341	0.0200612	0.0778185	0.5734451	0.6206935	2.3715874	2.3715874
34:19.5	574410	6.35303E+12	5.4739E+13	5723.04	0.0185341	0.0209275	0.0780402	0.5734451	0.6474969	2.3783446	2.3783446
39:22.8	574410	6.35303E+12	5.4739E+13	5712.44	0.0185341	0.0210112	0.0778956	0.5734451	0.6500865	2.3739395	2.3739395
44:26.3	574410	6.35303E+12	5.4739E+13	5766.56	0.0185341	0.0207384	0.0786336	0.5734451	0.6416461	2.3964304	2.3964304
49:29.4	574410	6.35303E+12	5.4739E+13	5752.64	0.0185341	0.0222079	0.0784438	0.5734451	0.6871124	2.3906456	2.3906456
54:32.5	574411	6.35303E+12	5.33843E+13	5785.23	0.0185341	0.0227025	0.0808902	0.5734451	0.7024153	2.4652002	2.4652002
59:35.5	574412	6.35303E+12	5.33495E+13	5778.03	0.0185341	0.0428589	0.0808422	0.5734451	1.3260544	2.4637378	2.4637378
04:38.4	574412	6.35303E+12	5.33495E+13	5707.59	0.0231547	0.0241354	0.0798566	0.7164064	0.7467493	2.4337024	2.4337024
09:41.5	574412	6.35303E+12	5.33495E+13	5698.98	0.0231547	0.0216243	0.0797362	0.7164064	0.6690558	2.4300311	2.4300311
14:44.4	574412	6.35303E+12	5.33495E+13	5716.84	0.0231547	0.0224334	0.079986	0.7164064	0.6940894	2.4376465	2.4376465
19:47.4	574413	6.35303E+12	5.25253E+13	5727.04	0.0231547	0.0226368	0.081386	0.7164064	0.7003826	2.4803111	2.4803111
24:50.2	574413	6.35303E+12	5.25253E+13	5727.44	0.0231547	0.0213798	0.0813917	0.7164064	0.661491	2.4804844	2.4804844
29:53.5	574413	6.35303E+12	5.25253E+13	5735.97	0.0231547	0.0246145	0.0815129	0.7164064	0.7615726	2.4841786	2.4841786
34:56.2	574414	6.35303E+12	5.19701E+13	5739.52	0.0231547	0.0244526	0.0824347	0.7164064	0.7565634	2.5122723	2.5122723
39:58.9	574415	6.35303E+12	5.18073E+13	5733.01	0.0231547	0.0247503	0.0826	0.7164064	0.7657743	2.5173089	2.5173089
45:02.0	574418	6.35303E+12	5.19586E+13	5730.9	0.0231547	0.0246666	0.0823292	0.7164064	0.7631846	2.5090566	2.5090566
50:05.4	574420	6.35303E+12	5.25895E+13	5722.12	0.0231547	0.0217518	0.0812169	0.7164064	0.6730007	2.4751591	2.4751591
55:08.3	574421	6.35303E+12	5.25734E+13	5697.57	0.0231547	0.0351625	0.0808932	0.7164064	1.0879278	2.4652918	2.4652918
00:11.2	574421	6.35303E+12	5.25734E+13	5674.99	0.0262502	0.0227664	0.0805726	0.8121812	0.7043924	2.4555216	2.4555216
05:14.1	574423	6.35303E+12	5.29406E+13	5662.61	0.0262502	0.0211763	0.0798392	0.8121812	0.6551947	2.4331701	2.4331701
10:17.1	574424	6.35303E+12	5.28202E+13	5700.01	0.0262502	0.0212464	0.0805497	0.8121812	0.6573636	2.4548241	2.4548241
15:20.3	574424	6.35303E+12	5.28202E+13	5679.07	0.0262502	0.0274053	0.0802538	0.8121812	0.84792	2.4458059	2.4458059
20:23.5	574425	6.35303E+12	5.23532E+13	5686.98	0.0262502	0.0470867	0.0810825	0.8121812	1.4568625	2.471061	2.471061

25:27.5	574426	6.35303E+12	5.30049E+13	5674.69	0.0262502	0.2292147	0.0799125	0.8121812	7.0919028	2.435404	7.0919028
30:31.9	574427	6.35303E+12	5.28466E+13	5692.52	0.0262502	0.2216174	0.0804036	0.8121812	6.8568424	2.4503724	6.8568424
35:34.7	574427	6.35303E+12	5.28466E+13	5694.01	0.0262502	0.0471417	0.0804247	0.8121812	1.4585642	2.4510138	2.4510138
40:37.2	574428	6.35303E+12	5.2354E+13	5713.35	0.0262502	0.026834	0.0814571	0.8121812	0.8302244	2.4824794	2.4824794
45:39.9	574428	6.35303E+12	5.2354E+13	5716.19	0.0262502	0.0271429	0.0814976	0.8121812	0.8398013	2.4837134	2.4837134
50:43.0	574428	6.35303E+12	5.2354E+13	5717.38	0.0262502	0.0274218	0.0815146	0.8121812	0.8484305	2.4842305	2.4842305
55:46.3	574429	6.35303E+12	5.15634E+13	5710.01	0.0262502	0.0231901	0.0826578	0.8121812	0.7175017	2.5190709	2.5190709
00:48.9	574429	6.35303E+12	5.15634E+13	5698.38	0.026897	0.0217524	0.0824894	0.8321932	0.6730193	2.5139401	2.5139401
05:51.7	574429	6.35303E+12	5.15634E+13	5709.41	0.026897	0.0217524	0.0826491	0.8321932	0.6730193	2.5188062	2.5188062
10:54.7	574430	6.35303E+12	5.12815E+13	5715.13	0.026897	0.0226581	0.0831866	0.8321932	0.7010416	2.5351866	2.5351866
15:57.5	574430	6.35303E+12	5.12815E+13	5712.23	0.026897	0.0229356	0.0831444	0.8321932	0.7096275	2.5339002	2.5339002
21:00.5	574430	6.35303E+12	5.12815E+13	5713.4	0.026897	0.0229256	0.0831614	0.8321932	0.7093181	2.5344192	2.5344192
26:04.3	574430	6.35303E+12	5.12815E+13	5723.95	0.026897	0.023048	0.083315	0.8321932	0.7131051	2.5390991	2.5390991
31:07.1	574430	6.35303E+12	5.12815E+13	5735.36	0.026897	0.0238875	0.0834811	0.8321932	0.7390793	2.5441605	2.5441605
36:10.4	574430	6.35303E+12	5.12815E+13	5739.01	0.026897	0.0236472	0.0835342	0.8321932	0.7316444	2.5457796	2.5457796
41:13.2	574430	6.35303E+12	5.12815E+13	5741.24	0.026897	0.0239907	0.0835666	0.8321932	0.7422723	2.5467688	2.5467688
46:16.4	574430	6.35303E+12	5.12815E+13	5724.65	0.026897	0.0464448	0.0833252	0.8321932	1.4370021	2.5394096	2.5394096
56:21.7	574432	6.35303E+12	4.99455E+13	5715.44	0.026897	0.0462722	0.0854165	0.8321932	1.4316619	2.6031435	2.6031435
01:25.6	574432	6.35303E+12	4.99455E+13	5710.99	0.026856	0.0260505	0.08535	0.8309246	0.8060025	2.6011167	2.6011167
06:28.6	574433	6.35303E+12	4.98413E+13	5720.19	0.026856	0.0232273	0.0856661	0.8309246	0.7186527	2.6107513	2.6107513
11:32.0	574435	6.35303E+12	4.97656E+13	5727.69	0.026856	0.0241208	0.085909	0.8309246	0.7462976	2.6181535	2.6181535
16:35.1	574435	6.35303E+12	4.97656E+13	5726.31	0.026856	0.0265562	0.0858883	0.8309246	0.8216488	2.6175227	2.6175227
21:38.0	574437	6.35303E+12	4.98823E+13	5731.36	0.026856	0.0254804	0.0857628	0.8309246	0.7883636	2.6136992	2.6136992
26:41.0	574438	6.35303E+12	4.9928E+13	5735.02	0.026856	0.0467602	0.0857391	0.8309246	1.4467606	2.6129777	2.6129777
31:44.0	574440	6.35303E+12	4.96931E+13	5745.06	0.026856	0.0262716	0.0862952	0.8309246	0.8128433	2.6299251	2.6299251
36:47.2	574441	6.35303E+12	5.04581E+13	5742.56	0.026856	0.0260607	0.0849499	0.8309246	0.8063181	2.5889252	2.5889252
41:49.9	574441	6.35303E+12	5.04581E+13	5743.71	0.026856	0.0469087	0.0849669	0.8309246	1.4513552	2.5894437	2.5894437
46:52.8	574442	6.35303E+12	5.28842E+13	5750.85	0.026856	0.0335792	0.0811698	0.8309246	1.0389404	2.4737229	2.4737229
51:55.7	574442	6.35303E+12	5.28842E+13	5746.02	0.026856	0.0258719	0.0811016	0.8309246	0.8004766	2.4716453	2.4716453
56:59.4	574443	6.35303E+12	5.28228E+13	5737.61	0.026856	0.0247931	0.0810771	0.8309246	0.7670985	2.4708977	2.4708977
07:04.8	574443	6.35303E+12	5.28228E+13	5735.1	0.0293057	0.0239244	0.0810416	0.9067184	0.7402209	2.4698168	2.4698168
12:08.2	574443	6.35303E+12	5.28228E+13	5755.91	0.0293057	0.0241312	0.0813357	0.9067184	0.7466193	2.4787786	2.4787786
17:11.3	574443	6.35303E+12	5.28228E+13	5760.01	0.0293057	0.0244131	0.0813936	0.9067184	0.7553413	2.4805442	2.4805442
22:14.8	574444	6.35303E+12	5.21447E+13	5754.45	0.0293057	0.0243054	0.0823724	0.9067184	0.7520091	2.510372	2.510372
27:17.9	574444	6.35303E+12	5.21447E+13	5767.44	0.0293057	0.0271808	0.0825583	0.9067184	0.840974	2.5160389	2.5160389
32:20.7	574445	6.35303E+12	5.19166E+13	5755.01	0.0293057	0.0334751	0.0827425	0.9067184	1.0357196	2.5216513	2.5216513
37:23.8	574446	6.35303E+12	5.17083E+13	5764.68	0.0293057	0.0269796	0.0832153	0.9067184	0.8347488	2.5360608	2.5360608
42:26.6	574446	6.35303E+12	5.17083E+13	5756.94	0.0293057	0.0257824	0.0831036	0.9067184	0.7977075	2.5326557	2.5326557
47:30.1	574446	6.35303E+12	5.17083E+13	5755.95	0.0293057	0.0259458	0.0830893	0.9067184	0.8027631	2.5322202	2.5322202
52:32.9	574448	6.35303E+12	5.19511E+13	5743.01	0.0293057	0.0258671	0.082515	0.9067184	0.8003281	2.5147176	2.5147176
57:35.8	574448	6.35303E+12	5.19511E+13	5714.06	0.0293057	0.029113	0.082099	0.9067184	0.9007562	2.5020411	2.5020411
02:38.8	574448	6.35303E+12	5.19511E+13	5709.16	0.0285642	0.0261365	0.0820286	0.8837763	0.8086633	2.4998955	2.4998955
07:41.8	574449	6.35303E+12	5.17328E+13	5699.99	0.0285642	0.0243494	0.0822425	0.8837763	0.7533704	2.5064137	2.5064137
12:45.5	574449	6.35303E+12	5.17328E+13	5715.31	0.0285642	0.0249058	0.0824635	0.8837763	0.7705855	2.5131502	2.5131502
17:48.3	574450	6.35303E+12	5.16724E+13	5717.01	0.0285642	0.0252523	0.0825845	0.8837763	0.7813062	2.5168369	2.5168369
22:51.1	574450	6.35303E+12	5.16724E+13	5712.98	0.0285642	0.0249495	0.0825263	0.8837763	0.7719375	2.5150627	2.5150627
27:54.2	574450	6.35303E+12	5.16724E+13	5722.03	0.0285642	0.0249614	0.082657	0.8837763	0.7723057	2.5190469	2.5190469

datetime	block_height	network_diff	est_network_hashrate	BTC_price	day_ahead_LMP	real_time_LMP	breakeven_mining_cost	day_ahead_LMP_rev	real_time_	mining_rev	realized_rev
18:57.8	574204	6.35303E+12	5.38327E+13	5320.85	0.0060427	0.005385	0.0737773	0.1869611	0.166612	2.2484294	2.2484294
24:01.3	574204	6.35303E+12	5.38327E+13	5320.01	0.0060427	0.0064427	0.0737656	0.1869611	0.199337	2.2480744	2.2480744
29:04.5	574204	6.35303E+12	5.38327E+13	5319.53	0.0060427	0.0066197	0.073759	0.1869611	0.204814	2.2478716	2.2478716
34:07.5	574204	6.35303E+12	5.38327E+13	5323.01	0.0060427	0.0050811	0.0738072	0.1869611	0.157209	2.2493421	2.2493421
39:10.8	574205	6.35303E+12	5.30839E+13	5321.95	0.0060427	0.0039673	0.0748335	0.1869611	0.122748	2.2806172	2.2806172
44:13.7	574205	6.35303E+12	5.30839E+13	5326.49	0.0060427	0.0026429	0.0748973	0.1869611	0.081771	2.2825627	2.2825627
49:17.3	574206	6.35303E+12	5.44532E+13	5325.49	0.0060427	0.0055617	0.0730003	0.1869611	0.172079	2.2247506	2.2247506
54:21.0	574207	6.35303E+12	5.39845E+13	5329.01	0.0060427	0.0078101	0.0736827	0.1869611	0.241645	2.2455467	2.2455467
59:24.0	574207	6.35303E+12	5.39845E+13	5325.97	0.0060427	0.0013496	0.0736407	0.1869611	0.041757	2.2442657	2.2442657
04:26.9	574208	6.35303E+12	5.34662E+13	5326.24	0.0010725	0.0028982	0.0743583	0.0331832	0.08967	2.2661373	2.2661373
09:29.9	574208	6.35303E+12	5.34662E+13	5325.01	0.0010725	-0.0032033	0.0743412	0.0331832	-0.09911	2.2656139	2.2656139
14:32.8	574209	6.35303E+12	5.33477E+13	5321.61	0.0010725	-0.0082933	0.0744587	0.0331832	-0.25659	2.2691954	2.2691954
19:35.8	574209	6.35303E+12	5.33477E+13	5321.01	0.0010725	0.0010456	0.0744503	0.0331832	0.032351	2.2689395	2.2689395
24:38.8	574210	6.35303E+12	5.36221E+13	5327.95	0.0010725	0.001341	0.074166	0.0331832	0.041491	2.2602762	2.2602762
29:41.7	574212	6.35303E+12	5.54528E+13	5327.05	0.0010725	-0.0189529	0.0717053	0.0331832	-0.5864	2.185285	2.185285
34:44.6	574212	6.35303E+12	5.54528E+13	5323.36	0.0010725	-0.0315616	0.0716557	0.0331832	-0.97652	2.1837713	2.1837713
39:47.5	574215	6.35303E+12	5.58834E+13	5323.1	0.0010725	-0.0309173	0.0711001	0.0331832	-0.95658	2.1668382	2.1668382
44:50.4	574215	6.35303E+12	5.58834E+13	5323.1	0.0010725	-0.0300668	0.0711001	0.0331832	-0.93027	2.1668382	2.1668382
49:53.4	574215	6.35303E+12	5.58834E+13	5326.69	0.0010725	-0.0266166	0.071148	0.0331832	-0.82352	2.1682995	2.1682995
54:56.2	574215	6.35303E+12	5.58834E+13	5326.7	0.0010725	-0.031087	0.0711481	0.0331832	-0.96183	2.1683036	2.1683036
59:59.2	574216	6.35303E+12	5.54406E+13	5326.69	0.0010725	-0.0320125	0.0717163	0.0331832	-0.99047	2.1856184	2.1856184
05:02.6	574216	6.35303E+12	5.54406E+13	5330.34	0.0004616	-0.0310784	0.0717654	0.0142819	-0.96157	2.187116	2.187116
10:05.7	574219	6.35303E+12	5.59245E+13	5326.73	0.0004616	-0.0029138	0.0710963	0.0142819	-0.09015	2.1667245	2.1667245
15:08.7	574220	6.35303E+12	5.59914E+13	5330.77	0.0004616	-0.0189733	0.0710652	0.0142819	-0.58703	2.1657754	2.1657754
20:11.5	574220	6.35303E+12	5.59914E+13	5343.74	0.0004616	-0.0173406	0.0712381	0.0142819	-0.53652	2.1710449	2.1710449
25:14.5	574224	6.35303E+12	5.59847E+13	5336.19	0.0004616	-0.0300341	0.071146	0.0142819	-0.92926	2.168237	2.168237
30:17.5	574226	6.35303E+12	5.60441E+13	5332.48	0.0004616	-0.0260257	0.0710211	0.0142819	-0.80524	2.1644326	2.1644326
35:20.7	574227	6.35303E+12	5.56725E+13	5331.92	0.0004616	-0.0190855	0.0714877	0.0142819	-0.59051	2.1786519	2.1786519
40:24.0	574227	6.35303E+12	5.56725E+13	5332.07	0.0004616	-0.0196742	0.0714897	0.0142819	-0.60872	2.1787132	2.1787132
45:26.9	574227	6.35303E+12	5.56725E+13	5339.99	0.0004616	-0.0193638	0.0715959	0.0142819	-0.59912	2.1819493	2.1819493
50:29.9	574228	6.35303E+12	5.52451E+13	5343.15	0.0004616	-0.0290785	0.0721925	0.0142819	-0.89969	2.2001303	2.2001303
55:32.9	574229	6.35303E+12	5.5892E+13	5339.93	0.0004616	-0.0235031	0.0713139	0.0142819	-0.72719	2.1733552	2.1733552
00:36.0	574229	6.35303E+12	5.5892E+13	5339.62	0.0003683	-0.0186023	0.0713098	0.0113952	-0.57556	2.173229	2.173229
05:38.8	574229	6.35303E+12	5.5892E+13	5340.81	0.0003683	-0.030799	0.0713256	0.0113952	-0.95292	2.1737133	2.1737133
10:41.7	574229	6.35303E+12	5.5892E+13	5346.19	0.0003683	-0.0302803	0.0713975	0.0113952	-0.93687	2.175903	2.175903
15:45.1	574230	6.35303E+12	5.53347E+13	5351.26	0.0003683	-0.030195	0.0721849	0.0113952	-0.93423	2.1999008	2.1999008
20:48.1	574231	6.35303E+12	5.49411E+13	5348.15	0.0003683	-0.0280841	0.0726599	0.0113952	-0.86892	2.2143761	2.2143761
25:51.1	574231	6.35303E+12	5.49411E+13	5345.35	0.0003683	-0.028219	0.0726219	0.0113952	-0.8731	2.2132168	2.2132168
30:54.2	574231	6.35303E+12	5.49411E+13	5345.27	0.0003683	-0.0269783	0.0726208	0.0113952	-0.83471	2.2131836	2.2131836
35:57.2	574232	6.35303E+12	5.47061E+13	5350.24	0.0003683	-0.0274456	0.0730005	0.0113952	-0.84917	2.2247569	2.2247569
41:00.3	574232	6.35303E+12	5.47061E+13	5346.06	0.0003683	-0.0274731	0.0729435	0.0113952	-0.85002	2.2230187	2.2230187
46:03.7	574232	6.35303E+12	5.47061E+13	5353.06	0.0003683	-0.0289024	0.073039	0.0113952	-0.89424	2.2259295	2.2259295
51:06.6	574232	6.35303E+12	5.47061E+13	5358.68	0.0003683	-0.0281664	0.0731157	0.0113952	-0.87147	2.2282664	2.2282664

56:09.5	574232	6.35303E+12	5.47061E+13	5361.44	0.0003683	-0.0264087	0.0731533	0.0113952	-0.81709	2.2294141	2.2294141	2.2294141
01:12.5	574232	6.35303E+12	5.47061E+13	5374.99	0.0029068	-0.0263978	0.0733382	0.0899364	-0.81675	2.2350485	2.2350485	2.2350485
06:15.5	574233	6.35303E+12	5.35475E+13	5374.51	0.0029068	-0.0027561	0.0749183	0.0899364	-0.08527	2.2832021	2.2832021	2.2832021
11:18.3	574233	6.35303E+12	5.35475E+13	5358.81	0.0029068	-0.0007245	0.0746994	0.0899364	-0.02242	2.2765324	2.2765324	2.2765324
16:21.5	574233	6.35303E+12	5.35475E+13	5364.9	0.0029068	-0.0182589	0.0747843	0.0899364	-0.56493	2.2791195	2.2791195	2.2791195
21:24.5	574234	6.35303E+12	5.31615E+13	5359.77	0.0029068	-0.0018612	0.0752553	0.0899364	-0.05759	2.293473	2.293473	2.293473
26:27.4	574234	6.35303E+12	5.31615E+13	5359.03	0.0029068	-0.0145596	0.0752449	0.0899364	-0.45047	2.2931563	2.2931563	2.2931563
31:30.3	574234	6.35303E+12	5.31615E+13	5350.15	0.0029068	-0.0032024	0.0751202	0.0899364	-0.09908	2.2893565	2.2893565	2.2893565
36:33.4	574234	6.35303E+12	5.31615E+13	5341.65	0.0029068	-0.0159588	0.0750009	0.0899364	-0.49377	2.2857193	2.2857193	2.2857193
41:37.6	574236	6.35303E+12	5.29706E+13	5347.88	0.0029068	-0.031347	0.075359	0.0899364	-0.96988	2.2966332	2.2966332	2.2966332
46:40.5	574237	6.35303E+12	5.26741E+13	5351.2	0.0029068	-0.0299955	0.0758303	0.0899364	-0.92806	2.3109964	2.3109964	2.3109964
51:43.8	574238	6.35303E+12	5.2719E+13	5355.44	0.0029068	-0.005314	0.0758257	0.0899364	-0.16442	2.3108556	2.3108556	2.3108556
56:47.1	574238	6.35303E+12	5.2719E+13	5345.98	0.0029068	-0.0015188	0.0756917	0.0899364	-0.04699	2.3067736	2.3067736	2.3067736
01:50.1	574239	6.35303E+12	5.28168E+13	5350.18	0.0123358	-0.0315408	0.0756109	0.3816697	-0.97587	2.3043114	2.3043114	2.3043114
06:52.9	574240	6.35303E+12	5.25658E+13	5350.99	0.0123358	-0.0303257	0.0759835	0.3816697	-0.93828	2.3156641	2.3156641	2.3156641
11:55.9	574242	6.35303E+12	5.34165E+13	5348.27	0.0123358	9.42E-05	0.0747354	0.3816697	0.002915	2.2776282	2.2776282	2.2776282
16:58.9	574243	6.35303E+12	5.35108E+13	5354.48	0.0123358	0.0004518	0.0746903	0.3816697	0.013979	2.2762553	2.2762553	2.2762553
22:01.8	574245	6.35303E+12	5.38531E+13	5359.65	0.0123358	0.0010006	0.0742872	0.3816697	0.030959	2.2639687	2.2639687	2.2639687
27:04.8	574246	6.35303E+12	5.41667E+13	5357.51	0.0123358	-0.0032478	0.0738276	0.3816697	-0.10049	2.2499632	2.2499632	2.2499632
32:07.7	574246	6.35303E+12	5.41667E+13	5361.99	0.0123358	-0.0012084	0.0738894	0.3816697	-0.03739	2.2518446	2.2518446	2.2518446
37:10.8	574246	6.35303E+12	5.41667E+13	5361.98	0.0123358	0.0049192	0.0738892	0.3816697	0.1522	2.2518404	2.2518404	2.2518404
42:13.6	574246	6.35303E+12	5.41667E+13	5366.22	0.0123358	-0.0153369	0.0739476	0.3816697	-0.47452	2.2536211	2.2536211	2.2536211
47:16.4	574249	6.35303E+12	5.43573E+13	5361.59	0.0123358	-0.001234	0.0736247	0.3816697	-0.03818	2.2437799	2.2437799	2.2437799
52:19.3	574251	6.35303E+12	5.52479E+13	5360.9	0.0123358	0.0019206	0.0724286	0.3816697	0.059423	2.2073275	2.2073275	2.2073275
57:22.2	574251	6.35303E+12	5.52479E+13	5354.26	0.0123358	0.0019529	0.0723389	0.3816697	0.060423	2.2045935	2.2045935	2.2045935
02:25.2	574252	6.35303E+12	5.50584E+13	5358.27	0.0171547	0.0052837	0.0726423	0.5307664	0.163478	2.2138386	2.2138386	2.2138386
07:29.5	574253	6.35303E+12	5.55506E+13	5362.43	0.0171547	0.1591301	0.0720545	0.5307664	4.923485	2.1959243	4.9234853	4.9234853
12:32.4	574254	6.35303E+12	5.55733E+13	5360.24	0.0171547	0.0137192	0.0719957	0.5307664	0.424472	2.1941337	2.1941337	2.1941337
17:35.8	574255	6.35303E+12	5.5978E+13	5358.19	0.0171547	0.0100247	0.0714478	0.5307664	0.310164	2.1774367	2.1774367	2.1774367
22:39.3	574257	6.35303E+12	5.59531E+13	5365.45	0.0171547	0.010676	0.0715764	0.5307664	0.330315	2.1813562	2.1813562	2.1813562
27:42.4	574257	6.35303E+12	5.59531E+13	5368.93	0.0171547	0.0084567	0.0716229	0.5307664	0.26165	2.182771	2.182771	2.182771
32:45.3	574257	6.35303E+12	5.59531E+13	5368.01	0.0171547	0.00695	0.0716106	0.5307664	0.215033	2.182397	2.182397	2.182397
37:48.1	574257	6.35303E+12	5.59531E+13	5368.01	0.0171547	0.0068908	0.0716106	0.5307664	0.213201	2.182397	2.182397	2.182397
42:51.2	574258	6.35303E+12	5.61961E+13	5363.48	0.0171547	0.0079862	0.0712408	0.5307664	0.247093	2.1711281	2.1711281	2.1711281
47:54.2	574258	6.35303E+12	5.61961E+13	5363.48	0.0171547	0.0077288	0.0712408	0.5307664	0.239129	2.1711281	2.1711281	2.1711281
53:01.0	574258	6.35303E+12	5.61961E+13	5367.12	0.0171547	0.0079606	0.0712892	0.5307664	0.246301	2.1726015	2.1726015	2.1726015
58:03.9	574258	6.35303E+12	5.61961E+13	5368.9	0.0171547	0.0094797	0.0713128	0.5307664	0.293302	2.1733221	2.1733221	2.1733221
03:06.9	574258	6.35303E+12	5.61961E+13	5361.18	0.0175345	0.0099931	0.0712103	0.5425174	0.309187	2.170197	2.170197	2.170197
08:10.0	574258	6.35303E+12	5.61961E+13	5360.85	0.0175345	0.0140424	0.0712059	0.5425174	0.434472	2.1700634	2.1700634	2.1700634
13:13.1	574260	6.35303E+12	5.46276E+13	5364.69	0.0175345	0.0115677	0.0733029	0.5425174	0.357905	2.2339708	2.2339708	2.2339708
18:16.1	574260	6.35303E+12	5.46276E+13	5368.73	0.0175345	0.0089848	0.0733581	0.5425174	0.27799	2.2356531	2.2356531	2.2356531
23:19.1	574260	6.35303E+12	5.46276E+13	5365.96	0.0175345	0.0087186	0.0733202	0.5425174	0.269754	2.2344996	2.2344996	2.2344996
28:22.1	574260	6.35303E+12	5.46276E+13	5366.96	0.0175345	0.0076954	0.0733339	0.5425174	0.238096	2.234916	2.234916	2.234916
33:25.3	574261	6.35303E+12	5.36607E+13	5369.99	0.0175345	0.0085314	0.0746974	0.5425174	0.263962	2.2764693	2.2764693	2.2764693

38:28.2	574261	6.35303E+12	5.36607E+13	5366.01	0.0175345	0.007959	0.074642	0.5425174	0.246252	2.2747821	2.2747821
43:31.2	574261	6.35303E+12	5.36607E+13	5363.99	0.0175345	0.0088748	0.0746139	0.5425174	0.274586	2.2739257	2.2739257
48:34.0	574261	6.35303E+12	5.36607E+13	5362.94	0.0175345	0.0087942	0.0745993	0.5425174	0.272093	2.2734806	2.2734806
53:36.9	574261	6.35303E+12	5.36607E+13	5374.61	0.0175345	0.0108958	0.0747616	0.5425174	0.337116	2.2784278	2.2784278
58:39.7	574263	6.35303E+12	5.26165E+13	5373.07	0.0175345	0.0088925	0.0762235	0.5425174	0.275134	2.3229796	2.3229796
03:42.6	574266	6.35303E+12	5.51716E+13	5365.69	0.0192201	0.008437	0.0725936	0.5946699	0.261041	2.2123564	2.2123564
08:45.5	574268	6.35303E+12	5.60115E+13	5358.95	0.0192201	0.0081387	0.0714152	0.5946699	0.251811	2.1764425	2.1764425
13:48.7	574269	6.35303E+12	5.58958E+13	5350.35	0.0192201	0.0089234	0.0714482	0.5946699	0.27609	2.1774474	2.1774474
18:51.9	574270	6.35303E+12	5.6144E+13	5350.01	0.0192201	0.0083345	0.0711278	0.5946699	0.257869	2.1676825	2.1676825
23:54.8	574271	6.35303E+12	5.6095E+13	5356.14	0.0192201	0.0081467	0.0712715	0.5946699	0.252059	2.172064	2.172064
28:57.8	574271	6.35303E+12	5.6095E+13	5348.01	0.0192201	0.0080171	0.0711633	0.5946699	0.248049	2.168767	2.168767
34:00.7	574272	6.35303E+12	5.54087E+13	5356.18	0.0192201	0.0081756	0.0721548	0.5946699	0.252953	2.1989837	2.1989837
39:03.7	574273	6.35303E+12	5.53104E+13	5355.34	0.0192201	0.0085978	0.0722717	0.5946699	0.266016	2.2025454	2.2025454
44:07.1	574274	6.35303E+12	5.53441E+13	5355.28	0.0192201	0.0106277	0.072227	0.5946699	0.328821	2.2011814	2.2011814
49:10.1	574274	6.35303E+12	5.53441E+13	5354.11	0.0192201	0.0119739	0.0722112	0.5946699	0.370473	2.2007005	2.2007005
54:13.2	574274	6.35303E+12	5.53441E+13	5355.14	0.0192201	0.0170918	0.0722251	0.5946699	0.52882	2.2011238	2.2011238
59:16.2	574274	6.35303E+12	5.53441E+13	5369.69	0.0192201	0.0147439	0.0724213	0.5946699	0.456176	2.2071043	2.2071043
04:19.1	574274	6.35303E+12	5.53441E+13	5370.68	0.0216772	0.0099164	0.0724347	0.6706926	0.306813	2.2075112	2.2075112
09:22.5	574274	6.35303E+12	5.53441E+13	5367.34	0.0216772	0.0091219	0.0723896	0.6706926	0.282232	2.2061384	2.2061384
14:25.5	574274	6.35303E+12	5.53441E+13	5364.39	0.0216772	0.0156346	0.0723498	0.6706926	0.483735	2.2049258	2.2049258
19:28.4	574275	6.35303E+12	5.36343E+13	5366.28	0.0216772	0.0160516	0.0746825	0.6706926	0.496637	2.276015	2.276015
24:31.3	574275	6.35303E+12	5.36343E+13	5371.27	0.0216772	0.0160404	0.0747519	0.6706926	0.49629	2.2781314	2.2781314
29:34.0	574275	6.35303E+12	5.36343E+13	5369.89	0.0216772	0.0158588	0.0747327	0.6706926	0.490671	2.2775461	2.2775461
34:37.0	574277	6.35303E+12	5.50501E+13	5373.89	0.0216772	0.0200104	0.0728651	0.6706926	0.619122	2.2206282	2.2206282
39:39.9	574280	6.35303E+12	5.61893E+13	5386.3	0.0216772	0.0192174	0.0715525	0.6706926	0.594586	2.1806275	2.1806275
44:42.8	574281	6.35303E+12	5.67946E+13	5376.94	0.0216772	0.0172971	0.070667	0.6706926	0.535172	2.1536405	2.1536405
49:45.4	574281	6.35303E+12	5.67946E+13	5380.34	0.0216772	0.0171393	0.0707117	0.6706926	0.53029	2.1550023	2.1550023
54:48.5	574282	6.35303E+12	5.6096E+13	5376.01	0.0216772	0.0134753	0.0715347	0.6706926	0.416926	2.1800845	2.1800845
59:51.6	574282	6.35303E+12	5.6096E+13	5379.99	0.0216772	0.0180308	0.0715877	0.6706926	0.557873	2.1816984	2.1816984
04:54.7	574283	6.35303E+12	5.56063E+13	5387.53	0.0236157	0.0178982	0.0723193	0.7306698	0.55377	2.2039945	2.2039945
09:58.2	574283	6.35303E+12	5.56063E+13	5404.49	0.0236157	0.0199601	0.0725469	0.7306698	0.617566	2.2109326	2.2109326
15:01.2	574283	6.35303E+12	5.56063E+13	5410.8	0.0236157	0.019843	0.0726316	0.7306698	0.613942	2.213514	2.213514
20:04.6	574284	6.35303E+12	5.64188E+13	5402.18	0.0236157	0.0211652	0.0714716	0.7306698	0.654851	2.1781617	2.1781617
25:08.2	574284	6.35303E+12	5.64188E+13	5401.01	0.0236157	0.0207169	0.0714561	0.7306698	0.640981	2.17769	2.17769
30:11.3	574285	6.35303E+12	5.57835E+13	5408.19	0.0236157	0.0202099	0.072366	0.7306698	0.625294	2.2054203	2.2054203
35:14.3	574285	6.35303E+12	5.57835E+13	5399.01	0.0236157	0.0197121	0.0722432	0.7306698	0.609892	2.2016767	2.2016767
40:17.3	574285	6.35303E+12	5.57835E+13	5401.14	0.0236157	0.0205203	0.0722717	0.7306698	0.634898	2.2025453	2.2025453
45:20.2	574285	6.35303E+12	5.57835E+13	5401.12	0.0236157	0.020253	0.0722714	0.7306698	0.626628	2.2025372	2.2025372
50:23.3	574285	6.35303E+12	5.57835E+13	5404.01	0.0236157	0.0204966	0.0723101	0.7306698	0.634165	2.2037157	2.2037157
55:26.4	574285	6.35303E+12	5.57835E+13	5402.66	0.0236157	0.0204779	0.072292	0.7306698	0.633586	2.2031652	2.2031652
00:29.5	574285	6.35303E+12	5.57835E+13	5405.56	0.0246623	0.0205394	0.0723309	0.7630516	0.635489	2.2043478	2.2043478
05:32.6	574285	6.35303E+12	5.57835E+13	5408.51	0.0246623	0.020696	0.0723703	0.7630516	0.640334	2.2055508	2.2055508
10:35.6	574286	6.35303E+12	5.36818E+13	5410.26	0.0246623	0.0206614	0.0752279	0.7630516	0.639264	2.2926386	2.2926386
15:38.9	574287	6.35303E+12	5.50908E+13	5405.01	0.0246623	0.0206639	0.0732328	0.7630516	0.639341	2.2318356	2.2318356

20:42.0	574287	6.35303E+12	5.50908E+13	5377.7	0.0246623	0.0207146	0.0728628	0.7630516	0.64091	2.2205587	2.2205587	
25:45.3	574288	6.35303E+12	5.6446E+13	5379.31	0.0246623	0.0207073	0.0711347	0.7630516	0.640684	2.1678941	2.1678941	
30:48.4	574289	6.35303E+12	5.61643E+13	5386.34	0.0246623	0.0217617	0.071585	0.7630516	0.673307	2.1816166	2.1816166	
35:51.4	574289	6.35303E+12	5.61643E+13	5386.22	0.0246623	0.0218403	0.0715834	0.7630516	0.675739	2.181568	2.181568	
40:54.5	574289	6.35303E+12	5.61643E+13	5380.96	0.0246623	0.0212653	0.0715135	0.7630516	0.657948	2.1794376	2.1794376	
45:57.5	574289	6.35303E+12	5.61643E+13	5373.11	0.0246623	0.0218495	0.0714091	0.7630516	0.676024	2.1762581	2.1762581	
51:00.5	574290	6.35303E+12	5.56905E+13	5379.99	0.0246623	0.0219329	0.0721089	0.7630516	0.678604	2.1975834	2.1975834	
56:03.8	574293	6.35303E+12	5.63654E+13	5381.68	0.0246623	0.0219044	0.0712679	0.7630516	0.677722	2.1719525	2.1719525	
01:07.0	574294	6.35303E+12	5.66874E+13	5378.02	0.0258006	0.02135	0.0708148	0.7982706	0.660569	2.1581456	2.1581456	
06:09.8	574295	6.35303E+12	5.71185E+13	5388.44	0.0258006	0.0215474	0.0704165	0.7982706	0.666677	2.1460054	2.1460054	
11:12.8	574296	6.35303E+12	5.69506E+13	5391.26	0.0258006	0.0217122	0.070661	0.7982706	0.671776	2.1534583	2.1534583	
16:15.8	574298	6.35303E+12	5.77593E+13	5388.44	0.0258006	0.0240987	0.0696352	0.7982706	0.745614	2.1221966	2.1221966	
21:19.0	574298	6.35303E+12	5.77593E+13	5388.43	0.0258006	0.0223207	0.0696351	0.7982706	0.690603	2.1221927	2.1221927	
26:22.1	574298	6.35303E+12	5.77593E+13	5393.86	0.0258006	0.0257788	0.0697053	0.7982706	0.797596	2.1243313	2.1243313	
31:25.5	574300	6.35303E+12	5.74492E+13	5390.38	0.0258006	0.0265151	0.0700363	0.7982706	0.820377	2.13442	2.13442	
36:29.7	574301	6.35303E+12	5.7613E+13	5391.27	0.0258006	0.0846763	0.0698488	0.7982706	2.619885	2.1287047	2.6198847	
41:33.9	574301	6.35303E+12	5.7613E+13	5391.2	0.0258006	0.2210761	0.0698479	0.7982706	6.840095	2.1286771	6.8400945	
46:37.9	574302	6.35303E+12	5.77583E+13	5394.99	0.0258006	0.1570346	0.0697211	0.7982706	4.858651	2.1248138	4.8586505	
51:42.1	574302	6.35303E+12	5.77583E+13	5394.99	0.0258006	0.1785148	0.0697211	0.7982706	5.523248	2.1248138	5.5232479	
56:46.2	574305	6.35303E+12	5.8471E+13	5394.98	0.0258006	0.1762844	0.0688712	0.7982706	5.454239	2.0989108	5.4542393	
01:50.2	574305	6.35303E+12	5.8471E+13	5392.44	0.0281961	0.2198672	0.0688387	0.8723873	6.802691	2.0979226	6.8026912	
06:53.7	574305	6.35303E+12	5.8471E+13	5392.99	0.0281961	0.0379209	0.0688458	0.8723873	1.173273	2.0981366	2.0981366	
11:56.7	574306	6.35303E+12	5.85526E+13	5393.03	0.0281961	0.0282621	0.0687504	0.8723873	0.874429	2.0952297	2.0952297	
17:00.1	574309	6.35303E+12	6.00748E+13	5396.48	0.0281961	0.0252831	0.0670512	0.8723873	0.782259	2.0434454	2.0434454	
22:03.0	574309	6.35303E+12	6.00748E+13	5397.01	0.0281961	0.0261016	0.0670578	0.8723873	0.807584	2.0436461	2.0436461	
27:06.2	574310	6.35303E+12	6.02983E+13	5396.19	0.0281961	0.0259345	0.0667991	0.8723873	0.802413	2.0357628	2.0357628	
32:09.2	574311	6.35303E+12	6.01255E+13	5399.99	0.0281961	0.0302117	0.0670382	0.8723873	0.93475	2.0430488	2.0430488	
37:12.3	574311	6.35303E+12	6.01255E+13	5396.83	0.0281961	0.0302065	0.0669989	0.8723873	0.934589	2.0418532	2.0418532	
42:16.0	574312	6.35303E+12	5.99055E+13	5396.6	0.0281961	0.0302581	0.0672421	0.8723873	0.936186	2.0492645	2.0492645	
47:18.9	574312	6.35303E+12	5.99055E+13	5395.6	0.0281961	0.0260237	0.0672297	0.8723873	0.805173	2.0488848	2.0488848	
52:22.0	574315	6.35303E+12	5.97623E+13	5391.32	0.0281961	0.0287961	0.0673373	0.8723873	0.890951	2.0521662	2.0521662	
57:25.5	574315	6.35303E+12	5.97623E+13	5389.83	0.0281961	0.0262929	0.0673187	0.8723873	0.813502	2.051599	2.051599	
02:29.6	574316	6.35303E+12	5.95157E+13	5386.52	0.0299161	0.2138762	0.0675561	0.9256041	6.61733	2.0588338	6.6173296	
07:32.4	574317	6.35303E+12	6.04051E+13	5388.05	0.0299161	0.0275251	0.0665804	0.9256041	0.851627	2.0290984	2.0290984	
12:36.3	574319	6.35303E+12	6.0775E+13	5393.81	0.0299161	0.2273591	0.0662458	0.9256041	7.034491	2.0189017	7.0344906	
17:39.2	574320	6.35303E+12	6.21737E+13	5393.01	0.0299161	0.0493661	0.064746	0.9256041	1.527387	1.9731924	1.9731924	
22:42.0	574320	6.35303E+12	6.21737E+13	5402.48	0.0299161	0.0375238	0.0648597	0.9256041	1.160986	1.9766573	1.9766573	
27:44.8	574320	6.35303E+12	6.21737E+13	5407.98	0.0299161	0.0307697	0.0649257	0.9256041	0.952015	1.9786696	1.9786696	
32:47.7	574321	6.35303E+12	6.17749E+13	5401.85	0.0299161	0.028391	0.0652708	0.9256041	0.878418	1.9891864	1.9891864	
37:50.6	574321	6.35303E+12	6.17749E+13	5405.27	0.0299161	0.0282624	0.0653121	0.9256041	0.874439	1.9904458	1.9904458	
42:53.6	574321	6.35303E+12	6.17749E+13	5406.86	0.0299161	0.0277909	0.0653313	0.9256041	0.85985	1.9910313	1.9910313	
47:56.6	574321	6.35303E+12	6.17749E+13	5408.61	0.0299161	0.0279723	0.0653525	0.9256041	0.865463	1.9916757	1.9916757	
52:59.4	574321	6.35303E+12	6.17749E+13	5414.93	0.0299161	0.0279911	0.0654288	0.9256041	0.866045	1.994003	1.994003	
58:02.4	574321	6.35303E+12	6.17749E+13	5402.69	0.0299161	0.026867	0.0652809	0.9256041	0.831265	1.9894957	1.9894957	

03:05.3	574321	6.35303E+12	6.17749E+13	5391.74	0.0292659	0.0268991	0.0651486	0.9054869	0.832258	1.9854634	1.9854634
08:08.5	574321	6.35303E+12	6.17749E+13	5395.3	0.0292659	0.0270222	0.0651917	0.9054869	0.836067	1.9867744	1.9867744
13:11.4	574321	6.35303E+12	6.17749E+13	5397.89	0.0292659	0.0267872	0.065223	0.9054869	0.828796	1.9877281	1.9877281
18:14.9	574321	6.35303E+12	6.17749E+13	5399.5	0.0292659	0.0268543	0.0652424	0.9054869	0.830872	1.988321	1.988321
23:17.9	574321	6.35303E+12	6.17749E+13	5394.06	0.0292659	0.0269768	0.0651767	0.9054869	0.834662	1.9863178	1.9863178
28:20.8	574321	6.35303E+12	6.17749E+13	5393.44	0.0292659	0.0268761	0.0651692	0.9054869	0.831547	1.9860895	1.9860895
33:24.0	574322	6.35303E+12	5.8824E+13	5394.4	0.0292659	0.0268238	0.0684506	0.9054869	0.829928	2.086093	2.086093
38:27.3	574322	6.35303E+12	5.8824E+13	5392.26	0.0292659	0.0261315	0.0684234	0.9054869	0.808509	2.0852655	2.0852655
43:30.4	574323	6.35303E+12	5.85421E+13	5392.81	0.0292659	0.0274694	0.0687599	0.9054869	0.849903	2.0955189	2.0955189
48:33.4	574323	6.35303E+12	5.85421E+13	5397.13	0.0292659	0.0267346	0.068815	0.9054869	0.827169	2.0971976	2.0971976
53:36.4	574323	6.35303E+12	5.85421E+13	5402.13	0.0292659	0.0276262	0.0688787	0.9054869	0.854755	2.0991404	2.0991404
58:39.2	574326	6.35303E+12	5.98016E+13	5403.36	0.0292659	0.0304034	0.0674434	0.9054869	0.940681	2.0553977	2.0553977
03:42.1	574326	6.35303E+12	5.98016E+13	5402.78	0.030273	0.0359978	0.0674361	0.9366466	1.113772	2.0551771	2.0551771
08:45.0	574327	6.35303E+12	5.96067E+13	5401.47	0.030273	0.0287712	0.0676402	0.9366466	0.890181	2.0613959	2.0613959
13:48.1	574327	6.35303E+12	5.96067E+13	5402.02	0.030273	0.0276182	0.0676471	0.9366466	0.854507	2.0616058	2.0616058
18:51.1	574328	6.35303E+12	5.96752E+13	5405.01	0.030273	0.0258534	0.0676069	0.9366466	0.799904	2.0603812	2.0603812
23:54.0	574328	6.35303E+12	5.96752E+13	5405.54	0.030273	0.0273201	0.0676135	0.9366466	0.845284	2.0605832	2.0605832
28:57.0	574328	6.35303E+12	5.96752E+13	5411.23	0.030273	0.0271151	0.0676847	0.9366466	0.838941	2.0627523	2.0627523
34:00.5	574329	6.35303E+12	5.94855E+13	5414.16	0.030273	0.0272609	0.0679373	0.9366466	0.843452	2.0704516	2.0704516
39:03.4	574330	6.35303E+12	5.97035E+13	5414.16	0.030273	0.0272442	0.0676893	0.9366466	0.842936	2.0628912	2.0628912
44:06.6	574331	6.35303E+12	5.96567E+13	5414.18	0.030273	0.0259561	0.0677426	0.9366466	0.803082	2.0645162	2.0645162
49:10.2	574333	6.35303E+12	5.9734E+13	5407.51	0.030273	0.0270756	0.0675716	0.9366466	0.837719	2.0593055	2.0593055
54:13.3	574333	6.35303E+12	5.9734E+13	5400.01	0.030273	0.0271004	0.0674779	0.9366466	0.838486	2.0564494	2.0564494
59:16.4	574334	6.35303E+12	5.92562E+13	5403.78	0.030273	0.0273779	0.0680695	0.9366466	0.847072	2.0744785	2.0744785
04:19.8	574335	6.35303E+12	5.9018E+13	5401.4	0.0290851	0.0283554	0.0683141	0.899893	0.877316	2.0819329	2.0819329
09:23.3	574335	6.35303E+12	5.9018E+13	5400.65	0.0290851	0.0271462	0.0683046	0.899893	0.839903	2.0816439	2.0816439
14:26.3	574337	6.35303E+12	6.04407E+13	5403.84	0.0290851	0.0271793	0.0667361	0.899893	0.840928	2.0338434	2.0338434
19:29.7	574338	6.35303E+12	6.00814E+13	5403.99	0.0290851	0.0269492	0.0671371	0.899893	0.833808	2.0460639	2.0460639
24:32.5	574341	6.35303E+12	6.05704E+13	5406.15	0.0290851	0.0265213	0.0666217	0.899893	0.820569	2.0303561	2.0303561
29:35.5	574342	6.35303E+12	6.0482E+13	5405.72	0.0290851	0.0269952	0.0667137	0.899893	0.835232	2.0331615	2.0331615
34:38.6	574343	6.35303E+12	5.99395E+13	5402.02	0.0290851	0.0260047	0.0672715	0.899893	0.804585	2.0501593	2.0501593
39:41.6	574343	6.35303E+12	5.99395E+13	5399.38	0.0290851	0.0266287	0.0672386	0.899893	0.823892	2.0491574	2.0491574
44:44.4	574344	6.35303E+12	5.95861E+13	5399.01	0.0290851	0.0265012	0.0676328	0.899893	0.819947	2.0611697	2.0611697
49:47.3	574344	6.35303E+12	5.95861E+13	5394.85	0.0290851	0.0271631	0.0675807	0.899893	0.840426	2.0595816	2.0595816
54:50.3	574344	6.35303E+12	5.95861E+13	5396.47	0.0290851	0.0265076	0.067601	0.899893	0.820145	2.0602	2.0602
59:53.1	574344	6.35303E+12	5.95861E+13	5398.44	0.0290851	0.0266994	0.0676256	0.899893	0.826079	2.0609521	2.0609521
04:56.9	574346	6.35303E+12	5.84022E+13	5394.51	0.02818	0.2274043	0.0689463	0.8718892	7.035889	2.1012014	7.035889
10:00.6	574347	6.35303E+12	5.86008E+13	5393.4	0.02818	0.0269004	0.0686985	0.8718892	0.832298	2.0936499	2.0936499
15:04.1	574347	6.35303E+12	5.86008E+13	5397.48	0.02818	0.026967	0.0687505	0.8718892	0.834359	2.0952337	2.0952337
20:07.3	574348	6.35303E+12	5.87322E+13	5396.99	0.02818	0.0271281	0.0685905	0.8718892	0.839343	2.0903567	2.0903567
25:10.3	574348	6.35303E+12	5.87322E+13	5396.15	0.02818	0.0268342	0.0685798	0.8718892	0.83025	2.0900313	2.0900313
30:14.9	574349	6.35303E+12	5.84595E+13	5395.98	0.02818	0.226576	0.0688975	0.8718892	7.010261	2.0997122	7.0102614
35:17.9	574350	6.35303E+12	5.91267E+13	5396.77	0.02818	0.0272473	0.06813	0.8718892	0.843032	2.0763241	2.0763241
40:20.9	574350	6.35303E+12	5.91267E+13	5395.88	0.02818	0.024981	0.0681188	0.8718892	0.772912	2.0759816	2.0759816

45:24.0	574351	6.35303E+12	5.92508E+13	5395.8	0.02818	0.0257123	0.0679751	0.8718892	0.795539	2.0716025	2.0716025	2.0716025
50:27.1	574351	6.35303E+12	5.92508E+13	5393.06	0.02818	0.0249229	0.0679406	0.8718892	0.771115	2.0705505	2.0705505	2.0705505
55:30.2	574351	6.35303E+12	5.92508E+13	5392.02	0.02818	0.0251479	0.0679275	0.8718892	0.778076	2.0701512	2.0701512	2.0701512
00:33.0	574351	6.35303E+12	5.92508E+13	5390.01	0.0294406	0.0252162	0.0679022	0.9108922	0.780189	2.0693795	2.0693795	2.0693795
05:35.8	574351	6.35303E+12	5.92508E+13	5365.12	0.0294406	0.0226972	0.0675886	0.9108922	0.702251	2.0598235	2.0598235	2.0598235
10:38.7	574351	6.35303E+12	5.92508E+13	5371.99	0.0294406	0.0227666	0.0676752	0.9108922	0.704399	2.0624611	2.0624611	2.0624611
15:41.6	574351	6.35303E+12	5.92508E+13	5379.7	0.0294406	0.0243866	0.0677723	0.9108922	0.754521	2.0654212	2.0654212	2.0654212
20:44.5	574353	6.35303E+12	5.95341E+13	5378.3	0.0294406	0.0230678	0.0674322	0.9108922	0.713718	2.0550568	2.0550568	2.0550568
25:47.5	574353	6.35303E+12	5.95341E+13	5381.03	0.0294406	0.0249763	0.0674664	0.9108922	0.772767	2.0560999	2.0560999	2.0560999
30:50.5	574353	6.35303E+12	5.95341E+13	5392.25	0.0294406	0.0253991	0.0676071	0.9108922	0.785848	2.0603871	2.0603871	2.0603871
35:53.6	574353	6.35303E+12	5.95341E+13	5394.16	0.0294406	0.0253424	0.067631	0.9108922	0.784094	2.0611169	2.0611169	2.0611169
40:56.7	574353	6.35303E+12	5.95341E+13	5399.99	0.0294406	0.0250223	0.0677041	0.9108922	0.77419	2.0633446	2.0633446	2.0633446
45:59.6	574356	6.35303E+12	6.01278E+13	5396.88	0.0294406	0.0234576	0.0669971	0.9108922	0.725778	2.0417971	2.0417971	2.0417971
51:02.7	574356	6.35303E+12	6.01278E+13	5394.77	0.0294406	0.0249344	0.0669709	0.9108922	0.77147	2.0409989	2.0409989	2.0409989
56:05.8	574356	6.35303E+12	6.01278E+13	5402.4	0.0294406	0.022081	0.0670656	0.9108922	0.683186	2.0438855	2.0438855	2.0438855
01:08.8	574357	6.35303E+12	5.98782E+13	5407.57	0.0358454	0.0219246	0.0674096	1.1090567	0.678347	2.0543694	2.0543694	2.0543694
06:12.1	574357	6.35303E+12	5.98782E+13	5412.01	0.0358454	0.0217059	0.067465	1.1090567	0.671581	2.0560562	2.0560562	2.0560562
11:15.1	574359	6.35303E+12	5.99023E+13	5413.47	0.0358454	0.0219481	0.067456	1.1090567	0.679074	2.0557835	2.0557835	2.0557835
16:18.2	574360	6.35303E+12	6.0023E+13	5411.11	0.0358454	0.0220348	0.0672909	1.1090567	0.681757	2.0507521	2.0507521	2.0507521
21:21.3	574360	6.35303E+12	6.0023E+13	5411.03	0.0358454	0.0228761	0.0672899	1.1090567	0.707787	2.0507217	2.0507217	2.0507217
26:24.5	574360	6.35303E+12	6.0023E+13	5403.73	0.0358454	0.0226145	0.0671992	1.1090567	0.699693	2.0479551	2.0479551	2.0479551
31:27.6	574361	6.35303E+12	5.95038E+13	5407.93	0.0358454	0.0246405	0.0678382	1.1090567	0.762377	2.0674304	2.0674304	2.0674304
36:30.8	574361	6.35303E+12	5.95038E+13	5411.14	0.0358454	0.0360477	0.0678785	1.1090567	1.115316	2.0686576	2.0686576	2.0686576
41:34.3	574362	6.35303E+12	5.87448E+13	5422.09	0.0358454	0.0239492	0.0688946	1.1090567	0.740988	2.0996263	2.0996263	2.0996263
46:37.4	574362	6.35303E+12	5.87448E+13	5435.74	0.0358454	0.0225539	0.0690681	1.1090567	0.697818	2.1049121	2.1049121	2.1049121
51:40.5	574362	6.35303E+12	5.87448E+13	5435.55	0.0358454	0.0241469	0.0690657	1.1090567	0.747105	2.1048385	2.1048385	2.1048385
56:43.6	574363	6.35303E+12	5.80502E+13	5427.15	0.0358454	0.0327231	0.0697841	1.1090567	1.012453	2.1267343	2.1267343	2.1267343
01:47.3	574363	6.35303E+12	5.80502E+13	5428.1	0.0269617	0.0483081	0.0697964	0.834195	1.494653	2.1271066	2.1271066	2.1271066
06:50.1	574364	6.35303E+12	5.78645E+13	5441.31	0.0269617	0.0434265	0.0701907	0.834195	1.343616	2.1391255	2.1391255	2.1391255
11:53.2	574364	6.35303E+12	5.78645E+13	5428.95	0.0269617	0.0243957	0.0700313	0.834195	0.754803	2.1342664	2.1342664	2.1342664
16:56.5	574367	6.35303E+12	5.84533E+13	5433.74	0.0269617	0.0247673	0.069387	0.834195	0.7663	2.1146321	2.1146321	2.1146321
21:59.8	574367	6.35303E+12	5.84533E+13	5439.23	0.0269617	0.0232371	0.0694571	0.834195	0.718956	2.1167686	2.1167686	2.1167686
27:03.6	574368	6.35303E+12	5.81378E+13	5433.99	0.0269617	0.0215394	0.0697668	0.834195	0.666429	2.1262058	2.1262058	2.1262058
32:06.7	574368	6.35303E+12	5.81378E+13	5443.02	0.0269617	0.0212281	0.0698827	0.834195	0.656797	2.1297391	2.1297391	2.1297391
37:09.8	574369	6.35303E+12	5.7527E+13	5441.82	0.0269617	0.0207248	0.0706092	0.834195	0.641225	2.1518775	2.1518775	2.1518775
42:13.0	574370	6.35303E+12	5.73316E+13	5444.99	0.0269617	0.0200896	0.0708911	0.834195	0.621572	2.1604697	2.1604697	2.1604697
47:16.2	574370	6.35303E+12	5.73316E+13	5471.73	0.0269617	0.0200075	0.0712392	0.834195	0.619032	2.1710796	2.1710796	2.1710796
52:19.8	574370	6.35303E+12	5.73316E+13	5464.57	0.0269617	0.0196461	0.071146	0.834195	0.60785	2.1682387	2.1682387	2.1682387
57:22.8	574373	6.35303E+12	5.75391E+13	5469.53	0.0269617	0.0199141	0.0709537	0.834195	0.641225	2.162379	2.162379	2.162379
02:26.3	574373	6.35303E+12	5.75391E+13	5466.18	0.0207707	0.0196095	0.0709103	0.6426455	0.606718	2.1610546	2.1610546	2.1610546
07:29.4	574373	6.35303E+12	5.75391E+13	5468.2	0.0207707	0.0193582	0.0709365	0.6426455	0.598943	2.1618532	2.1618532	2.1618532
12:32.4	574374	6.35303E+12	5.70787E+13	5462.25	0.0207707	0.019736	0.0714308	0.6426455	0.610632	2.1769189	2.1769189	2.1769189
17:35.9	574375	6.35303E+12	5.67247E+13	5457.26	0.0207707	0.0194616	0.0718109	0.6426455	0.602142	2.1885032	2.1885032	2.1885032
22:38.8	574376	6.35303E+12	5.68162E+13	5459.27	0.0207707	0.021469	0.0717217	0.6426455	0.664251	2.185782	2.185782	2.185782

27:41.6	574376	6.35303E+12	5.68162E+13	5455.91	0.0207707	0.0195687	0.0716775	0.6426455	0.605456	2.1844367	2.1844367
32:44.5	574377	6.35303E+12	5.63276E+13	5456.06	0.0207707	0.0197946	0.0723014	0.6426455	0.612445	2.2034492	2.2034492
37:47.4	574377	6.35303E+12	5.63276E+13	5461.19	0.0207707	0.0219931	0.0723693	0.6426455	0.680467	2.205521	2.205521
42:50.1	574377	6.35303E+12	5.63276E+13	5464.3	0.0207707	0.0213058	0.0724106	0.6426455	0.659202	2.206777	2.206777
47:53.0	574378	6.35303E+12	5.65074E+13	5471.12	0.0207707	0.0213015	0.0722702	0.6426455	0.659068	2.2024995	2.2024995
52:55.9	574378	6.35303E+12	5.65074E+13	5465.8	0.0207707	0.0208578	0.0721999	0.6426455	0.64534	2.2003578	2.2003578
57:58.7	574378	6.35303E+12	5.65074E+13	5467.45	0.0207707	0.0197404	0.0722217	0.6426455	0.610768	2.2010221	2.2010221
03:32.3	574384	6.35303E+12	5.65611E+13	5475.82	0.0180828	0.018821	0.0722636	0.5594818	0.582322	2.2022993	2.2022993
08:35.1	574384	6.35303E+12	5.65611E+13	5472.78	0.0180828	0.0187888	0.0722235	0.5594818	0.581326	2.2010766	2.2010766
13:38.2	574384	6.35303E+12	5.65611E+13	5477.51	0.0180828	0.0188459	0.0722859	0.5594818	0.583092	2.2029789	2.2029789
18:41.2	574384	6.35303E+12	5.65611E+13	5475.27	0.0180828	0.0184952	0.0722564	0.5594818	0.572242	2.202078	2.202078
23:44.5	574384	6.35303E+12	5.65611E+13	5485.01	0.0180828	0.0183313	0.0723849	0.5594818	0.56717	2.2059953	2.2059953
28:47.4	574385	6.35303E+12	5.52675E+13	5483.01	0.0180828	0.0180025	0.0740521	0.5594818	0.556997	2.2568058	2.2568058
33:50.3	574386	6.35303E+12	5.5002E+13	5487.35	0.0180828	0.0182859	0.0744685	0.5594818	0.565766	2.2694951	2.2694951
38:53.3	574386	6.35303E+12	5.5002E+13	5489.7	0.0180828	0.0187295	0.0745004	0.5594818	0.579491	2.270467	2.270467
43:56.2	574387	6.35303E+12	5.4816E+13	5485.01	0.0180828	0.0183101	0.0746893	0.5594818	0.566515	2.2762247	2.2762247
48:59.1	574387	6.35303E+12	5.4816E+13	5494.56	0.0180828	0.0184541	0.0748194	0.5594818	0.57097	2.2801879	2.2801879
54:02.0	574387	6.35303E+12	5.4816E+13	5496.86	0.0180828	0.0184113	0.0748507	0.5594818	0.569646	2.2811424	2.2811424
59:04.8	574388	6.35303E+12	5.41076E+13	5492.23	0.0180828	0.0184131	0.0757667	0.5594818	0.569701	2.3090591	2.3090591
04:07.9	574388	6.35303E+12	5.41076E+13	5492.55	0.0171198	0.0184116	0.0757711	0.5296866	0.569655	2.3091936	2.3091936
09:11.2	574388	6.35303E+12	5.41076E+13	5499.47	0.0171198	0.018402	0.0758666	0.5296866	0.569358	2.3121029	2.3121029
14:14.7	574390	6.35303E+12	5.36713E+13	5497.38	0.0171198	0.0183991	0.0764543	0.5296866	0.569268	2.3300147	2.3300147
19:17.4	574393	6.35303E+12	5.4543E+13	5505.67	0.0171198	0.0188975	0.0753459	0.5296866	0.584689	2.296235	2.296235
24:20.4	574393	6.35303E+12	5.4543E+13	5525.72	0.0171198	0.0194457	0.0756203	0.5296866	0.60165	2.3045972	2.3045972
29:23.6	574393	6.35303E+12	5.4543E+13	5532.69	0.0171198	0.0193998	0.0757157	0.5296866	0.60023	2.3075042	2.3075042
34:27.1	574393	6.35303E+12	5.4543E+13	5548.77	0.0171198	0.0195967	0.0759358	0.5296866	0.606322	2.3142106	2.3142106
39:30.2	574394	6.35303E+12	5.38779E+13	5540.68	0.0171198	0.0195476	0.076761	0.5296866	0.604803	2.3393597	2.3393597
44:33.4	574395	6.35303E+12	5.53825E+13	5512.91	0.0171198	0.0198241	0.0743014	0.5296866	0.613358	2.2644017	2.2644017
49:36.3	574395	6.35303E+12	5.53825E+13	5524.53	0.0171198	0.0195437	0.074458	0.5296866	0.604682	2.2691746	2.2691746
54:39.3	574395	6.35303E+12	5.53825E+13	5525.3	0.0171198	0.0195692	0.0744684	0.5296866	0.605471	2.2694909	2.2694909
59:42.3	574395	6.35303E+12	5.53825E+13	5518.69	0.0171198	0.0192178	0.0743793	0.5296866	0.594599	2.2667759	2.2667759
04:45.3	574395	6.35303E+12	5.53825E+13	5533.7	0.0177576	0.0191891	0.0745816	0.5494201	0.593711	2.2729411	2.2729411
09:48.1	574395	6.35303E+12	5.53825E+13	5530.29	0.0177576	0.0191378	0.0745356	0.5494201	0.592124	2.2715405	2.2715405
14:51.2	574396	6.35303E+12	5.44713E+13	5534.64	0.0177576	0.0189612	0.0758421	0.5494201	0.58666	2.3113551	2.3113551
19:54.1	574396	6.35303E+12	5.44713E+13	5544.31	0.0177576	0.0189168	0.0759746	0.5494201	0.585286	2.3153934	2.3153934
24:57.0	574396	6.35303E+12	5.44713E+13	5549.76	0.0177576	0.018934	0.0760493	0.5494201	0.585818	2.3176694	2.3176694
30:00.1	574397	6.35303E+12	5.38389E+13	5535.92	0.0177576	0.019027	0.0767506	0.5494201	0.588695	2.3390422	2.3390422
35:03.1	574397	6.35303E+12	5.38389E+13	5548.11	0.0177576	0.0186692	0.0769196	0.5494201	0.577625	2.3441927	2.3441927
40:06.4	574397	6.35303E+12	5.38389E+13	5576.84	0.0177576	0.0189082	0.0773179	0.5494201	0.58502	2.3563317	2.3563317
45:09.5	574397	6.35303E+12	5.38389E+13	5588.49	0.0177576	0.0188137	0.0774794	0.5494201	0.582096	2.3612541	2.3612541
50:12.8	574397	6.35303E+12	5.38389E+13	5580.14	0.0177576	0.0194016	0.0773636	0.5494201	0.600286	2.3577261	2.3577261
55:16.0	574397	6.35303E+12	5.38389E+13	5584.03	0.0177576	0.0194473	0.0774176	0.5494201	0.6017	2.3593697	2.3593697
00:19.0	574398	6.35303E+12	5.24135E+13	5587.36	0.0179634	0.0194473	0.0795704	0.5557876	0.6017	2.4249801	2.4249801
05:22.0	574399	6.35303E+12	5.22154E+13	5575.01	0.0179634	0.0198978	0.0796957	0.5557876	0.615638	2.4287994	2.4287994

10:25.0	574400	6.35303E+12	5.19602E+13	5558.15	0.0179634	0.0197059	0.079845	0.5557876	0.609701	2.4333473	2.4333473	
15:28.5	574400	6.35303E+12	5.19602E+13	5577.5	0.0179634	0.0197937	0.0801229	0.5557876	0.612417	2.4418187	2.4418187	
20:31.4	574400	6.35303E+12	5.19602E+13	5579.19	0.0179634	0.019798	0.0801472	0.5557876	0.61255	2.4425586	2.4425586	
25:34.2	574401	6.35303E+12	5.14241E+13	5571.72	0.0179634	0.0199501	0.0808744	0.5557876	0.617256	2.4647197	2.4647197	
30:37.1	574401	6.35303E+12	5.14241E+13	5570.01	0.0179634	0.0199163	0.0808496	0.5557876	0.61621	2.4639632	2.4639632	
35:40.1	574402	6.35303E+12	5.15991E+13	5590.6	0.0179634	0.0206372	0.0808732	0.5557876	0.638515	2.4646821	2.4646821	
40:43.0	574403	6.35303E+12	5.16659E+13	5618.11	0.0179634	0.0201332	0.0811661	0.5557876	0.622921	2.4736097	2.4736097	
45:45.9	574404	6.35303E+12	5.22163E+13	5610.56	0.0179634	0.0220943	0.0802027	0.5557876	0.683598	2.444248	2.444248	
50:48.6	574406	6.35303E+12	5.44332E+13	5659.03	0.0179634	0.0201857	0.0776008	0.5557876	0.624546	2.3649536	2.3649536	
55:51.5	574406	6.35303E+12	5.44332E+13	5657.45	0.0179634	0.0201063	0.0775791	0.5557876	0.622089	2.3642933	2.3642933	
00:54.3	574407	6.35303E+12	5.44179E+13	5681.44	0.0187756	0.0190108	0.0779301	0.5809171	0.588194	2.3749899	2.3749899	
05:57.2	574408	6.35303E+12	5.43366E+13	5664.77	0.0187756	0.0196478	0.0778177	0.5809171	0.607903	2.3715634	2.3715634	
11:00.1	574409	6.35303E+12	5.45039E+13	5675.15	0.0187756	0.019932	0.0777209	0.5809171	0.616696	2.368615	2.368615	
16:03.5	574409	6.35303E+12	5.45039E+13	5712.4	0.0187756	0.0201859	0.0782311	0.5809171	0.624552	2.3841619	2.3841619	
21:07.1	574409	6.35303E+12	5.45039E+13	5686.74	0.0187756	0.0225242	0.0778796	0.5809171	0.696899	2.3734522	2.3734522	
26:10.3	574410	6.35303E+12	5.4739E+13	5682.68	0.0187756	0.0206965	0.0774898	0.5809171	0.64035	2.3615721	2.3615721	
31:13.5	574410	6.35303E+12	5.4739E+13	5696.73	0.0187756	0.0215966	0.0776814	0.5809171	0.668199	2.3674109	2.3674109	
36:16.9	574410	6.35303E+12	5.4739E+13	5721.55	0.0187756	0.0216764	0.0780199	0.5809171	0.670668	2.3777254	2.3777254	
41:19.9	574410	6.35303E+12	5.4739E+13	5723.36	0.0187756	0.0214227	0.0780445	0.5809171	0.662818	2.3784776	2.3784776	
46:23.0	574410	6.35303E+12	5.4739E+13	5753.44	0.0187756	0.0229512	0.0784547	0.5809171	0.71011	2.3909781	2.3909781	
51:26.1	574410	6.35303E+12	5.4739E+13	5751.61	0.0187756	0.0234893	0.0784298	0.5809171	0.726759	2.3902176	2.3902176	
56:29.0	574412	6.35303E+12	5.33495E+13	5783.15	0.0187756	0.0444265	0.0809138	0.5809171	1.374556	2.465921	2.465921	
01:31.9	574412	6.35303E+12	5.33495E+13	5778.34	0.0236295	0.0250626	0.0808465	0.7310967	0.775437	2.46387	2.46387	
06:34.9	574412	6.35303E+12	5.33495E+13	5717.03	0.0236295	0.0224619	0.0799887	0.7310967	0.694971	2.4377276	2.4377276	
11:38.0	574412	6.35303E+12	5.33495E+13	5720.45	0.0236295	0.0232839	0.0800365	0.7310967	0.720404	2.4391858	2.4391858	
16:40.9	574413	6.35303E+12	5.25253E+13	5714.68	0.0236295	0.0234838	0.0812103	0.7310967	0.726589	2.4749582	2.4749582	
21:43.7	574413	6.35303E+12	5.25253E+13	5731.49	0.0236295	0.0221746	0.0814492	0.7310967	0.686082	2.4822384	2.4822384	
26:46.8	574413	6.35303E+12	5.25253E+13	5723.09	0.0236295	0.0254915	0.0813299	0.7310967	0.788707	2.4786004	2.4786004	
31:50.0	574414	6.35303E+12	5.19701E+13	5734.99	0.0236295	0.0253002	0.0823697	0.7310967	0.782788	2.5102894	2.5102894	
36:53.0	574414	6.35303E+12	5.19701E+13	5744.23	0.0236295	0.0255777	0.0825024	0.7310967	0.791374	2.5143339	2.5143339	
41:56.0	574416	6.35303E+12	5.19215E+13	5727.36	0.0236295	0.0254854	0.0823371	0.7310967	0.788518	2.5092973	2.5092973	
46:59.2	574418	6.35303E+12	5.19586E+13	5734.35	0.0236295	0.0224637	0.0823788	0.7310967	0.695027	2.510567	2.510567	
52:02.0	574420	6.35303E+12	5.25895E+13	5710.56	0.0236295	0.036317	0.0810529	0.7310967	1.123648	2.4701587	2.4701587	
57:05.3	574421	6.35303E+12	5.25734E+13	5677.64	0.0236295	0.023519	0.0806102	0.7310967	0.727678	2.4566683	2.4566683	
02:08.1	574422	6.35303E+12	5.2543E+13	5686.55	0.0268916	0.0219254	0.0807834	0.8320261	0.678372	2.4619458	2.4619458	
07:11.0	574423	6.35303E+12	5.29406E+13	5686.98	0.0268916	0.0218438	0.0801828	0.8320261	0.675847	2.4436417	2.4436417	
12:13.8	574424	6.35303E+12	5.28202E+13	5690.22	0.0268916	0.0219166	0.0804113	0.8320261	0.6781	2.4506078	2.4506078	
17:16.6	574424	6.35303E+12	5.28202E+13	5676.93	0.0268916	0.0283	0.0802235	0.8320261	0.875602	2.4448842	2.4448842	
22:19.5	574426	6.35303E+12	5.30049E+13	5683.45	0.0268916	0.0487112	0.0800358	0.8320261	1.507125	2.4391635	2.4391635	
27:23.6	574426	6.35303E+12	5.30049E+13	5679.11	0.0268916	0.2372194	0.0799747	0.8320261	7.339568	2.4373009	7.3395682	
32:27.6	574427	6.35303E+12	5.28466E+13	5693.6	0.0268916	0.2295848	0.0804189	0.8320261	7.103354	2.4508373	7.1033537	
37:30.4	574427	6.35303E+12	5.28466E+13	5702.84	0.0268916	0.0489678	0.0805494	0.8320261	1.515064	2.4548147	2.4548147	
42:33.4	574428	6.35303E+12	5.2354E+13	5719.96	0.0268916	0.0279098	0.0815514	0.8320261	0.863529	2.4853515	2.4853515	
47:36.4	574428	6.35303E+12	5.2354E+13	5723.27	0.0268916	0.0281961	0.0815986	0.8320261	0.872387	2.4867897	2.4867897	

52:39.2	574428	6.35303E+12	5.2354E+13	5713.35	0.0268916	0.0284418	0.0814571	0.8320261	0.879989	2.4824794	2.4824794
57:41.9	574429	6.35303E+12	5.15634E+13	5701.89	0.0268916	0.0240122	0.0825403	0.8320261	0.742938	2.5154886	2.5154886
02:44.8	574429	6.35303E+12	5.15634E+13	5699.76	0.0275399	0.0225376	0.0825094	0.8520845	0.697313	2.5145489	2.5145489
07:47.7	574429	6.35303E+12	5.15634E+13	5710.93	0.0275399	0.0233152	0.0826711	0.8520845	0.721372	2.5194768	2.5194768
12:50.6	574430	6.35303E+12	5.12815E+13	5715.01	0.0275399	0.0234875	0.0831849	0.8520845	0.726703	2.5351334	2.5351334
17:53.7	574430	6.35303E+12	5.12815E+13	5705.63	0.0275399	0.0238366	0.0830483	0.8520845	0.737504	2.5309725	2.5309725
22:56.5	574430	6.35303E+12	5.12815E+13	5712.82	0.0275399	0.0238261	0.083153	0.8520845	0.73718	2.5341619	2.5341619
27:59.5	574430	6.35303E+12	5.12815E+13	5735.12	0.0275399	0.0239167	0.0834776	0.8520845	0.739983	2.544054	2.544054
33:02.8	574430	6.35303E+12	5.12815E+13	5742.14	0.0275399	0.024794	0.0835797	0.8520845	0.767126	2.547168	2.547168
38:06.1	574430	6.35303E+12	5.12815E+13	5731.9	0.0275399	0.0244682	0.0834307	0.8520845	0.757046	2.5426257	2.5426257
43:09.2	574430	6.35303E+12	5.12815E+13	5731.35	0.0275399	0.0248106	0.0834227	0.8520845	0.76764	2.5423817	2.5423817
48:12.0	574430	6.35303E+12	5.12815E+13	5726.26	0.0275399	0.047908	0.0833486	0.8520845	1.482274	2.5401238	2.5401238
53:15.1	574432	6.35303E+12	4.99455E+13	5722.76	0.0275399	0.0287109	0.0855259	0.8520845	0.888315	2.6064774	2.6064774
58:18.0	574432	6.35303E+12	4.99455E+13	5706.12	0.0275399	0.0476729	0.0852772	0.8520845	1.475	2.5988986	2.5988986
03:21.0	574433	6.35303E+12	4.98413E+13	5718.48	0.027516	0.0268482	0.0856405	0.851345	0.830683	2.6099708	2.6099708
08:24.1	574435	6.35303E+12	4.97656E+13	5722.49	0.027516	0.0239382	0.085831	0.851345	0.740648	2.6157766	2.6157766
13:27.6	574435	6.35303E+12	4.97656E+13	5731.99	0.027516	0.024889	0.0859735	0.851345	0.770066	2.6201191	2.6201191
18:31.2	574437	6.35303E+12	4.98823E+13	5729.41	0.027516	0.0274338	0.0857336	0.851345	0.848802	2.61281	2.61281
23:34.4	574438	6.35303E+12	4.9928E+13	5727.98	0.027516	0.0263334	0.0856339	0.851345	0.814755	2.6097702	2.6097702
28:37.4	574438	6.35303E+12	4.9928E+13	5745.01	0.027516	0.0483259	0.0858885	0.851345	1.495203	2.6175294	2.6175294
33:41.0	574441	6.35303E+12	5.04581E+13	5733.7	0.027516	0.027147	0.0848189	0.851345	0.839928	2.5849309	2.5849309
38:43.9	574441	6.35303E+12	5.04581E+13	5748.11	0.027516	0.0269173	0.085032	0.851345	0.832821	2.5914274	2.5914274
43:47.1	574442	6.35303E+12	5.28842E+13	5748.64	0.027516	0.048425	0.0811386	0.851345	1.49827	2.4727723	2.4727723
48:50.4	574442	6.35303E+12	5.28842E+13	5745.02	0.027516	0.0346966	0.0810875	0.851345	1.073513	2.4712151	2.4712151
53:53.5	574442	6.35303E+12	5.28842E+13	5746.74	0.027516	0.026743	0.0811118	0.851345	0.827428	2.471955	2.471955
58:56.5	574443	6.35303E+12	5.28228E+13	5739.99	0.027516	0.0256215	0.0811107	0.851345	0.792729	2.4719226	2.4719226
03:59.3	574443	6.35303E+12	5.28228E+13	5735.16	0.0300224	0.0258636	0.0810425	0.9288931	0.80022	2.4698426	2.4698426
09:02.7	574443	6.35303E+12	5.28228E+13	5751.51	0.0300224	0.0247336	0.0812735	0.9288931	0.765258	2.4768837	2.4768837
14:05.7	574443	6.35303E+12	5.28228E+13	5760.39	0.0300224	0.0249539	0.081399	0.9288931	0.772074	2.4807079	2.4807079
19:09.0	574443	6.35303E+12	5.28228E+13	5759.7	0.0300224	0.0252528	0.0813893	0.9288931	0.781322	2.4804107	2.4804107
24:12.2	574444	6.35303E+12	5.21447E+13	5765.94	0.0300224	0.0251079	0.0825368	0.9288931	0.776838	2.5153845	2.5153845
29:15.1	574445	6.35303E+12	5.19166E+13	5760.01	0.0300224	0.028066	0.0828144	0.9288931	0.868362	2.5238421	2.5238421
34:18.0	574446	6.35303E+12	5.17083E+13	5752.55	0.0300224	0.0345945	0.0830402	0.9288931	1.070354	2.5307244	2.5307244
39:20.9	574446	6.35303E+12	5.17083E+13	5767.39	0.0300224	0.0278833	0.0832544	0.9288931	0.862709	2.537253	2.537253
44:23.9	574446	6.35303E+12	5.17083E+13	5759.99	0.0300224	0.0266611	0.0831476	0.9288931	0.824894	2.5339975	2.5339975
49:26.8	574448	6.35303E+12	5.19511E+13	5756.94	0.0300224	0.0267976	0.0827151	0.9288931	0.829118	2.5208172	2.5208172
54:30.1	574448	6.35303E+12	5.19511E+13	5735.1	0.0300224	0.0267019	0.0824013	0.9288931	0.826157	2.511254	2.511254
59:33.0	574448	6.35303E+12	5.19511E+13	5719.45	0.0300224	0.0300539	0.0821764	0.9288931	0.929868	2.5044012	2.5044012
04:36.4	574448	6.35303E+12	5.19511E+13	5702.8	0.0292181	0.0270051	0.0819372	0.904008	0.835538	2.4971106	2.4971106
09:39.4	574449	6.35303E+12	5.17328E+13	5699.65	0.0292181	0.0251577	0.0822376	0.904008	0.778379	2.5062642	2.5062642
14:42.6	574450	6.35303E+12	5.16724E+13	5715.01	0.0292181	0.0257413	0.0825556	0.904008	0.796436	2.5159564	2.5159564
19:45.6	574450	6.35303E+12	5.16724E+13	5715.9	0.0292181	0.0260754	0.0825685	0.904008	0.806773	2.5163482	2.5163482
24:48.6	574450	6.35303E+12	5.16724E+13	5710.01	0.0292181	0.0257615	0.0824834	0.904008	0.797061	2.5137552	2.5137552
29:51.6	574450	6.35303E+12	5.16724E+13	5720.01	0.0292181	0.0258404	0.0826278	0.904008	0.799502	2.5181576	2.5181576

datetime	block_height	network_diff	est_network_hashrate	BTC_price	day_ahead_LMP	real_time_LMP	breakeven_mining_cost	day_ahead_LMP_rev	real_time_LMP_rev	mining_rev	realized_rev
22:13.7	574204	6.35303E+12	5.38327E+13	5320.02	0.0059375	0.0061512	0.0737658	0.1837063	0.1903181	2.2480786	2.2480786
27:16.8	574204	6.35303E+12	5.38327E+13	5320.01	0.0059375	0.0062341	0.0737656	0.1837063	0.1928831	2.2480744	2.2480744
32:19.8	574204	6.35303E+12	5.38327E+13	5321.94	0.0059375	0.0048202	0.0737924	0.1837063	0.149137	2.24889	2.24889
37:22.9	574205	6.35303E+12	5.30839E+13	5321.95	0.0059375	0.0036136	0.0748335	0.1837063	0.1118048	2.2806172	2.2806172
42:25.9	574205	6.35303E+12	5.30839E+13	5325.19	0.0059375	0.0022848	0.074879	0.1837063	0.0706917	2.2820056	2.2820056
47:28.9	574206	6.35303E+12	5.44532E+13	5328.27	0.0059375	0.0052204	0.0730384	0.1837063	0.1615192	2.225912	2.225912
52:31.9	574206	6.35303E+12	5.44532E+13	5328.65	0.0059375	0.0074321	0.0730436	0.1837063	0.2299492	2.2260707	2.2260707
57:34.9	574207	6.35303E+12	5.39845E+13	5327.68	0.0059375	0.0009997	0.0736643	0.1837063	0.0309307	2.2449863	2.2449863
02:37.8	574207	6.35303E+12	5.39845E+13	5327.22	0.0009735	0.0025864	0.073658	0.0301201	0.0800232	2.2447925	2.2447925
07:40.8	574208	6.35303E+12	5.34662E+13	5325.01	0.0009735	-0.0034704	0.0743412	0.0301201	-0.1073742	2.2656139	2.2656139
12:43.8	574208	6.35303E+12	5.34662E+13	5325.01	0.0009735	-0.0085232	0.0743412	0.0301201	-0.2637078	2.2656139	2.2656139
17:46.9	574209	6.35303E+12	5.33477E+13	5321.01	0.0009735	0.0007819	0.0744503	0.0301201	0.024192	2.2689395	2.2689395
22:49.7	574209	6.35303E+12	5.33477E+13	5327.95	0.0009735	0.0010434	0.0745474	0.0301201	0.0322828	2.2718988	2.2718988
27:53.3	574211	6.35303E+12	5.42133E+13	5325.19	0.0009735	-0.0190352	0.0733191	0.0301201	-0.5889491	2.2344662	2.2344662
32:56.5	574212	6.35303E+12	5.54528E+13	5323.43	0.0009735	-0.0316021	0.0716566	0.0301201	-0.977769	2.1838	2.1838
37:59.5	574214	6.35303E+12	5.533E+13	5323.35	0.0009735	-0.0308754	0.0718145	0.0301201	-0.9552849	2.1886119	2.1886119
43:03.0	574215	6.35303E+12	5.58834E+13	5323.1	0.0009735	-0.0299834	0.0711001	0.0301201	-0.9276864	2.1668382	2.1668382
48:06.0	574215	6.35303E+12	5.58834E+13	5326.55	0.0009735	-0.026648	0.0711461	0.0301201	-0.8244891	2.1682425	2.1682425
53:09.5	574215	6.35303E+12	5.58834E+13	5328.3	0.0009735	-0.030956	0.0711695	0.0301201	-0.9577786	2.1689549	2.1689549
58:12.8	574216	6.35303E+12	5.54406E+13	5326.69	0.0009735	-0.031885	0.0717163	0.0301201	-0.9865219	2.1856184	2.1856184
03:15.8	574216	6.35303E+12	5.54406E+13	5330.35	0.0003732	-0.0310131	0.0717656	0.0115468	-0.9595453	2.1871201	2.1871201
08:18.9	574218	6.35303E+12	5.58377E+13	5330.78	0.0003732	-0.0030349	0.071261	0.0115468	-0.0938998	2.1717421	2.1717421
13:22.6	574220	6.35303E+12	5.59914E+13	5329.45	0.0003732	-0.0190837	0.0710476	0.0115468	-0.5904497	2.1652392	2.1652392
18:25.7	574220	6.35303E+12	5.59914E+13	5348.41	0.0003732	-0.0174614	0.0713003	0.0115468	-0.5402557	2.1729422	2.1729422
23:28.8	574223	6.35303E+12	5.60912E+13	5338.35	0.0003732	-0.0275277	0.0710397	0.0115468	-0.851707	2.164998	2.164998
28:31.6	574226	6.35303E+12	5.60441E+13	5328.39	0.0003732	-0.0300569	0.0709666	0.0115468	-0.9299605	2.1627725	2.1627725
33:34.4	574226	6.35303E+12	5.60441E+13	5333.1	0.0003732	-0.0260876	0.0710294	0.0115468	-0.8071503	2.1646843	2.1646843
38:37.6	574227	6.35303E+12	5.56725E+13	5332.07	0.0003732	-0.0192161	0.0714897	0.0115468	-0.5945461	2.1787132	2.1787132
43:40.6	574227	6.35303E+12	5.56725E+13	5339.02	0.0003732	-0.0197771	0.0715829	0.0115468	-0.6119035	2.181553	2.181553
48:43.8	574228	6.35303E+12	5.52451E+13	5343.15	0.0003732	-0.0194532	0.0721925	0.0115468	-0.601882	2.2001303	2.2001303
53:47.1	574229	6.35303E+12	5.5892E+13	5338.61	0.0003732	-0.0291334	0.0712963	0.0115468	-0.9013874	2.1728179	2.1728179
58:50.2	574229	6.35303E+12	5.5892E+13	5336.51	0.0003732	-0.0235618	0.0712682	0.0115468	-0.7290021	2.1719632	2.1719632
03:53.5	574229	6.35303E+12	5.5892E+13	5340.15	0.0002799	-0.0187222	0.0713168	0.0086601	-0.5792649	2.1734447	2.1734447
08:56.9	574229	6.35303E+12	5.5892E+13	5341.69	0.0002799	-0.0308233	0.0713374	0.0086601	-0.9536729	2.1740715	2.1740715
14:00.0	574230	6.35303E+12	5.53347E+13	5346.1	0.0002799	-0.0302971	0.0721153	0.0086601	-0.9373923	2.1977795	2.1977795
19:03.3	574230	6.35303E+12	5.53347E+13	5347.19	0.0002799	-0.0301938	0.07213	0.0086601	-0.9341962	2.1982276	2.1982276
24:06.5	574231	6.35303E+12	5.49411E+13	5341.77	0.0002799	-0.0280347	0.0725732	0.0086601	-0.8673936	2.2117345	2.2117345
29:09.8	574231	6.35303E+12	5.49411E+13	5342.48	0.0002799	-0.0281744	0.0725829	0.0086601	-0.8717159	2.2120284	2.2120284
34:12.9	574232	6.35303E+12	5.47061E+13	5349.99	0.0002799	-0.0268456	0.0729971	0.0086601	-0.8306029	2.2246529	2.2246529
39:15.9	574232	6.35303E+12	5.47061E+13	5346.06	0.0002799	-0.0273812	0.0729435	0.0086601	-0.8471743	2.2230187	2.2230187
44:19.1	574232	6.35303E+12	5.47061E+13	5350.69	0.0002799	-0.0274119	0.0730067	0.0086601	-0.8481242	2.224944	2.224944
49:22.3	574232	6.35303E+12	5.47061E+13	5361.36	0.0002799	-0.0288527	0.0731523	0.0086601	-0.8927025	2.2293808	2.2293808
54:25.5	574232	6.35303E+12	5.47061E+13	5358.36	0.0002799	-0.0281218	0.0731113	0.0086601	-0.8700885	2.2281334	2.2281334
59:28.2	574232	6.35303E+12	5.47061E+13	5366.19	0.0002799	-0.0262745	0.0732182	0.0086601	-0.812933	2.2313893	2.2313893
04:31.6	574233	6.35303E+12	5.35475E+13	5377.4	0.0028119	-0.026271	0.0749586	0.0870002	-0.8128247	2.2844298	2.2844298
09:34.5	574233	6.35303E+12	5.35475E+13	5358.81	0.0028119	-0.0028349	0.0746994	0.0870002	-0.0877118	2.2765324	2.2765324

14:37.5	574233	6.35303E+12	5.35475E+13	5359.15	0.0028119	-0.0008362	0.0747042	0.0870002	-0.025872	2.2766768	2.2766768	
19:40.5	574233	6.35303E+12	5.35475E+13	5359.66	0.0028119	-0.018256	0.0747113	0.0870002	-0.5648406	2.2768935	2.2768935	
24:43.4	574234	6.35303E+12	5.31615E+13	5358.18	0.0028119	-0.0019335	0.075233	0.0870002	-0.0598225	2.2927926	2.2927926	
29:46.4	574234	6.35303E+12	5.31615E+13	5351.99	0.0028119	-0.0146595	0.0751461	0.0870002	-0.4535649	2.2901439	2.2901439	
34:49.2	574234	6.35303E+12	5.31615E+13	5344.84	0.0028119	-0.0033057	0.0750457	0.0870002	-0.1022784	2.2870844	2.2870844	
39:52.4	574236	6.35303E+12	5.29706E+13	5349.94	0.0028119	-0.0160658	0.075388	0.0870002	-0.4970759	2.2975179	2.2975179	
44:55.4	574237	6.35303E+12	5.26741E+13	5348.56	0.0028119	-0.0313865	0.0757929	0.0870002	-0.9710983	2.3098563	2.3098563	
49:58.5	574238	6.35303E+12	5.2719E+13	5353.94	0.0028119	-0.0300483	0.0758044	0.0870002	-0.9296944	2.3102083	2.3102083	
55:01.6	574238	6.35303E+12	5.2719E+13	5351.76	0.0028119	-0.0054625	0.0757736	0.0870002	-0.1690098	2.3092677	2.3092677	
00:04.5	574239	6.35303E+12	5.28168E+13	5350.18	0.0122894	-0.0015936	0.0756109	0.380234	-0.049306	2.3043114	2.3043114	
10:10.2	574240	6.35303E+12	5.25658E+13	5348.27	0.0122894	-0.0303162	0.0759448	0.380234	-0.9379832	2.314487	2.314487	
15:13.1	574243	6.35303E+12	5.35108E+13	5354.34	0.0122894	4.40E-06	0.0746884	0.380234	0.0001361	2.2761958	2.2761958	
20:15.8	574245	6.35303E+12	5.38531E+13	5358.41	0.0122894	0.0009337	0.07427	0.380234	0.0288887	2.2634449	2.2634449	
25:18.5	574245	6.35303E+12	5.38531E+13	5356.02	0.0122894	-0.0033181	0.0742369	0.380234	-0.102662	2.2624353	2.2624353	
30:21.5	574246	6.35303E+12	5.41667E+13	5359.34	0.0122894	-0.0013696	0.0738528	0.380234	-0.0423754	2.2507317	2.2507317	
35:24.4	574246	6.35303E+12	5.41667E+13	5361.98	0.0122894	0.0048181	0.0738892	0.380234	0.149072	2.2518404	2.2518404	
40:27.4	574246	6.35303E+12	5.41667E+13	5366.6	0.0122894	-0.0154488	0.0739529	0.380234	-0.4779859	2.2537807	2.2537807	
45:30.2	574248	6.35303E+12	5.41479E+13	5365.93	0.0122894	-0.001393	0.0739693	0.380234	-0.0430994	2.2542821	2.2542821	
50:33.1	574251	6.35303E+12	5.52479E+13	5359.19	0.0122894	0.0017926	0.0724055	0.380234	0.055463	2.2066234	2.2066234	
55:36.2	574251	6.35303E+12	5.52479E+13	5356.1	0.0122894	0.0017688	0.0723638	0.380234	0.0547267	2.2053511	2.2053511	
00:39.1	574252	6.35303E+12	5.50584E+13	5358.27	0.0171137	0.005096	0.0726423	0.5294979	0.1576702	2.2138386	2.2138386	
05:43.7	574252	6.35303E+12	5.50584E+13	5360.85	0.0171137	0.1588863	0.0726772	0.5294979	4.9159421	2.2149045	4.9159421	
10:47.0	574253	6.35303E+12	5.55506E+13	5361.66	0.0171137	0.0136055	0.0720441	0.5294979	0.4209542	2.1956089	2.1956089	
15:49.8	574255	6.35303E+12	5.5978E+13	5358.19	0.0171137	0.0099201	0.0714478	0.5294979	0.3069279	2.1774367	2.1774367	
20:52.5	574256	6.35303E+12	5.57331E+13	5364.52	0.0171137	0.0105695	0.0718465	0.5294979	0.3270203	2.1895872	2.1895872	
25:55.7	574257	6.35303E+12	5.59531E+13	5368.93	0.0171137	0.0083334	0.0716229	0.5294979	0.2578354	2.182771	2.182771	
30:58.7	574257	6.35303E+12	5.59531E+13	5369.93	0.0171137	0.0068334	0.0716362	0.5294979	0.2114254	2.1831776	2.1831776	
36:01.5	574257	6.35303E+12	5.59531E+13	5368.01	0.0171137	0.0067429	0.0716106	0.5294979	0.2086253	2.182397	2.182397	
41:04.6	574258	6.35303E+12	5.61961E+13	5363.48	0.0171137	0.0078346	0.0712408	0.5294979	0.2424025	2.1711281	2.1711281	
46:07.7	574258	6.35303E+12	5.61961E+13	5363.48	0.0171137	0.0075805	0.0712408	0.5294979	0.2345407	2.1711281	2.1711281	
51:10.6	574258	6.35303E+12	5.61961E+13	5363.48	0.0171137	0.0078186	0.0712408	0.5294979	0.2419075	2.1711281	2.1711281	
01:19.4	574258	6.35303E+12	5.61961E+13	5365.45	0.0174714	0.009863	0.071267	0.5405651	0.3051612	2.1719255	2.1719255	
06:22.3	574258	6.35303E+12	5.61961E+13	5361.34	0.0174714	0.0138977	0.0712124	0.5405651	0.4299948	2.1702618	2.1702618	
16:28.1	574260	6.35303E+12	5.46276E+13	5368.73	0.0174714	0.0088417	0.0733581	0.5405651	0.2735622	2.2356531	2.2356531	
26:33.4	574260	6.35303E+12	5.46276E+13	5367.86	0.0174714	0.0074735	0.0733462	0.5405651	0.2312301	2.2352908	2.2352908	
31:36.3	574260	6.35303E+12	5.46276E+13	5369.51	0.0174714	0.0083523	0.0733687	0.5405651	0.2584202	2.2359779	2.2359779	
36:39.4	574261	6.35303E+12	5.36607E+13	5367.41	0.0174714	0.0077585	0.0746615	0.5405651	0.240048	2.2753756	2.2753756	
41:42.3	574261	6.35303E+12	5.36607E+13	5361.03	0.0174714	0.0087074	0.0745727	0.5405651	0.269407	2.2726709	2.2726709	
46:45.2	574261	6.35303E+12	5.36607E+13	5363.23	0.0174714	0.0086441	0.0746033	0.5405651	0.2674485	2.2736036	2.2736036	
51:48.5	574261	6.35303E+12	5.36607E+13	5367.99	0.0174714	0.0107546	0.0746695	0.5405651	0.3327473	2.2756214	2.2756214	
56:51.5	574261	6.35303E+12	5.36607E+13	5378.51	0.0174714	0.0087535	0.0748159	0.5405651	0.2708333	2.2800811	2.2800811	
01:54.8	574266	6.35303E+12	5.51716E+13	5368.99	0.0191744	0.0082983	0.0726383	0.5932559	0.2567494	2.2137171	2.2137171	
06:57.7	574268	6.35303E+12	5.60115E+13	5366.55	0.0191744	0.0079925	0.0715165	0.5932559	0.247288	2.1795291	2.1795291	
12:00.6	574269	6.35303E+12	5.58958E+13	5356.64	0.0191744	0.0087789	0.0715322	0.5932559	0.2716192	2.1800073	2.1800073	
17:03.4	574270	6.35303E+12	5.6144E+13	5352.04	0.0191744	0.0082206	0.0711547	0.5932559	0.2543454	2.168505	2.168505	
22:06.5	574271	6.35303E+12	5.6095E+13	5352.41	0.0191744	0.0080153	0.0712219	0.5932559	0.2479934	2.1705513	2.1705513	
27:09.5	574271	6.35303E+12	5.6095E+13	5350.73	0.0191744	0.0078927	0.0711995	0.5932559	0.2442001	2.1698701	2.1698701	

32:12.4	574271	6.35303E+12	5.6095E+13	5352.02	0.0191744	0.0080581	0.0712167	0.5932559	0.2493176	2.1703932	2.1703932	
37:15.7	574273	6.35303E+12	5.53104E+13	5353.7	0.0191744	0.0084743	0.0722496	0.5932559	0.2621948	2.2018709	2.2018709	
42:19.1	574273	6.35303E+12	5.53104E+13	5354.2	0.0191744	0.0105116	0.0722563	0.5932559	0.3252289	2.2020766	2.2020766	
47:22.1	574274	6.35303E+12	5.53441E+13	5354.14	0.0191744	0.0118583	0.0722116	0.5932559	0.3668958	2.2007128	2.2007128	
52:25.1	574274	6.35303E+12	5.53441E+13	5355.15	0.0191744	0.0169972	0.0722252	0.5932559	0.5258934	2.2011279	2.2011279	
57:28.6	574274	6.35303E+12	5.53441E+13	5366.51	0.0191744	0.0145957	0.0723784	0.5932559	0.451591	2.2057972	2.2057972	
02:31.9	574274	6.35303E+12	5.53441E+13	5367.34	0.0216519	0.009775	0.0723896	0.6699098	0.3024385	2.2061384	2.2061384	
07:34.9	574274	6.35303E+12	5.53441E+13	5369.11	0.0216519	0.0089501	0.0724135	0.6699098	0.2769161	2.2068659	2.2068659	
12:38.4	574274	6.35303E+12	5.53441E+13	5361.12	0.0216519	0.0155345	0.0723057	0.6699098	0.4806374	2.2035818	2.2035818	
17:41.3	574274	6.35303E+12	5.53441E+13	5366.11	0.0216519	0.0159714	0.072373	0.6699098	0.4941551	2.2056328	2.2056328	
22:44.6	574275	6.35303E+12	5.36343E+13	5369.98	0.0216519	0.015976	0.0747339	0.6699098	0.4942974	2.2775843	2.2775843	
27:47.5	574275	6.35303E+12	5.36343E+13	5368.01	0.0216519	0.0157924	0.0747065	0.6699098	0.4886169	2.2767487	2.2767487	
32:50.5	574277	6.35303E+12	5.50501E+13	5373.94	0.0216519	0.0199778	0.0728657	0.6699098	0.6181131	2.2206488	2.2206488	
37:53.4	574279	6.35303E+12	5.54528E+13	5377.71	0.0216519	0.019191	0.0723873	0.6699098	0.5937695	2.2060669	2.2060669	
42:56.1	574281	6.35303E+12	5.67946E+13	5384.52	0.0216519	0.0172445	0.0707666	0.6699098	0.5335448	2.1566766	2.1566766	
47:59.0	574281	6.35303E+12	5.67946E+13	5380.73	0.0216519	0.0171053	0.0707168	0.6699098	0.529238	2.1551586	2.1551586	
53:02.0	574282	6.35303E+12	5.6096E+13	5375.54	0.0216519	0.0134277	0.0715284	0.6699098	0.415453	2.1798939	2.1798939	
58:05.2	574282	6.35303E+12	5.6096E+13	5378.27	0.0216519	0.018	0.0715648	0.6699098	0.55692	2.1810009	2.1810009	
03:08.4	574283	6.35303E+12	5.56063E+13	5389.1	0.0235997	0.0178977	0.0723403	0.7301747	0.5537548	2.2046367	2.2046367	
08:11.8	574283	6.35303E+12	5.56063E+13	5401.6	0.0235997	0.0199519	0.0725081	0.7301747	0.6173118	2.2097504	2.2097504	
13:14.8	574283	6.35303E+12	5.56063E+13	5411.61	0.0235997	0.0198174	0.0726425	0.7301747	0.6131504	2.2138454	2.2138454	
18:18.7	574284	6.35303E+12	5.64188E+13	5399.02	0.0235997	0.0211285	0.0714298	0.7301747	0.6537158	2.1768876	2.1768876	
23:21.6	574284	6.35303E+12	5.64188E+13	5401.6	0.0235997	0.0206955	0.0714639	0.7301747	0.6403188	2.1779279	2.1779279	
28:24.6	574284	6.35303E+12	5.64188E+13	5405.99	0.0235997	0.0201906	0.071522	0.7301747	0.6246972	2.1796979	2.1796979	
38:30.0	574285	6.35303E+12	5.57835E+13	5401.12	0.0235997	0.0196938	0.0722714	0.7301747	0.6093262	2.2025372	2.2025372	
43:33.2	574285	6.35303E+12	5.57835E+13	5404.01	0.0235997	0.0205017	0.0723101	0.7301747	0.6343226	2.2037157	2.2037157	
48:36.5	574285	6.35303E+12	5.57835E+13	5404.26	0.0235997	0.0202344	0.0723135	0.7301747	0.6260523	2.2038176	2.2038176	
53:39.7	574285	6.35303E+12	5.57835E+13	5400.01	0.0235997	0.0204794	0.0722566	0.7301747	0.6336326	2.2020845	2.2020845	
58:42.8	574285	6.35303E+12	5.57835E+13	5405.56	0.0235997	0.0204578	0.0723309	0.7301747	0.6329643	2.2043478	2.2043478	
03:45.8	574285	6.35303E+12	5.57835E+13	5405.7	0.0246624	0.0205258	0.0723327	0.7630547	0.6350683	2.2044049	2.2044049	
08:49.5	574286	6.35303E+12	5.36818E+13	5416.95	0.0246624	0.0206883	0.0753209	0.7630547	0.640096	2.2954736	2.2954736	
13:52.4	574287	6.35303E+12	5.50908E+13	5405.74	0.0246624	0.0206454	0.0732427	0.7630547	0.6387687	2.232137	2.232137	
18:56.1	574287	6.35303E+12	5.50908E+13	5394.62	0.0246624	0.0206499	0.073092	0.7630547	0.6389079	2.2275453	2.2275453	
23:59.2	574288	6.35303E+12	5.6446E+13	5372.85	0.0246624	0.0206922	0.0710493	0.7630547	0.6402167	2.1652907	2.1652907	
29:02.2	574288	6.35303E+12	5.6446E+13	5385.99	0.0246624	0.0206955	0.071223	0.7630547	0.6403188	2.1705862	2.1705862	
34:05.7	574289	6.35303E+12	5.61643E+13	5382.78	0.0246624	0.0217427	0.0715377	0.7630547	0.6727191	2.1801747	2.1801747	
39:08.7	574289	6.35303E+12	5.61643E+13	5380.01	0.0246624	0.0218238	0.0715009	0.7630547	0.6752284	2.1790528	2.1790528	
44:11.8	574289	6.35303E+12	5.61643E+13	5375.01	0.0246624	0.0212482	0.0714344	0.7630547	0.6574193	2.1770277	2.1770277	
54:17.2	574292	6.35303E+12	5.59818E+13	5380.19	0.0246624	0.0219149	0.0717363	0.7630547	0.678047	2.1862275	2.1862275	
59:20.2	574293	6.35303E+12	5.63654E+13	5377.35	0.0246624	0.021873	0.0712105	0.7630547	0.6767506	2.1702049	2.1702049	
04:23.7	574294	6.35303E+12	5.66874E+13	5388.44	0.0258801	0.0213278	0.070952	0.8007303	0.6598821	2.1623271	2.1623271	
09:26.5	574295	6.35303E+12	5.71185E+13	5388.44	0.0258801	0.021527	0.0704165	0.8007303	0.6660454	2.1460054	2.1460054	
14:29.9	574298	6.35303E+12	5.77593E+13	5389.19	0.0258801	0.0216842	0.0696449	0.8007303	0.6709091	2.122492	2.122492	
19:32.9	574298	6.35303E+12	5.77593E+13	5388.39	0.0258801	0.0240613	0.0696346	0.8007303	0.7444566	2.122177	2.122177	
24:35.8	574298	6.35303E+12	5.77593E+13	5391.23	0.0258801	0.0222895	0.0696713	0.8007303	0.6896371	2.1232955	2.1232955	
29:38.9	574298	6.35303E+12	5.77593E+13	5399.68	0.0258801	0.0257402	0.0697805	0.8007303	0.7964018	2.1266234	2.1266234	
34:42.6	574300	6.35303E+12	5.74492E+13	5391.27	0.0258801	0.0264737	0.0700479	0.8007303	0.8190963	2.1347724	2.1347724	

39:47.4	574301	6.35303E+12	5.7613E+13	5390.99	0.0258801	0.0845686	0.0698452	0.8007303	2.6165525	2.1285942	2.6165525	
44:51.4	574302	6.35303E+12	5.77583E+13	5394.15	0.0258801	0.2208707	0.0697103	0.8007303	6.8337395	2.124483	6.8337395	
49:55.5	574302	6.35303E+12	5.77583E+13	5395.41	0.0258801	0.1569397	0.0697265	0.8007303	4.8557143	2.1249792	4.8557143	
55:00.3	574304	6.35303E+12	5.7411E+13	5395.02	0.0258801	0.1785686	0.0701433	0.8007303	5.5249125	2.1376815	5.5249125	
05:07.6	574305	6.35303E+12	5.8471E+13	5393.61	0.0282381	0.2199419	0.0688537	0.8736868	6.8050024	2.0983778	6.8050024	
10:10.7	574305	6.35303E+12	5.8471E+13	5393.59	0.0282381	0.0379328	0.0688534	0.8736868	1.1736408	2.09837	2.09837	
15:13.9	574307	6.35303E+12	5.89967E+13	5393.1	0.0282381	0.0282657	0.0682337	0.8736868	0.8745408	2.0794831	2.0794831	
20:16.9	574309	6.35303E+12	6.00748E+13	5397.01	0.0282381	0.0260977	0.0670578	0.8736868	0.8074628	2.0436461	2.0436461	
25:20.0	574309	6.35303E+12	6.00748E+13	5396.19	0.0282381	0.0259319	0.0670476	0.8736868	0.802333	2.0433356	2.0433356	
30:22.8	574310	6.35303E+12	6.02983E+13	5397.48	0.0282381	0.030206	0.0668151	0.8736868	0.9345736	2.0362495	2.0362495	
35:25.7	574311	6.35303E+12	6.01255E+13	5402.84	0.0282381	0.0302009	0.0670736	0.8736868	0.9344158	2.044127	2.044127	
40:29.7	574312	6.35303E+12	5.99055E+13	5397.41	0.0282381	0.0302509	0.0672522	0.8736868	0.9359628	2.0495721	2.0495721	
45:32.5	574312	6.35303E+12	5.99055E+13	5395.01	0.0282381	0.0260271	0.0672223	0.8736868	0.8052785	2.0486608	2.0486608	
55:37.6	574315	6.35303E+12	5.97623E+13	5391.82	0.0282381	0.0262949	0.0673436	0.8736868	0.8135642	2.0523565	2.0523565	
00:42.0	574315	6.35303E+12	5.97623E+13	5387.9	0.0299687	0.2138963	0.0672946	0.9272316	6.6179515	2.0508644	6.6179515	
05:45.0	574317	6.35303E+12	6.04051E+13	5388.49	0.0299687	0.0275245	0.0665859	0.9272316	0.851608	2.0292641	2.0292641	
10:49.5	574319	6.35303E+12	6.0775E+13	5387.98	0.0299687	0.2273972	0.0661742	0.9272316	7.0356694	2.0167195	7.0356694	
15:52.2	574320	6.35303E+12	6.21737E+13	5393.73	0.0299687	0.0493605	0.0647546	0.9272316	1.5272139	1.9734558	1.9734558	
20:54.9	574320	6.35303E+12	6.21737E+13	5399.05	0.0299687	0.0375331	0.0648185	0.9272316	1.1612741	1.9754023	1.9754023	
25:57.6	574320	6.35303E+12	6.21737E+13	5405.74	0.0299687	0.0307695	0.0648988	0.9272316	0.9520083	1.97785	1.97785	
31:00.3	574321	6.35303E+12	6.17749E+13	5405.41	0.0299687	0.0283888	0.0653138	0.9272316	0.8783495	1.9904973	1.9904973	
36:03.1	574321	6.35303E+12	6.17749E+13	5401.85	0.0299687	0.0282614	0.0652708	0.9272316	0.8744077	1.9891864	1.9891864	
41:06.0	574321	6.35303E+12	6.17749E+13	5409.99	0.0299687	0.0277866	0.0653692	0.9272316	0.8597174	1.9921839	1.9921839	
46:08.9	574321	6.35303E+12	6.17749E+13	5408.8	0.0299687	0.0279693	0.0653548	0.9272316	0.8653701	1.9917457	1.9917457	
51:11.6	574321	6.35303E+12	6.17749E+13	5412.57	0.0299687	0.0279898	0.0654003	0.9272316	0.8660044	1.9931339	1.9931339	
56:14.5	574321	6.35303E+12	6.17749E+13	5407.34	0.0299687	0.0268645	0.0653371	0.9272316	0.8311876	1.991208	1.991208	
01:17.4	574321	6.35303E+12	6.17749E+13	5400.73	0.0293113	0.0268945	0.0652573	0.9068916	0.8321158	1.9887739	1.9887739	
06:20.2	574321	6.35303E+12	6.17749E+13	5395.3	0.0293113	0.027018	0.0651917	0.9068916	0.8359369	1.9867744	1.9867744	
11:23.2	574321	6.35303E+12	6.17749E+13	5397.81	0.0293113	0.0267743	0.065222	0.9068916	0.8283968	1.9876987	1.9876987	
16:26.3	574321	6.35303E+12	6.17749E+13	5397.93	0.0293113	0.0268461	0.0652234	0.9068916	0.8306183	1.9877429	1.9877429	
21:29.6	574321	6.35303E+12	6.17749E+13	5392.62	0.0293113	0.0269721	0.0651593	0.9068916	0.8345168	1.9857875	1.9857875	
26:32.5	574321	6.35303E+12	6.17749E+13	5393.89	0.0293113	0.0268715	0.0651746	0.9068916	0.8314042	1.9862552	1.9862552	
31:35.4	574322	6.35303E+12	5.8824E+13	5396.27	0.0293113	0.0268167	0.0684743	0.9068916	0.8297087	2.0868162	2.0868162	
36:38.4	574322	6.35303E+12	5.8824E+13	5393.1	0.0293113	0.0261239	0.0684341	0.9068916	0.8082735	2.0855903	2.0855903	
41:41.3	574322	6.35303E+12	5.8824E+13	5393.7	0.0293113	0.0274601	0.0684417	0.9068916	0.8496155	2.0858223	2.0858223	
46:44.3	574323	6.35303E+12	5.85421E+13	5398.48	0.0293113	0.0267306	0.0688322	0.9068916	0.8270448	2.0977221	2.0977221	
51:47.3	574323	6.35303E+12	5.85421E+13	5406.39	0.0293113	0.0276187	0.068933	0.9068916	0.8545226	2.1007958	2.1007958	
56:50.2	574324	6.35303E+12	5.81584E+13	5403.98	0.0293113	0.0303914	0.0693569	0.9068916	0.9403099	2.1137127	2.1137127	
01:53.0	574326	6.35303E+12	5.98016E+13	5406.62	0.0303255	0.0359994	0.0674841	0.938271	1.1138214	2.0566378	2.0566378	
06:56.1	574326	6.35303E+12	5.98016E+13	5402.77	0.0303255	0.0287643	0.067436	0.938271	0.8899674	2.0551733	2.0551733	
11:58.9	574327	6.35303E+12	5.96067E+13	5401.77	0.0303255	0.0276195	0.067644	0.938271	0.8545473	2.0615104	2.0615104	
17:01.7	574327	6.35303E+12	5.96067E+13	5403.81	0.0303255	0.0258549	0.0676695	0.938271	0.8431119	2.0704516	2.0704516	
22:04.9	574328	6.35303E+12	5.96752E+13	5405.43	0.0303255	0.0273178	0.0676122	0.938271	0.7999506	2.0622889	2.0622889	
27:08.0	574328	6.35303E+12	5.96752E+13	5405.62	0.0303255	0.027105	0.0676145	0.938271	0.8452127	2.0605413	2.0605413	
32:11.6	574329	6.35303E+12	5.94855E+13	5414.16	0.0303255	0.0272499	0.0679373	0.938271	0.8386287	2.0606137	2.0606137	
37:14.5	574330	6.35303E+12	5.97035E+13	5414.16	0.0303255	0.0272366	0.0676893	0.938271	0.8427004	2.0628912	2.0628912	
42:17.3	574331	6.35303E+12	5.96567E+13	5411.93	0.0303255	0.0259498	0.0677144	0.938271	0.8028868	2.0636583	2.0636583	

47:20.1	574331	6.35303E+12	5.96567E+13	5411.28	0.0303255	0.0270709	0.0677063	0.938271	0.8375736	2.0634104	2.0634104
52:22.9	574333	6.35303E+12	5.9734E+13	5406.27	0.0303255	0.0270923	0.0675561	0.938271	0.8382358	2.0588333	2.0588333
57:25.6	574333	6.35303E+12	5.9734E+13	5401.15	0.0303255	0.0273697	0.0674921	0.938271	0.8468185	2.0568835	2.0568835
02:28.6	574334	6.35303E+12	5.92562E+13	5400.02	0.0291501	0.028349	0.0680221	0.9019041	0.8771181	2.0730351	2.0730351
07:32.0	574335	6.35303E+12	5.9018E+13	5400.05	0.0291501	0.0271441	0.068297	0.9019041	0.8398385	2.0814126	2.0814126
12:35.2	574337	6.35303E+12	6.04407E+13	5403.81	0.0291501	0.0271795	0.0667358	0.9019041	0.8409337	2.0338321	2.0338321
17:38.0	574338	6.35303E+12	6.00814E+13	5403.9	0.0291501	0.0269433	0.067136	0.9019041	0.8336257	2.0460298	2.0460298
22:41.3	574340	6.35303E+12	6.01388E+13	5404.53	0.0291501	0.0265047	0.0670798	0.9019041	0.8200554	2.0443159	2.0443159
27:44.1	574342	6.35303E+12	6.0482E+13	5405.01	0.0291501	0.0269789	0.066705	0.9019041	0.8347272	2.0328944	2.0328944
32:47.4	574342	6.35303E+12	6.0482E+13	5405.02	0.0291501	0.0259921	0.0667051	0.9019041	0.8041956	2.0328982	2.0328982
37:50.1	574343	6.35303E+12	5.99395E+13	5399.97	0.0291501	0.0266251	0.067246	0.9019041	0.8237806	2.0493813	2.0493813
42:52.9	574344	6.35303E+12	5.95861E+13	5399.01	0.0291501	0.0264856	0.0676328	0.9019041	0.8194645	2.0611697	2.0611697
47:55.6	574344	6.35303E+12	5.95861E+13	5399.01	0.0291501	0.027138	0.0676328	0.9019041	0.8396497	2.0611697	2.0611697
52:58.5	574344	6.35303E+12	5.95861E+13	5394.86	0.0291501	0.0264887	0.0675808	0.9019041	0.8195604	2.0595854	2.0595854
58:01.6	574344	6.35303E+12	5.95861E+13	5398.35	0.0291501	0.0266866	0.0676245	0.9019041	0.8256834	2.0609177	2.0609177
03:05.6	574346	6.35303E+12	5.84022E+13	5395.14	0.0282198	0.227266	0.0689544	0.8731206	7.03161	2.1014468	7.03161
08:09.0	574347	6.35303E+12	5.86008E+13	5392.22	0.0282198	0.0268838	0.0686835	0.8731206	0.8317848	2.0931918	2.0931918
13:12.1	574347	6.35303E+12	5.86008E+13	5397.01	0.0282198	0.0269587	0.0687445	0.8731206	0.8341022	2.0950512	2.0950512
18:15.1	574348	6.35303E+12	5.87322E+13	5398.6	0.0282198	0.02711	0.0686109	0.8731206	0.8387834	2.0909802	2.0909802
23:18.2	574348	6.35303E+12	5.87322E+13	5396.18	0.0282198	0.0268066	0.0685802	0.8731206	0.8293962	2.0900429	2.0900429
28:22.4	574349	6.35303E+12	5.84595E+13	5396.23	0.0282198	0.2263655	0.0689007	0.8731206	7.0037486	2.0998095	7.0037486
33:25.3	574349	6.35303E+12	5.84595E+13	5395.06	0.0282198	0.0366701	0.0688857	0.8731206	1.1345729	2.0993542	2.0993542
38:28.1	574350	6.35303E+12	5.91267E+13	5395.03	0.0282198	0.0272366	0.0681081	0.8731206	0.8427004	2.0756546	2.0756546
43:31.1	574351	6.35303E+12	5.92508E+13	5395.02	0.0282198	0.0249648	0.0679653	0.8731206	0.7724109	2.071303	2.071303
48:33.9	574351	6.35303E+12	5.92508E+13	5394.15	0.0282198	0.025678	0.0679543	0.8731206	0.7944773	2.070969	2.070969
53:36.6	574351	6.35303E+12	5.92508E+13	5390.52	0.0282198	0.0248895	0.0679086	0.8731206	0.7700811	2.0695753	2.0695753
58:39.4	574351	6.35303E+12	5.92508E+13	5391.4	0.0282198	0.0251117	0.0679197	0.8731206	0.776956	2.0699132	2.0699132
03:42.2	574351	6.35303E+12	5.92508E+13	5383.02	0.0294796	0.0251798	0.0678141	0.9120988	0.779063	2.0666958	2.0666958
08:45.1	574351	6.35303E+12	5.92508E+13	5371.99	0.0294796	0.0226656	0.0676752	0.9120988	0.7012737	2.0624611	2.0624611
13:48.0	574351	6.35303E+12	5.92508E+13	5376.84	0.0294796	0.0227334	0.0677362	0.9120988	0.7033714	2.0643232	2.0643232
18:50.8	574353	6.35303E+12	5.95341E+13	5372.72	0.0294796	0.0243466	0.0673622	0.9120988	0.7532838	2.0529247	2.0529247
23:53.6	574353	6.35303E+12	5.95341E+13	5379.06	0.0294796	0.023035	0.0674417	0.9120988	0.7127029	2.0553472	2.0553472
28:56.9	574353	6.35303E+12	5.95341E+13	5386.27	0.0294796	0.0249424	0.0675321	0.9120988	0.7717179	2.0581021	2.0581021
33:59.8	574353	6.35303E+12	5.95341E+13	5393.51	0.0294796	0.0253684	0.0676229	0.9120988	0.7848983	2.0608686	2.0608686
39:02.6	574353	6.35303E+12	5.95341E+13	5397.98	0.0294796	0.0253102	0.0676789	0.9120988	0.7830976	2.0625766	2.0625766
44:05.8	574354	6.35303E+12	5.92005E+13	5401.73	0.0294796	0.0249924	0.0681077	0.9120988	0.7732649	2.0756429	2.0756429
49:09.4	574356	6.35303E+12	6.01278E+13	5395.44	0.0294796	0.0234267	0.0669792	0.9120988	0.7248221	2.0412523	2.0412523
54:12.7	574356	6.35303E+12	6.01278E+13	5400.19	0.0294796	0.0248989	0.0670382	0.9120988	0.770372	2.0430494	2.0430494
59:15.5	574357	6.35303E+12	5.98782E+13	5407.34	0.0294796	0.0220481	0.0674068	0.9120988	0.6821682	2.054282	2.054282
04:18.3	574357	6.35303E+12	5.98782E+13	5412.65	0.0358902	0.0218857	0.067473	1.1104428	0.6771436	2.0562993	2.0562993
09:22.0	574358	6.35303E+12	5.94067E+13	5412.99	0.0358902	0.0216716	0.0680127	1.1104428	0.6705193	2.0727494	2.0727494
14:25.2	574359	6.35303E+12	5.99023E+13	5410.59	0.0358902	0.0219037	0.0674202	1.1104428	0.6777005	2.0546898	2.0546898
19:28.2	574360	6.35303E+12	6.0023E+13	5412.47	0.0358902	0.0219939	0.0673079	1.1104428	0.6804913	2.0512675	2.0512675
24:32.0	574360	6.35303E+12	6.0023E+13	5404.27	0.0358902	0.0228282	0.0672059	1.1104428	0.7063045	2.0481598	2.0481598
29:35.3	574361	6.35303E+12	5.95038E+13	5406.99	0.0358902	0.0225739	0.0678264	1.1104428	0.6984365	2.0670711	2.0670711
34:38.6	574361	6.35303E+12	5.95038E+13	5410.01	0.0358902	0.0245993	0.0678643	1.1104428	0.7611023	2.0682256	2.0682256
39:41.7	574361	6.35303E+12	5.95038E+13	5424.76	0.0358902	0.0359936	0.0680493	1.1104428	1.113642	2.0738645	2.0738645

44:44.7	574362	6.35303E+12	5.87448E+13	5432.99	0.0358902	0.0239225	0.0690331	1.1104428	0.7401622	2.1038472	2.1038472	
49:48.5	574362	6.35303E+12	5.87448E+13	5431.52	0.0358902	0.0225293	0.0690145	1.1104428	0.6970565	2.103278	2.103278	
54:51.9	574363	6.35303E+12	5.80502E+13	5426.35	0.0358902	0.0241253	0.0697738	1.1104428	0.7464368	2.1264208	2.1264208	
59:55.2	574363	6.35303E+12	5.80502E+13	5426.04	0.0358902	0.0326824	0.0697699	1.1104428	1.0111935	2.1262994	2.1262994	
04:57.9	574364	6.35303E+12	5.78645E+13	5431.65	0.0269835	0.0482413	0.0700661	0.8348695	1.4925858	2.1353278	2.1353278	
10:00.7	574364	6.35303E+12	5.78645E+13	5442.45	0.0269835	0.043395	0.0702054	0.8348695	1.3426413	2.1395736	2.1395736	
15:04.3	574366	6.35303E+12	5.7531E+13	5432.6	0.0269835	0.0243861	0.0704846	0.8348695	0.7545059	2.1480807	2.1480807	
20:07.3	574367	6.35303E+12	5.84533E+13	5443.24	0.0269835	0.0247503	0.0695083	0.8348695	0.7657743	2.1183292	2.1183292	
25:11.1	574368	6.35303E+12	5.81378E+13	5430.99	0.0269835	0.0232247	0.0697283	0.8348695	0.7185722	2.125032	2.125032	
30:14.0	574368	6.35303E+12	5.81378E+13	5447.49	0.0269835	0.0215208	0.0699401	0.8348695	0.6658536	2.1314881	2.1314881	
35:16.8	574369	6.35303E+12	5.7527E+13	5441.28	0.0269835	0.0212082	0.0706021	0.8348695	0.6561817	2.151664	2.151664	
40:20.2	574369	6.35303E+12	5.7527E+13	5444.99	0.0269835	0.0200685	0.0706503	0.8348695	0.6209194	2.153131	2.153131	
45:23.2	574370	6.35303E+12	5.73316E+13	5445.99	0.0269835	0.0200685	0.0709041	0.8348695	0.6209194	2.1608665	2.1608665	
50:26.3	574370	6.35303E+12	5.73316E+13	5466.65	0.0269835	0.0196295	0.0711731	0.8348695	0.6073367	2.169064	2.169064	
55:29.5	574372	6.35303E+12	5.7029E+13	5473.18	0.0269835	0.0196295	0.0716362	0.8348695	0.6073367	2.1831762	2.1831762	
00:32.6	574373	6.35303E+12	5.75391E+13	5470.2	0.0208048	0.0195841	0.0709624	0.6437005	0.6059321	2.1626439	2.1626439	
05:35.5	574373	6.35303E+12	5.75391E+13	5471.01	0.0208048	0.0193404	0.0709729	0.6437005	0.598392	2.1629641	2.1629641	
10:38.5	574374	6.35303E+12	5.70787E+13	5461.19	0.0208048	0.0197241	0.071417	0.6437005	0.6102637	2.1764965	2.1764965	
15:41.4	574374	6.35303E+12	5.70787E+13	5460.95	0.0208048	0.019458	0.0714138	0.6437005	0.6020305	2.1764008	2.1764008	
20:44.2	574376	6.35303E+12	5.68162E+13	5461.87	0.0208048	0.0214581	0.0717558	0.6437005	0.6639136	2.186823	2.186823	
25:47.0	574376	6.35303E+12	5.68162E+13	5458.6	0.0208048	0.019573	0.0717129	0.6437005	0.6055886	2.1855137	2.1855137	
30:49.8	574376	6.35303E+12	5.68162E+13	5452.56	0.0208048	0.0197916	0.0716335	0.6437005	0.6123521	2.1830955	2.1830955	
35:52.5	574377	6.35303E+12	5.63276E+13	5460.02	0.0208048	0.0219913	0.0723538	0.6437005	0.6804108	2.2050485	2.2050485	
40:55.3	574377	6.35303E+12	5.63276E+13	5466.78	0.0208048	0.021309	0.0724434	0.6437005	0.6593005	2.2077785	2.2077785	
45:58.1	574378	6.35303E+12	5.65074E+13	5473.24	0.0208048	0.0213163	0.0722982	0.6437005	0.6595263	2.2033529	2.2033529	
56:03.2	574378	6.35303E+12	5.65074E+13	5469.64	0.0208048	0.0197517	0.0722507	0.6437005	0.6111176	2.2019037	2.2019037	
01:36.8	574383	6.35303E+12	5.72964E+13	5478.36	0.0179961	0.0188214	0.0713693	0.5567993	0.5823341	2.1750424	2.1750424	
06:39.7	574384	6.35303E+12	5.65611E+13	5470.62	0.0179961	0.0187891	0.072195	0.5567993	0.5813348	2.2002079	2.2002079	
11:42.6	574384	6.35303E+12	5.65611E+13	5480.47	0.0179961	0.0188495	0.072325	0.5567993	0.5832035	2.2041694	2.2041694	
21:48.0	574384	6.35303E+12	5.65611E+13	5484.78	0.0179961	0.0183258	0.0723819	0.5567993	0.5670003	2.2059028	2.2059028	
26:51.2	574384	6.35303E+12	5.65611E+13	5487.23	0.0179961	0.0179839	0.0724142	0.5567993	0.5564219	2.2068882	2.2068882	
31:54.4	574385	6.35303E+12	5.52675E+13	5489.21	0.0179961	0.018281	0.0741359	0.5567993	0.5656141	2.2593577	2.2593577	
36:57.3	574386	6.35303E+12	5.5002E+13	5489.86	0.0179961	0.0187203	0.0745026	0.5567993	0.5792061	2.2705332	2.2705332	
42:00.1	574387	6.35303E+12	5.4816E+13	5485.01	0.0179961	0.0183036	0.0746893	0.5567993	0.5663134	2.2762247	2.2762247	
47:03.0	574387	6.35303E+12	5.4816E+13	5496.27	0.0179961	0.0184508	0.0748427	0.5567993	0.5708678	2.2808975	2.2808975	
52:05.9	574387	6.35303E+12	5.4816E+13	5492.82	0.0179961	0.0184047	0.0747957	0.5567993	0.5694414	2.2794658	2.2794658	
57:09.3	574388	6.35303E+12	5.41076E+13	5492.11	0.0179961	0.0184153	0.0757651	0.5567993	0.5697694	2.3090086	2.3090086	
02:12.6	574388	6.35303E+12	5.41076E+13	5492.89	0.0170398	0.0184147	0.0757758	0.5272114	0.5697508	2.3093366	2.3093366	
07:15.4	574388	6.35303E+12	5.41076E+13	5495.29	0.0170398	0.0183942	0.0758089	0.5272114	0.5691165	2.3103456	2.3103456	
12:18.2	574389	6.35303E+12	5.34819E+13	5496.51	0.0170398	0.0183866	0.0767129	0.5272114	0.5688814	2.3378941	2.3378941	
17:21.0	574392	6.35303E+12	5.44667E+13	5498.94	0.0170398	0.0188814	0.0753591	0.5272114	0.5841905	2.2966372	2.2966372	
22:23.9	574393	6.35303E+12	5.4543E+13	5520.34	0.0170398	0.0194343	0.0755467	0.5272114	0.6012972	2.3023534	2.3023534	
27:26.7	574393	6.35303E+12	5.4543E+13	5541.73	0.0170398	0.0193942	0.0758394	0.5272114	0.6000565	2.3112745	2.3112745	
32:29.9	574393	6.35303E+12	5.4543E+13	5543.62	0.0170398	0.0195938	0.0758653	0.5272114	0.6062322	2.3120627	2.3120627	
37:32.8	574394	6.35303E+12	5.38779E+13	5540.34	0.0170398	0.0195528	0.0767563	0.5272114	0.6049636	2.3392162	2.3392162	
42:35.6	574394	6.35303E+12	5.38779E+13	5499.34	0.0170398	0.0198363	0.0761882	0.5272114	0.6137351	2.3219053	2.3219053	
47:38.5	574395	6.35303E+12	5.53825E+13	5524.89	0.0170398	0.0195588	0.0744629	0.5272114	0.6051493	2.2693225	2.2693225	

52:42.0	574395	6.35303E+12	5.53825E+13	5516.19	0.0170398	0.0195968	0.0743456	0.5272114	0.606325	2.265749	2.265749		
57:45.2	574395	6.35303E+12	5.53825E+13	5519.38	0.0170398	0.0192475	0.0743886	0.5272114	0.5955177	2.2670593	2.2670593		
02:48.0	574395	6.35303E+12	5.53825E+13	5528.44	0.0176772	0.0192253	0.0745107	0.5469326	0.5948308	2.2707806	2.2707806		
07:50.8	574395	6.35303E+12	5.53825E+13	5533.27	0.0176772	0.0191698	0.0745758	0.5469326	0.5931136	2.2727645	2.2727645		
12:53.8	574396	6.35303E+12	5.44713E+13	5531.02	0.0176772	0.0189901	0.0757925	0.5469326	0.5875537	2.3098433	2.3098433		
17:56.7	574396	6.35303E+12	5.44713E+13	5545.02	0.0176772	0.0189449	0.0759843	0.5469326	0.5861552	2.3156899	2.3156899		
22:59.6	574396	6.35303E+12	5.44713E+13	5548.95	0.0176772	0.0189618	0.0760382	0.5469326	0.5866781	2.3173312	2.3173312		
28:02.4	574397	6.35303E+12	5.38389E+13	5554.01	0.0176772	0.0190515	0.0770014	0.5469326	0.5894534	2.3466856	2.3466856		
33:05.6	574397	6.35303E+12	5.38389E+13	5549.85	0.0176772	0.0186935	0.0769437	0.5469326	0.5783769	2.3449279	2.3449279		
38:08.5	574397	6.35303E+12	5.38389E+13	5562.7	0.0176772	0.0189393	0.0771218	0.5469326	0.5859819	2.3503573	2.3503573		
43:13.3	574397	6.35303E+12	5.38389E+13	5576.66	0.0176772	0.0188386	0.0773154	0.5469326	0.5828663	2.3562557	2.3562557		
48:16.3	574397	6.35303E+12	5.38389E+13	5591.65	0.0176772	0.0189326	0.0775232	0.5469326	0.5857746	2.3625893	2.3625893		
53:19.2	574397	6.35303E+12	5.38389E+13	5576.07	0.0176772	0.0194225	0.0773072	0.5469326	0.6009321	2.3560064	2.3560064		
58:22.3	574398	6.35303E+12	5.24135E+13	5579.93	0.0176772	0.0194733	0.0794646	0.5469326	0.6025039	2.4217554	2.4217554		
03:25.2	574399	6.35303E+12	5.22154E+13	5582.01	0.0178805	0.0197824	0.0797958	0.5532227	0.6120675	2.431849	2.431849		
13:30.3	574400	6.35303E+12	5.19602E+13	5575.84	0.0178805	0.0197535	0.0800991	0.5532227	0.6111733	2.441092	2.441092		
18:33.2	574400	6.35303E+12	5.19602E+13	5579.19	0.0178805	0.0198435	0.0801472	0.5532227	0.6139579	2.4425586	2.4425586		
23:36.6	574401	6.35303E+12	5.14241E+13	5571.19	0.0178805	0.0198432	0.0808667	0.5532227	0.6139486	2.4644852	2.4644852		
28:40.0	574401	6.35303E+12	5.14241E+13	5570.27	0.0178805	0.0199995	0.0808533	0.5532227	0.6187845	2.4640783	2.4640783		
38:45.6	574403	6.35303E+12	5.16659E+13	5613.91	0.0178805	0.0206986	0.0811054	0.5532227	0.6404147	2.4717605	2.4717605		
43:48.7	574404	6.35303E+12	5.22163E+13	5628.79	0.0178805	0.0201896	0.0804633	0.5532227	0.6246662	2.45219	2.45219		
48:51.6	574405	6.35303E+12	5.26766E+13	5629.74	0.0178805	0.0221578	0.0797736	0.5532227	0.6855623	2.4311707	2.4311707		
53:54.6	574406	6.35303E+12	5.44332E+13	5687.49	0.0178805	0.020244	0.077991	0.5532227	0.6263494	2.3768473	2.3768473		
58:57.4	574407	6.35303E+12	5.44179E+13	5665.95	0.0178805	0.0201642	0.0777176	0.5532227	0.6238803	2.3685147	2.3685147		
04:00.3	574407	6.35303E+12	5.44179E+13	5670.39	0.0186939	0.019061	0.0777785	0.5783893	0.5897473	2.3703707	2.3703707		
09:03.7	574408	6.35303E+12	5.43366E+13	5670.17	0.0186939	0.0196968	0.0778918	0.5783893	0.609419	2.3738241	2.3738241		
14:06.8	574409	6.35303E+12	5.45039E+13	5709.88	0.0186939	0.0199734	0.0781965	0.5783893	0.617977	2.3831101	2.3831101		
19:09.8	574409	6.35303E+12	5.45039E+13	5681.29	0.0186939	0.0202197	0.077805	0.5783893	0.6255975	2.3711776	2.3711776		
24:13.3	574409	6.35303E+12	5.45039E+13	5681.4	0.0186939	0.022567	0.0778065	0.5783893	0.698223	2.3712235	2.3712235		
34:18.6	574410	6.35303E+12	5.4739E+13	5723.04	0.0186939	0.021648	0.0780402	0.5783893	0.6697891	2.3783446	2.3783446		
39:21.6	574410	6.35303E+12	5.4739E+13	5712.44	0.0186939	0.0217271	0.0778956	0.5783893	0.6722365	2.3739395	2.3739395		
44:26.0	574410	6.35303E+12	5.4739E+13	5766.56	0.0186939	0.0214755	0.0786336	0.5783893	0.664452	2.3964304	2.3964304		
49:30.2	574410	6.35303E+12	5.4739E+13	5752.64	0.0186939	0.0230133	0.0784438	0.5783893	0.7120315	2.3906456	2.3906456		
54:33.3	574411	6.35303E+12	5.33843E+13	5785.23	0.0186939	0.0235469	0.0808902	0.5783893	0.7285411	2.4652002	2.4652002		
59:36.0	574412	6.35303E+12	5.33495E+13	5778.03	0.0186939	0.0445382	0.0808422	0.5783893	1.3780119	2.4637378	2.4637378		
04:38.7	574412	6.35303E+12	5.33495E+13	5707.59	0.0235949	0.0251205	0.0798566	0.7300262	0.7772283	2.4337024	2.4337024		
09:41.6	574412	6.35303E+12	5.33495E+13	5698.98	0.0235949	0.0225234	0.0797362	0.7300262	0.696874	2.4300311	2.4300311		
14:44.9	574412	6.35303E+12	5.33495E+13	5716.84	0.0235949	0.023342	0.079986	0.7300262	0.7222015	2.4376465	2.4376465		
19:47.8	574413	6.35303E+12	5.25253E+13	5727.04	0.0235949	0.0235409	0.081386	0.7300262	0.7283554	2.4803111	2.4803111		
24:51.0	574413	6.35303E+12	5.25253E+13	5727.44	0.0235949	0.0222209	0.0813917	0.7300262	0.6875146	2.4804844	2.4804844		
29:53.8	574413	6.35303E+12	5.25253E+13	5735.97	0.0235949	0.0255473	0.0815129	0.7300262	0.7904335	2.4841786	2.4841786		
34:56.6	574414	6.35303E+12	5.19701E+13	5739.52	0.0235949	0.0253504	0.0824347	0.7300262	0.7843414	2.5122723	2.5122723		
39:59.3	574415	6.35303E+12	5.18073E+13	5733.01	0.0235949	0.0256234	0.0826	0.7300262	0.792788	2.5173089	2.5173089		
45:02.1	574418	6.35303E+12	5.19586E+13	5730.9	0.0235949	0.0255253	0.0823292	0.7300262	0.7897528	2.5090566	2.5090566		
50:05.4	574420	6.35303E+12	5.25895E+13	5722.12	0.0235949	0.0224989	0.0812169	0.7300262	0.696116	2.4751591	2.4751591		
55:08.2	574421	6.35303E+12	5.25734E+13	5697.57	0.0235949	0.0363746	0.0808932	0.7300262	1.1254301	2.4652918	2.4652918		
00:11.2	574421	6.35303E+12	5.25734E+13	5676.99	0.0269152	0.023551	0.080601	0.8327563	0.7286679	2.456387	2.456387		

05:14.1	574423	6.35303E+12	5.29406E+13	5669.12	0.0269152	0.0218688	0.0799309	0.8327563	0.6766207	2.4359674	2.4359674
15:19.2	574424	6.35303E+12	5.28202E+13	5679.07	0.0269152	0.0283279	0.0802538	0.8327563	0.8764652	2.4458059	2.4458059
20:22.3	574425	6.35303E+12	5.23532E+13	5686.98	0.0269152	0.0487423	0.0810825	0.8327563	1.5080868	2.471061	2.471061
25:27.1	574426	6.35303E+12	5.30049E+13	5674.69	0.0269152	0.2374762	0.0799125	0.8327563	7.3475136	2.435404	7.3475136
30:31.1	574427	6.35303E+12	5.28466E+13	5692.52	0.0269152	0.2299546	0.0804036	0.8327563	7.1147953	2.4503724	7.1147953
35:34.0	574427	6.35303E+12	5.28466E+13	5694.01	0.0269152	0.0490713	0.0804247	0.8327563	1.518266	2.4510138	2.4510138
40:36.8	574428	6.35303E+12	5.2354E+13	5713.35	0.0269152	0.0279617	0.0814571	0.8327563	0.865135	2.4824794	2.4824794
45:39.8	574428	6.35303E+12	5.2354E+13	5716.19	0.0269152	0.0282458	0.0814976	0.8327563	0.8739251	2.4837134	2.4837134
50:42.7	574428	6.35303E+12	5.2354E+13	5717.38	0.0269152	0.0284795	0.0815146	0.8327563	0.8811557	2.4842305	2.4842305
55:45.7	574429	6.35303E+12	5.15634E+13	5710.01	0.0269152	0.0240423	0.0826578	0.8327563	0.7438688	2.5190709	2.5190709
00:48.6	574429	6.35303E+12	5.15634E+13	5698.38	0.0275406	0.0225554	0.0824894	0.8521062	0.6978641	2.5139401	2.5139401
05:51.3	574429	6.35303E+12	5.15634E+13	5709.41	0.0275406	0.0225554	0.0826491	0.8521062	0.6978641	2.5188062	2.5188062
10:54.1	574430	6.35303E+12	5.12815E+13	5715.13	0.0275406	0.023496	0.0831866	0.8521062	0.7269662	2.5351866	2.5351866
15:58.2	574430	6.35303E+12	5.12815E+13	5712.23	0.0275406	0.023838	0.0831444	0.8521062	0.7375477	2.5339002	2.5339002
21:01.2	574430	6.35303E+12	5.12815E+13	5713.4	0.0275406	0.0238314	0.0831614	0.8521062	0.7373435	2.5344192	2.5344192
26:05.1	574430	6.35303E+12	5.12815E+13	5723.95	0.0275406	0.0239138	0.083315	0.8521062	0.739893	2.5390991	2.5390991
31:08.2	574430	6.35303E+12	5.12815E+13	5735.36	0.0275406	0.0247866	0.0834811	0.8521062	0.7668974	2.5441605	2.5441605
36:11.1	574430	6.35303E+12	5.12815E+13	5739.01	0.0275406	0.0244687	0.0835342	0.8521062	0.7570616	2.5457796	2.5457796
41:13.9	574430	6.35303E+12	5.12815E+13	5741.24	0.0275406	0.024823	0.0835666	0.8521062	0.7680236	2.5467688	2.5467688
46:16.8	574430	6.35303E+12	5.12815E+13	5724.65	0.0275406	0.0479102	0.0833252	0.8521062	1.4823416	2.5394096	2.5394096
51:19.5	574432	6.35303E+12	4.99455E+13	5726.23	0.0275406	0.0287101	0.0855777	0.8521062	0.8882905	2.6080579	2.6080579
56:22.3	574432	6.35303E+12	4.99455E+13	5715.44	0.0275406	0.0476762	0.0854165	0.8521062	1.4751016	2.6031435	2.6031435
01:25.2	574432	6.35303E+12	4.99455E+13	5710.99	0.0275178	0.0268429	0.08535	0.8514007	0.8305193	2.6011167	2.6011167
06:28.2	574433	6.35303E+12	4.98413E+13	5720.19	0.0275178	0.023935	0.0856661	0.8514007	0.7405489	2.6107513	2.6107513
11:31.5	574435	6.35303E+12	4.97656E+13	5727.69	0.0275178	0.0248874	0.085909	0.8514007	0.7700162	2.6181535	2.6181535
16:34.7	574435	6.35303E+12	4.97656E+13	5726.31	0.0275178	0.0274311	0.0858883	0.8514007	0.8487182	2.6175227	2.6175227
21:37.9	574437	6.35303E+12	4.98823E+13	5731.36	0.0275178	0.0263376	0.0857628	0.8514007	0.8148853	2.6136992	2.6136992
26:41.0	574438	6.35303E+12	4.9928E+13	5735.02	0.0275178	0.0483454	0.0857391	0.8514007	1.4958067	2.6129777	2.6129777
31:44.0	574440	6.35303E+12	4.96931E+13	5745.06	0.0275178	0.0271616	0.0862952	0.8514007	0.8403799	2.6299251	2.6299251
36:47.1	574441	6.35303E+12	5.04581E+13	5742.56	0.0275178	0.0269363	0.0849499	0.8514007	0.8334091	2.5889252	2.5889252
41:50.0	574441	6.35303E+12	5.04581E+13	5743.71	0.0275178	0.0484523	0.0849669	0.8514007	1.4991142	2.5894437	2.5894437
46:52.9	574442	6.35303E+12	5.28842E+13	5750.85	0.0275178	0.0347258	0.0811698	0.8514007	1.0744163	2.4737229	2.4737229
51:56.2	574442	6.35303E+12	5.28842E+13	5746.02	0.0275178	0.0267711	0.0811016	0.8514007	0.8282978	2.4716453	2.4716453
56:59.0	574443	6.35303E+12	5.28228E+13	5737.61	0.0275178	0.0256417	0.0810771	0.8514007	0.7933542	2.4708977	2.4708977
02:02.6	574443	6.35303E+12	5.28228E+13	5735.06	0.0300242	0.0258787	0.0810411	0.9289487	0.800687	2.4697995	2.4697995
07:05.8	574443	6.35303E+12	5.28228E+13	5735.1	0.0300242	0.0247432	0.0810416	0.9289487	0.7655546	2.4698168	2.4698168
12:08.7	574443	6.35303E+12	5.28228E+13	5755.91	0.0300242	0.0249703	0.0813357	0.9289487	0.7725811	2.4787786	2.4787786
17:11.4	574443	6.35303E+12	5.28228E+13	5760.01	0.0300242	0.0252751	0.0813936	0.9289487	0.7820116	2.4805442	2.4805442
22:14.5	574444	6.35303E+12	5.21447E+13	5754.45	0.0300242	0.0251352	0.0823724	0.9289487	0.7776831	2.510372	2.510372
27:17.4	574444	6.35303E+12	5.21447E+13	5767.44	0.0300242	0.0280841	0.0825583	0.9289487	0.8689221	2.5160389	2.5160389
32:20.3	574445	6.35303E+12	5.19166E+13	5755.01	0.0300242	0.0345983	0.0827425	0.9289487	1.0704714	2.5216513	2.5216513
37:23.3	574446	6.35303E+12	5.17083E+13	5764.68	0.0300242	0.0278962	0.0832153	0.9289487	0.8631084	2.5360608	2.5360608
42:26.9	574446	6.35303E+12	5.17083E+13	5756.94	0.0300242	0.0266725	0.0831036	0.9289487	0.8252472	2.5326557	2.5326557
47:29.7	574446	6.35303E+12	5.17083E+13	5755.95	0.0300242	0.0268138	0.0830893	0.9289487	0.829619	2.5322202	2.5322202
52:33.2	574448	6.35303E+12	5.19511E+13	5743.01	0.0300242	0.0267197	0.082515	0.9289487	0.8267075	2.5147176	2.5147176
57:36.1	574448	6.35303E+12	5.19511E+13	5714.06	0.0300242	0.0300574	0.082099	0.9289487	0.929976	2.5020411	2.5020411
02:39.4	574448	6.35303E+12	5.19511E+13	5709.16	0.0291971	0.0270146	0.0820286	0.9033583	0.8358317	2.4998955	2.4998955

A would-be inventor's proof of conception, however, must be more than simply his/her testimony. "To prove [his or her] contribution, the purported inventor must provide corroborating evidence of any asserted contributions to the conception." *Acromed*, 253 F.3d at 1379 (internal citations and quotations omitted); *see also Ethicon, Inc. v. U.S. Surgical Corp.*, 135 F.3d 1456, 1461 (Fed. Cir. 1998). Indeed, a would-be inventor's testimony regarding their own inventorship claim is "regarded with skepticism." *Scott*, 889 F. Supp. 2d at 664. Would-be inventors, therefore, must supply evidence to corroborate their testimony. *Symantec*, 552 F.3d at 1295. The sufficiency of the corroborating evidence is evaluated under a rule of reason analysis, which requires that an evaluation of all pertinent evidence be made so that a sound determination of the credibility of the alleged inventor's story may be reached. *Id.*; *Gemstar*, 383 F.3d at 1382.

b. Claim Construction

"When the parties raise an actual dispute regarding the proper scope of these claims, the court, not the jury, must resolve that dispute." *O2 Micro Int'l Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351, 1360 (Fed. Cir. 2008). A district court "may engage in claim construction during various phases of litigation" and is "well within its power to clarify, supplement, and even alter its construction" of disputed terms "in its summary judgment order." *Level Sleep LLC v. Sleep No. Corp.*, No. 2020-1718, 2021 WL 2934816, at *3 (Fed. Cir. July 13, 2021).

"Words of a claim are generally given their ordinary and customary meaning, which is the meaning a term would have to a person of ordinary skill in the art after reviewing the intrinsic record at the time of the invention." *O2 Micro*, 521 F.3d at 1360 (citing *Philips v. AWH Corp.*, 415 F.3d 1303, 1312-13 (Fed. Cir. 2005)). "A determination that a claim term 'needs no construction' or has the 'plain and ordinary meaning' may be inadequate when a term has more than one 'ordinary' meaning or when reliance on a term's 'ordinary' meaning does not resolve the parties' dispute." *Id.* at 1361. "To determine the meaning of the claims, courts start by considering the

(e.g. "load-only") to be designated a CLR, the CLR designation had been available within ERCOT for nearly twenty years. Ex. S, at 31.

The CLR designation would allow Lancium's Bitcoin mining datacenters, once registered, to operate as Storms' BearBox system and sell options to turn off its miners under certain conditions, and also sell power back to the grid. *Id*. at 24-28. During these commercialization efforts, Lancium realized operating its Bitcoin miners as Storms' BearBox system, with a CLR designation, would be incredibly profitable, but even more so if there was no other Bitcoin miners doing it. SSF ¶ 11; Ex. R, LANCIUM00033139 ("More importantly, when we bid into this [CLR] category we will be the only bidder, and therefore our award level should not be diminished"); Ex. Y, at LANCIUM00031222 ("first and only" CLR "therefore our revenue … would go up"); Ex. H, Cline Dep. at 166. A few days later, Lancium filed an application for the '433 Patent.

4. Lancium filed the '433 patent to monopolize Storms' portions of the system that Storms communicated to it

About two months after first commercializing some of Storms' BearBox system features, Lancium filed a provisional patent application that would eventually support the '433 Patent. D.I. 151 Ex. 17, '433 Patent at cover page. In general, the '433 Patent discloses example embodiments which enable a computing system to adjust power consumption based on a power option agreement, and using some combinations of power thresholds, time intervals, and monitored conditions. The '433 Patent provides an overview of this aspect of the disclosure:

> Examples relate to adjusting load power consumption based on a power option agreement. A computing system may receive power option data that is based on a power option agreement and specify minimum power thresholds associated with time intervals. The computing system may determine a performance strategy for a load (e.g., set of computing systems) based on a combination of the power option data and one or more monitored conditions. The performance strategy may specify a power consumption target for the load for each time interval such that each power consumption target is equal to or greater than the minimum power threshold associated with each

applies this very same analysis in his expert reports. In fact, in Defendants' expert's rebuttal report, Dr. Mark Ehsani, in offering his criticisms of Dr. McClellan's opinions, performs no claim construction of his own, and says nothing of McClellan's application of the "plain and ordinary meaning of the claim terms." Ex. J, Ehsani Report at ¶ 43.

Second, the Court should reject Lancium's proposed constructions of the terms "power option agreement" and "minimum power threshold" because they clash with the plain language of the claims and the intrinsic record.[5]

a. Power Option Agreement

Defendants proposed construction for "power option agreement" is inconsistent with the term's plain and ordinary meaning because the phrase, "such that the load must use at least the amount of power subject to the option during the time interval" is internally inconsistent with the plain language of the claim and not supported by the specification.

Lancium's proposed definition is internally inconsistent because it does not allow for scenarios in which the option is exercised by a power entity. Specifically, if the power entity "reduces the amount of power delivered to the load" during a time interval, that power is no longer accessible to the load, and it is impossible for the load to continuing using the diverted power. Yet under Lancium's proposed construction, the load still "must" use that power for the duration of the time interval. In other words, Lancium's proposal requires the system to use power it is not receiving.

Lancium's proposed definition is also inconsistent with the remaining language of the claim, inviting confusion. The terms Lancium cherry-picked for construction are set forth within a larger limitation recited in claim 1, specifically that the system "receive power option data based, at least in part, on a power option agreement, wherein the power option data specify: (i) a set of minimum

[5] Even if the Court does adopt Lancium's proposed constructions for these two terms, it would not affect Plaintiffs' experts' opinions, or impact Plaintiffs' ability to meet its burdens of proof.

technique to show the Bitcoin emanating from the box of miners (highlighted in orange) and the various functionality of his software (highlighted in purple). Because the generator business model is to generate, sell and deliver power to the grid, a POSA would have understood (1) the generator already had both the functional capacity and compliance with existing regulatory/administrative requirements to do so, and (2) that this disclosure reflects the generator curtailing power delivered to the Bearbox in order to perform the sellback operation. As Dr. McClellan explained:

> Q: But what is the entity selling the power back?
> A: The thing that's not doing the bitcoin mining.
> Q: So the generator?
> A: Yeah, that's selling the power that you've contracted to provide. That's passing the power through to the market rather than using it to mine bitcoin. That's the markup on the pass through. This data here [the .CSV file provided to Lancium] is just -- this lays out the whole scheme. It's great.

Ex. U, McClellan Dep. at 215:4-12; *see also*, Ex. U, McClellan Dep. at 67:2-68:16, 164:11-166:12. At a minimum, the documents communicated to Lancium raise a material question of fact. SSF ¶ 5.

a. Storms' system as described in the documents he communicated to Lancium meets Lancium's constructions even if there were not corrected.

When the generator performs sell back as shown in the documentation, Storms' BearBox system literally meets each aspect of these limitations, even if Lancium's proposed construction were not modified. Specifically, Storms' BearBox system involved "an agreement between a power entity associated with the delivery of power to a load [the generator/generation assets] and the load [BearBox], wherein the load [BearBox] provides the power entity [the generator/generation assets] with the option to reduce the amount of power delivered to the load up to an agreed amount of power [full curtailment of "minimum power threshold"] during an agreed upon time interval [during a 5-minute interval when sell-back is appropriate], such that the load must use at least the amount of power subject to the option during the time interval [mine Bitcoin when energy is not being curtailed by the generator]." Storms' BearBox system also used, at least in one implementation, 30.94kW of

power as "a minimum amount of power a load must use during an associated time interval." In other words, when the generator sells back power to the grid, it fully curtails the delivery to Storms that otherwise would have been used to mine Bitcoin—precisely the subject matter Lancium alleges is recited in the claim. Stated yet another way, the Storms documents describe a "minimum power threshold" of 30.94 kW that is always used by Storms for mining unless the delivery of power is curtailed by the generator in accordance with a "power option agreement" between those two entities.

b. Lancium misrepresents both the underlying evidence and the requirements of the claims.

Lancium contends, without citation, that Dr. McClellan does not explain how the materials Storms provided "to McNamara disclose or convey the properly construed requirements of the claims." D.I. 149 at 21. This argument ignores 27 pages of Dr. McClellan's analysis in his initial report alone showing how the information Storms communicated to Lancium disclosed each and every limitation recited in the claims of the '433 Patent. D.I. 151 Ex. 3, McClellan Report at 53-80.

Lancium also is wrong when it argues "the claims set forth requirements that a load (e.g., a Bitcoin mining operation) must use the amount of power set by the minimum power thresholds regardless of profitability." First, as noted above, Storms' system meets this element even under Lancium's construction. Second, Lancium is wrong as no claim requires mining occur "regardless of profitability," as even Lancium acknowledges. D.I. 149 at 22 ("the claim elements … have no requirements relating to profitability"). Lastly, as noted above, the '433 Patent contemplates having a "minimum power threshold" of zero for an interval or even the full duration of a power option agreement, so whether Storms' system stopped all mining is not dispositive of whether it evidenced Storms' conception or would have communicated that subject matter to a POSA. D.I. 151 Ex. 17, '433 Patent at 54:13-21.

For at least these reasons, there are genuine issues of fact that preclude summary judgment

regarding Storms' possession of the claimed invention. SSF ¶ 3, 4.

3. Storms communicated the subject matter claimed by the terms "power option agreement" and "minimum power threshold" even if he did not use those words when communicating with Defendants

As discussed above, some of the same evidence that establishes possession of the invention by Storms—the Product details and .CSV file—was also communicated directly to Lancium. Thus, the same issues of fact that preclude summary judgment on the issue of possession also preclude summary judgment as to whether Storms communicated those inventions to Lancium. SSF ¶ 5.

In addition, Storms verbally told Mr. McNamara that, in such situations, the selling of power could be performed by a variety of market entities:

A: . . . And then utilizing, you know, different configurations and kind of some of the break-even calculations around the machines within your build determine when it's most profitable to effectively mine Bitcoin at that location or utilize the power and sell it back to the grid but in both the day-ahead and real-time markets.
Q. In the context you're talking about, **who sells the power back to the grid**?
A. **Variety of different options there. It could be the generator sells the power back. It could be the mining facility sells the power back. It could be a different market participant depending on the ISO**.
Q. And what we've just been discussing, is that part of what you maintain you talked to Mr. McNamara about regarding how load can be controlled to maximize profitability?
A. Yes.

Ex. E, Storms Dep. at 104:22-105:15 (emphasis added). Conversely, McNamara's memory of this conversation is "vague." Ex. F, McNamara Dep. at 133-135.

As explained above, in such a scenario, Storms system literally meets each aspect of Lancium's proposed construction. SSF ¶ 3, 4, 5. Storms additional testimony, as supported by the documentary evidence discussed above, raises an additional question of fact to be resolved by the jury. *Nexus*, 2020 WL 6940505 at *13.

also found that the original conversion claim, "by its wording, is dependent on a determination of patent inventorship," and on that basis alone found preemption. D.I. 92 at 5.[7] The Court recognized that a BearBox amendment could fix the issue. D.I. 92 at 12 ("it is not clear that allowing the opportunity to amend would be a futile act"). Notably, whether or not the converted property was confidential was not part of the Court's analysis, nor should it have been. *Dileo v. Horn*, 15-684 (La. App. 5 Cir. 3/16/16), 189 So. 3d 1189, 1198 ("Conversion is committed when one wrongfully does any act of dominion over the property of another in denial of or inconsistent with the owner's rights."). The Court's decision also clarified that "conversion claims that are based on *non*-patent-ownership theory of conversion are generally not preempted by federal patent law." D.I. 92 at 5, n.5 (emphasis added).

In its SAC, then, BearBox explained that its conversion claim is based on the theft of material that is *not* included in the '433 Patent, and therefore does *not* seek "patent-like" relief, or turn on questions of patent inventorship or ownership, which the Court properly concluded would not be preempted by patent law. *See, e.g.*, D.I. 103 ¶ 46 ("Not all aspects of BearBox's technology that was stolen and used by Defendants was described and claimed in the '433 Patent."). As a result, when Lancium filed yet another motion to dismiss, this time directed to the SAC, including BearBox's conversion claim, it did not ask the court to consider preemption again. D.I. 121.

Lancium's argument that Louisiana conversion can only be premised on the theft of documents describing confidential information is wrong. If the "ideas and materials allegedly provided to [the defendant] are not found in [a] patent … nothing in federal patent law now stands in the way of [the plaintiff] pursuing his state law claims." *Wawrzynski v. H.J. Heinz Co.*, 728 F.3d

[7] Plaintiffs did not object to the Report and Recommendation, and Your Honor adopted it on February 2, 2022. Plaintiffs subsequently filed their Second Amended Complaint on February 16, 2022.

14. Admitted for purposes of this motion.

15. Admitted for purposes of this motion.

16. **Disputed**. Defendants state as an undisputed fact that "none of the attachments to [Storms' May 9, 2019 email] include any confidentiality marking or designation." The "CONFIDENTIALITY NOTICE" at the bottom of that email, however, states that the email may contain "private, confidential, or legally privileged information," which necessarily includes attachments contained in the email. The "CONFIDENTIALITY NOTICE" also directs any unintended recipients of the email to "permanently delete all copies of this email including all attachments," further evidencing the understanding that the CONFIDENTIALITY NOTICE applies not only to the email, but to attachments in the email. Ex. L (LANCIUM00014645).

17. Admitted for purposes of this motion.

18. **Disputed**. While Plaintiffs do not assert that certain attachments to the May 9, 2019 email, alone, are confidential, the May 9, 2019 email (BB00000090) in its entirety, and by virtue of its attachment (BB00000097), is confidential. Storms Tr. at 217:20-23 ("Q: So what, if anything, in this e-mail then do you consider confidential. A: The confidential information in this email would be the attached Excel spreadsheet."). Ex. B.

19. Admitted for purposes of this motion.

20. Admitted for purposes of this motion.

21. **Disputed as incomplete**. Although BearBox built and sold one container to Great American Mining, that container did not include the systems and methods at issue in this case. Storms Tr. 46:2-9. In addition to Mr. Storms' testimony, the nature of the BearBox container sold to Great American Mining was explained to Defendants in written discovery responses at least as early as November 22, 2021:

A. Kind of all -- all of the above. You know, I -- I developed a "product" with the BearBox containers and felt confident at the time that I could develop software solutions for a variety of different types of deployments.

Q. What about as a miner, what were you doing there as a miner?

A. I was -- I was trying to -- to learn more about a few different things, specifically some of Steve's flare gas initiatives, some of the microbtu specifications and kind of looking at and feeling the unit as opposed to just looking at pictures on line, understanding kind of some of the speakers who were I guess announced prior to and what they were talking about and learning more about the industry and what other people were doing.

Q. So is this -- the people attending this, are there -- competitors in the mining industry. There's finance, money people. There's -- is that fair?

A. Yeah, I wouldn't really categorize people as like competitors in the mining industry. The industry's still -- at the time was so young but that -- I guess that's a fair -- fair consideration.

Q. Yeah, because I mean if two entities are

mining, the way I understand it, you're all trying to solve the next equation and whoever gets it first gets the Bitcoin; isn't that right?

A. That's -- that's a high level understanding of how it works, yes.

Q. That's an overly simplistic but correct description; is that fair?

A. Yes.

Q. So who -- Quinn Lawler was a Bitcoin miner?

A. He -- he was at the time.

Q. Okay. And what did you and Mr. Lawler talk about? We started on that before and went in a different direction.

A. Yeah. We talked about a GPU farm that he -- he was managing in Upstate New York and kind of his experience that led him to managing that farm.

Q. What did -- what did you say to him?

A. I told him he should learn Python, you know, because he was a former Wall Street like hedge fund guy but didn't really have the experience to manage a large scale GPU mining facility, and using Python he could -- he could manage it a little bit -- a little bit better than physically doing things.

Q. So what -- what is it about Python that makes

it easier to manage mining facilities?

A. It's -- it's -- as an object-oriented programming language, it's decently easy to learn, and there's a ton of API integrations that are easy to implement from the perspective of Python as opposed to other languages.

Q. Anything else?

A. It's -- it's my favorite language, so I guess that's kind of my bias towards it, yeah.

Q. So you said you talked to Mr. McNamara at the dinner. What did you talk to him about? Not at the dinner, at the happy hour. What did you talk to him about?

A. Talked to him about the BearBox container builds and this idea about, you know, utilizing excess wind and renewable energy in Texas.

Q. Did you talk to him about anything else?

A. Not to my recollection.

Q. Did you talk to him at a high level or specifics level?

A. High level.

Q. Did you understand what you told Mr. McNamara at that time to be confidential?

A. I don't think I communicated anything to him

at the time that I would have considered to be confidential.

Q. What did you talk to Mr. Peltan about?

A. I talked to Jesse about their Huddle Ranch project and I guess how they were looking at the development of that -- that substation and then about his presentation that he gave at the summit.

Q. Did you talk to him about anything else?

A. I talked to him about building custom power distribution units.

Q. About BearBox doing it or you doing it on behalf of BearBox?

A. Yeah, designing and building custom power distribution units because the industry wasn't -- there wasn't anything off the shelf at the time for some of the specifications.

Q. Did you go into any specifics?

A. Went into specifics around the -- how the branch circuits were designed and why I started building them in the first place.

Q. Did Mr. Peltan understand what you were telling him was confidential?

A. At the time I -- I wasn't -- I didn't communicate anything to Jesse that was confidential to

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Q. So if I understand your position, you -- well, let's -- so who did you talk to at the dinner?
A. I talked with Michael McNamara and his CFO.
Q. Did you talk to anybody else?
A. Maybe like very briefly.
Q. Did you talk to Mr. Lawler who was on your other side?
A. I probably did at some point.
Q. Did you talk to anybody else?
A. I probably talked with -- with Jamie and Rich at some point as well.
Q. Anybody else?
A. No. The table was so long. I couldn't -- you can't really see or talk past that.
Q. So sort of the people on your end of the table you talked with?
A. Yeah.
Q. And across from you?
A. Yeah.
Q. How long was the dinner?
A. Probably an hour to two hours.
Q. So what did you talk to Mr. Godwin about?
A. At the dinner?
Q. Yeah.

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A. Nothing -- nothing in particular.
Q. What about -- I'm trying to remember who else you said you spoke with. What did you talk with them about outside of the Lancium folks?
A. Again -- again, nothing in particular. There's general small talk, if you will. I think Quinn and I probably continued some of the conversation around what I was telling him he needed to learn for the GPU farm, but the vast majority of the conversation that took place at the dinner was between me and Michael McNamara and his CFO.
Q. And what did you talk to Mr. McNamara and his CFO about?
A. What I was working on at BearBox, what I developed and kind of my vision on how you could build out something like this to -- to really utilize renewable energy.
Q. When you say "something like this," what do you mean?
A. Something like the -- the BearBox containers. They're -- you know, building containers is great, but you could utilize the same -- the same type of software in a large like super structure build. It's not specific to the housing in which the machines run.

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Q. Did you tell Mr. McNamara that?
A. Yes.
Q. What -- tell me everything you remember talking to either Mr. McNamara or his CFO.
A. Yeah, so I talked with them about like their current physical infrastructure and what they were looking at from an electrical standpoint. I talked with them about their -- their electrical engineer they said on staff who didn't like the Digital Shovel electrical distribution and why I thought it was a bad idea as well. I talked to them about physical characteristics of my BearBox units and why I thought that they were different than other offerings in the market, and I talked with them about the -- some of the software that I was working on to offer flexibility for those units and the -- their load and how they, you know, could be controlled and how you could really maximize the profitability depending on the setup.
Q. Anything else?
A. There's -- there's a lot that goes into that and some of the ideas around kind of how -- how the development took place from the -- from the physical side of the power distribution units to me writing the software and understanding how electricity moves through

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the market.
Q. Anything else?
A. I wouldn't say anything else outside of like some like specifications around -- around those things.
Q. Did you show Mr. McNamara or his CEO or CFO I should say any documents or, you know, pictures on your phone or anything like that during -- during the dinner?
A. I think I may have showed them like an outdoor picture of the BearBox container but outside of that, no.
Q. So you said -- what did -- so what did Mr. McNamara talk to you about?
A. So at a high level, he just talked about that they were looking for ways to utilize excess wind energy for some of their -- at the time it was their data center-type builds around high throughput computing like machine learning algorithms and neural networks and how he thought that the power costs for the wind energy would make hosting those type of data center arrangements profitable.
Q. Did you talk to him about Bitcoin mining at all?
A. I did, yeah.
Q. So we started this with current physically --

current physical installation and that's -- Mr. McNamara talked to you about that, his current installation?

A. They talked about some of the designs that they were looking at and so did his CFO and how they had some I guess issues with the safety of certain voltages in the electrical distribution system that some of the manufacturers were -- were deciding to use, and I explained to them how -- how mine were different. Outside of that nothing really in particular about their -- their I guess physical characteristics or their, you know, mining efforts, if you will.

Q. So you also said he talked to you about Digital Shovel. What is Digital Shovel?

A. Digital Shovel is a company owned by a guy named -- I can't remember his name. They -- they -- they manufacture Bitcoin mining containers, and I think at the time they were doing GPU mining containers as well, but they weren't -- they weren't like shipping containers that were modified. They were built from scratch, and I had some hesitations about the units.

Q. And so your BearBox unit that you have at this time --

A. Um-hum.

Q. -- that's basically a modified shipping

container --

A. Yes.

Q. -- to ship, you know, stuff on large ships that go back and forth between the U.S. and other countries?

A. Yes.

Q. So you get those containers and then build them out?

A. Yes.

Q. So did Mr. McNamara talk to you about anything else?

A. Not that I can recall, no.

Q. You said you talked to him about physical characteristics of the BearBox. What did you talk to him about that?

A. Things like air flow, how -- how I designed the intakes and exhaust, how I designed the electrical service and distribution, some of the benefits to doing that, like I said earlier, like the power distribution units, right, and how they were modular so you wouldn't have to change out everything when new mining machines came out. Yeah, that's pretty much all the physical characteristics.

Q. You said you talked about -- you talked to

him about software. What did you talk to him about software?

A. Yeah, so I talked to him about how I thought that my software would be able to utilize certain -- certain variables to achieve what I considered to be like fine grain load control over -- over the mining machines within the build depending on a bunch of different things.

Q. And what -- what did you understand fine grain load control -- what did you mean by fine grain load control?

A. So fine grain load control at least from my understanding at the time was the ability to turn on or off machines within a build, mining machines within a build. Rather than turn it all on or all off you have some flexibility within there.

Q. Anything else?

A. No, that's pretty much -- that's what fine grain load control means.

Q. So did you talk about anything else about the software?

A. Yeah, so we talked about how I was building out different integrations for -- for power entities and how you could utilize those integrations and things like

power pricing to determine like what -- what your strategy was for how many machines you wanted on, how many machines you wanted mining, the break-even costs and opportunity costs of those machines and how to calculate that.

MR. NELSON: Can I get you to read his answer back?

(Requested portion of the record read.)

BY MR. NELSON:

Q. So you said you were building out different integrations for power entities. Which power entities were you building out integrations for at that time?

A. A couple of different types. As a -- as a power generator like of the wind facility or solar facility and being able to understand kind of what their pricing mechanisms were or other variable constraints, some marketplace data from independent system operators like ERCOT or MISO or the Selvis (phonetic) Power Pool and how to -- how to actually take down that information in a way that was usable for the mining facility.

Q. So this isn't -- you haven't been hired by power entities to do this. This is just you're talking about sort of what you were working on when you were

doing software modeling, is that what -- is that -- I guess I'm confused. Were you actually hired by power entities to do this?

A. No, I wasn't -- I wasn't hired by any power entities at the time.

Q. Okay.

A. Yeah.

Q. So when you say "integration for power entities," you're talking sort of generic wind farm, solar, that sort of stuff?

A. Yeah, really like generic -- I guess generic integrations for the data that you would need in order to maximize the -- the economic potential of that energy as it relates to, you know, mining Bitcoin or not mining Bitcoin and where the energy goes and how it's priced.

Q. And where -- where did you obtain the information that you maintain you were discussing with him?

A. I'm sorry. Can you clarify?

Q. Yeah, I'll try. That's probably a bad question.

A. Yeah.

Q. So, you know, you're talking about discussions that you under -- that you remember happened

with Mr. McNamara and his CFO.

A. Um-hum.

Q. And what I'm trying to find out is so the information that you're talking about here, what is that based on.

A. That information's based on software that I wrote and databases that I created and modeling information that I created.

Q. And is that in connection with working with Ben Hakes and the GlidePath project and the Exelon stuff?

A. Part of it was but part of it wasn't. You know, reasonably I think there -- there was a lot of data that I was modeling at the time for a ton of different locations and different setups.

Q. So what part of it was based on the code that you had written in connection with Mr. Hakes and GlidePath?

A. I guess like one of -- one of the setups or different configurations where you could utilize a mining container in a behind the meter setup that looked at both the day-ahead and real-time pricing for that settlement location on the grid and then determine what the strategy was to take down the wind power to mine or to use it to sell back to the grid.

Q. What do you maintain that you discussed with Mr. McNamara and/or his CFO that wasn't part of what you just described as part of the GlidePath project?

A. Sure. So different -- different configurations and setups for that. You don't -- you don't necessarily have to be like a behind the meter load in order to utilize a strategy like that to determine wind power pricing makes sense when it doesn't or other, you know, other grid directives that might come through.

Q. So did you -- did you talk about any specifics? Had you already modeled that stuff at that point?

A. I modeled some of it. I modeled all of the settlement locations at that point, yeah.

Q. When you say "modeled all of the settlement locations," what do you mean?

A. So you can essentially take down the power price at each settlement location within a grid.

Q. That's publicly available; right?

A. Publicly available data.

Q. Yeah.

A. Yep. And then utilizing, you know, different configurations and kind of some of the break-even calculations around the machines within your build

determine when it's most profitable to effectively mine Bitcoin at that location or utilize the power and sell it back to the grid but in both the day-ahead and real-time markets.

Q. In the context you're talking about, who sells the power back to the grid?

A. Variety of different options there. It could be the generator sells the power back. It could be the mining facility sells the power back. It could be a different market participant depending on the ISO.

Q. And what we've just been discussing, is that part of what you maintain you talked to Mr. McNamara about regarding how load can be controlled to maximize profitability?

A. Yes.

Q. So anything else other than what we just -- so how -- in your memory, how specific were you with your discussions with Mr. McNamara and his CFO?

A. Extremely specific.

Q. What do you mean by that?

A. I -- I shared with them how to design database tables for a miner management system that could effectively pull in individual data from individual miners that were mapped to PDUs and relays within the

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build to determine what the break-even cost is there, and then the power distribution unit and control system could at the same time toggle relays on or off or send a command to the miner to, you know, power on or power off or stop mining or change the mode which it's operating depending upon the power and price and things of that nature.

Q. And you did -- you did all of this over dinner?

A. Yeah. Almost like huddled up at the end of the table, yeah.

Q. Did anybody else hear these conversations?

A. Not to my knowledge, no.

Q. Did Mr. McNamara or his CFO, to your knowledge, have an understanding of what they told you was confidential?

A. They didn't really share anything with me that I would -- I would think that they believed would be confidential.

Q. So you don't know one way or the other?

A. Yeah, I don't know what they consider to be confidential.

Q. And from my understanding of this case, you believe that what you shared with them was confidential;

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is that right?

A. Yes.

Q. Did you tell them that?

A. I think it's -- it's understood in that conversation and the -- the -- I guess how it takes place. I don't remember if I specifically told them to not tell anybody about this or -- or to keep it confidential and between us.

Q. Well, I understand that you may feel it -- you may feel it's understood. Do you have any recollection of telling Mr. McNamara or his CFO that it was confidential?

A. I imagine that I did because of the detail in which I went in, but I can't say either yes or no that I remember me saying don't tell anyone about this and this is confidential information.

Q. So what happened next at the dinner?

A. That was pretty much the conclusion of the dinner. I mean for the majority of the dinner I -- I talked and McNamara and his CFO just kind of listened. Again, like you said, maybe I was in sales mode at the time, but that was -- the majority of the dinner was me going into specifications around how this worked not in theory but in practice and how it could be utilized to,

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you know, maintain the maximum economic outcome from renewable energy.

Q. Were they -- were they talking to other people?

A. No.

Q. They were just talking to you the whole time?

A. Yeah. Maybe like, again, maybe some passing conversations like I had with, you know, Quinn or Rich or Jamie but nothing -- nothing in depth.

Q. Do you remember how -- how many glasses of wine, if any, they had during the dinner?

A. No, I don't.

Q. Did you have more than one glass of wine during the dinner?

A. I might have had two, but that's -- that's typically my rule.

Q. Was this -- what was the general atmosphere like? Was it everybody was kind of celebrating, you go out to a conference, you're meeting each other, having some drinks, having a good steak?

A. Yeah, I'd say that's a decent description of it.

Q. What -- if I understand you correctly, you picked up the check?

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A. A portion of the check, yeah.

Q. Okay. Why did -- why did you choose to pick up a portion of the check?

A. It's something that I've kind of always done.

Q. Who picked up -- who else picked up the check?

A. I'm not sure who picked up the check for like the rest of the table. I remember -- I remember I picked up the check for like kind of our section, but I don't know who picked up the check for other chunks of the table.

Q. By your section, you mean who?

A. I think I picked up the check for me, McNamara's CFO, McNamara, and then I remember P.J. McAvity telling me thank you for paying for dinner.

Q. So what happened after dinner?

A. After dinner some -- some people went out to a bar. Some people went back to their hotels. I went out to a bar with Jesse Peltan, this Australian guy who I can't remember his name but he was kind of crazy. And who else was there? I think -- I think that was it.

Q. And what did you and Mr. Peltan talk about at the -- afterwards at the bar?

A. Well, we had talked about different

From: Stover, Chad <Chad.Stover@btlaw.com>
Sent: Wednesday, June 23, 2021 3:09 PM
To: Benjamin T. Horton; John R. Labbe
Cc: Nelson, Mark; Chelsea M. Murray; Mayo, Andrew C.; Ray Ricordati
Subject: RE: BearBox and Storms v. Lancium - Rule 26(f) discovery conference
Attachments: Bearbox v. Lancium - Draft Scheduling Order 6-22-21-c-c.docx; Judge Noreika letter.docx

External - This email is from an external email address outside the firm.

Ben,

Thanks for providing this and making these changes. In the attached version, I made a few minor changes that I hope won't be controversial. Here's a summary:

- Pushed the trial date back about a month because of a conflict on our end with August 2022. I also pushed back the dispositive motion deadline and pretrial conference a bit given that there was more time in schedule after moving the trial date.
- I changed the rebuttal expert report deadline from Feb. 18 to Feb 22, 2022
- I changed the RFAs to 50 and excluded RFA related solely to authenticity from this limit.
- I added a note about deposition locations. We expect we can agree to take depositions near where the witnesses live/work.

On the cover letter, please see the attached draft. We reserve the right to modify our portion in response to the arguments you add. I'm happy to put this on my letterhead after receiving your portion.

Thanks,
Chad

Chad S.C. Stover | Partner
Direct: (302) 300-3474 | Mobile: (302) 766-2932
Wilmington, DE

BARNES & THORNBURG LLP

From: Benjamin T. Horton <bhorton@marshallip.com>
Sent: Tuesday, June 22, 2021 5:36 PM
To: Stover, Chad <Chad.Stover@btlaw.com>; John R. Labbe <jlabbe@marshallip.com>
Cc: Nelson, Mark <mnelson@btlaw.com>; Chelsea M. Murray <cmurray@marshallip.com>; Mayo, Andrew C. <AMayo@ashbygeddes.com>; Ray Ricordati <rricordati@marshallip.com>
Subject: [EXTERNAL]RE: BearBox and Storms v. Lancium - Rule 26(f) discovery conference

Hi Chad,

I attach a revised proposed schedule, consistent with our call this morning. For clarity, we accepted all previous edits, and new changes are now in redline. As you requested, we moved up the trial date by two months to August 2022. We reconfigured a few of the intermediate deadlines, but maintained the spacing that we all agree is appropriate. As you suggested, we removed the claim construction dates, leaving only the August 27, 2021 deadline, a promise to inform the

Court of the parties' decision and, if Markman is necessary, that the parties will propose a claim construction schedule for the Court's consideration.

We left the RFA limit at 25, but we will agree that the limit does not apply to authentication RFAs. If that doesn't address your request to increase the limit to 50 RFAs, let me know and we can work something out.

This should address all issues with this proposal. We look forward to your confirmation that Defendants will raise bifurcation with Judge Noreika by cover letter and, if so, that we will receive your portion of that letter the first half of tomorrow.

Best regards,
Ben

From: Stover, Chad <Chad.Stover@btlaw.com>
Sent: Monday, June 21, 2021 5:02 PM
To: John R. Labbe <jlabbe@marshallip.com>; Benjamin T. Horton <bhorton@marshallip.com>
Cc: Nelson, Mark <mnelson@btlaw.com>; Chelsea M. Murray <cmurray@marshallip.com>; Mayo, Andrew C. <AMayo@ashbygeddes.com>; Ray Ricordati <rricordati@marshallip.com>
Subject: RE: BearBox and Storms v. Lancium - Rule 26(f) discovery conference

External - This email is from an external email address outside the firm.

John,

Today got away from me. Noon ET tomorrow works. I'll look forward to speaking with you then.

Thanks,
Chad

Chad S.C. Stover | Partner
Direct: (302) 300-3474 | Mobile: (302) 766-2932
Wilmington, DE

BARNES & THORNBURG LLP

From: John R. Labbe <jlabbe@marshallip.com>
Sent: Monday, June 21, 2021 3:04 PM
To: Stover, Chad <Chad.Stover@btlaw.com>; Benjamin T. Horton <bhorton@marshallip.com>
Cc: Nelson, Mark <mnelson@btlaw.com>; Chelsea M. Murray <cmurray@marshallip.com>; Mayo, Andrew C. <AMayo@ashbygeddes.com>; Ray Ricordati <rricordati@marshallip.com>
Subject: [EXTERNAL]Re: BearBox and Storms v. Lancium - Rule 26(f) discovery conference

Chad,

Ben isn't available this afternoon, but I could talk at either 4:30 or 5:00 ET. We're also available at noon ET tomorrow and other times tomorrow, as well, if necessary.

Please let us know when you would prefer to talk.

John

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

BEARBOX LLC and AUSTIN STORMS, Plaintiffs, v. LANCIUM LLC, MICHAEL T. MCNAMARA, and RAYMOND E. CLINE, JR., Defendants.	)	C.A. No. 21-534-MN

SCHEDULING ORDER [NON-PATENT; JURY TRIAL]

This day of _____, the Court having conducted an initial Rule 16(b) scheduling conference pursuant to Local Rule 16.1(b), and the parties having determined after discussion that the matter cannot be resolved at this juncture by settlement, voluntary mediation, or binding arbitration;

IT IS ORDERED that:

1. Rule 26(a)(1) Initial Disclosures and E-Discovery Default Standard.

Unless otherwise agreed to by the parties, the parties shall make their initial disclosures pursuant to Federal Rule of Civil Procedure 26(a)(1) within five (5) days of the date the Court entered this Order. If they have not already done so, the parties are to review the Court's Default Standard for Discovery, Including Discovery of Electronically Stored Information ("ESI"), which is posted at http://www.ded.uscourts.gov (*see* Other Resources, Default Standard for Discovery) and is incorporated herein by reference.

2. Joinder of Other Parties and Amendment of Pleadings. All motions to join other parties, and to amend or supplement the pleadings, shall be filed on or before **November 1, 2021**.

Unless otherwise ordered by the Court, any motion to join a party or motion to amend the pleadings shall be made pursuant to the procedures set forth in Paragraphs 7(g) and 8.

3. Application to Court for Protective Order. Should counsel find it will be necessary to apply to the Court for a protective order specifying terms and conditions for the disclosure of confidential information, counsel should confer and attempt to reach an agreement on a proposed form of order and submit it to the Court within ten (10) days from the date the Court enters this Order. Should counsel be unable to reach an agreement on a proposed form of order, counsel must follow the provisions of Paragraph 7(g) below.

Any proposed protective order must include the following paragraph:

> Other Proceedings. By entering this order and limiting the disclosure of information in this case, the Court does not intend to preclude another court from finding that information may be relevant and subject to disclosure in another case. Any person or party subject to this order who becomes subject to a motion to disclose another party's information designated "confidential" [the parties should list any other level of designation, such as "highly confidential," which may be provided for in the protective order] pursuant to this order shall promptly notify that party of the motion so that the party may have an opportunity to appear and be heard on whether that information should be disclosed.

4. Papers Filed Under Seal. In accordance with section G of the Revised Administrative Procedures Governing Filing and Service by Electronic Means, a redacted version of any sealed document shall be filed electronically within seven (7) days of the filing of the sealed document.

5. Courtesy Copies. The parties shall provide to the Court two (2) courtesy copies of all briefs and any other document filed in support of any briefs (*i.e.*, appendices, exhibits, declarations, affidavits etc.). This provision also applies to papers filed under seal. All courtesy copies shall be double-sided.

6. ADR Process. This matter is referred to a magistrate judge to explore the possibility of alternative dispute resolution.

7. Discovery. Unless otherwise ordered by the Court or agreed to by parties, the limitations on discovery set forth in the Federal Rules shall be strictly observed.

(a) Fact Discovery Cut Off. All fact discovery in this case shall be initiated so that it will be completed on or before December 14, 2021.

(b) Document Production. Document production shall be substantially complete by October 8, 2021.

(c) Requests for Admission. A maximum of fifty (50) requests for admission are permitted for each side. For clarity, this limit does not apply to requests for admission related solely to authenticity.

(d) Interrogatories.

i. A maximum of twenty-five (25) interrogatories, including contention interrogatories, are permitted for each side.

ii. The Court encourages the parties to serve and respond to contention interrogatories early in the case. In the absence of agreement among the parties, contention interrogatories, if filed, shall first be addressed by the party with the burden of proof. The adequacy of all interrogatory answers shall be judged by the level of detail each party provides (*i.e.*, the more detail a party provides, the more detail a party shall receive).

(e) Depositions.

i. Limitation on Hours for Deposition Discovery. Each side is limited to a total of thirty (30) hours of taking testimony by deposition upon oral examination.

ii. Location of Depositions. Any party or representative (officer, director, or managing agent) of a party filing a civil action in this district court must ordinarily be required, upon request, to submit to a deposition at a place designated within this district. Exceptions to this general rule may be made by order of the Court. A defendant who becomes a counterclaimant, cross-claimant, or third-party plaintiff shall be considered as having filed an action in this Court for the purpose of this provision.

(f) Disclosure of Expert Testimony.

i. Expert Reports. For the party who has the initial burden of proof on the subject matter, the initial Federal Rule of Civil Procedure 26(a)(2) disclosure of expert testimony is due on or before January 18, 2022. The supplemental disclosure to contradict or rebut evidence on the same matter identified by another party is due on or before February 18, 2022. Reply expert reports from the party with the initial burden of proof are due on or before March 8, 2022. No other expert reports will be permitted without either the consent of all parties or leave of the Court. Along with the submissions of the expert reports, the parties shall advise of the dates and times of their experts' availability for deposition.

ii. Objections to Expert Testimony. To the extent any objection to expert testimony is made pursuant to the principles announced in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579 (1993), as incorporated in Federal Rule of Evidence 702, it shall be made by motion no later than the deadline for dispositive motions set forth herein, unless otherwise ordered by the Court.

iii. Expert Discovery Cut Off. All expert discovery in this case shall be initiated so that it will be completed on or before April 13, 2022.

(g) Discovery Matters and Disputes Relating to Protective Orders.

i. Any discovery motion filed without first complying with the following procedures will be denied without prejudice to renew pursuant to these procedures.

ii. Should counsel find, after a reasonable effort pursuant to Local Rule 7.1.1 that they are unable to resolve a discovery matter or a dispute relating to a protective order, the parties involved in the discovery matter or protective order dispute shall contact the Court's Judicial Administrator to schedule an argument.

iii. On a date to be set by separate order, generally not less than four (4) days prior to the conference, the party seeking relief shall file with the Court a letter, not to exceed three (3) pages, outlining the issues in dispute and its position on those issues. On a date to be set by separate order, but generally not less than three (3) days prior to the conference, any party opposing the application for relief may file a letter, not to exceed three (3) pages, outlining that party's reasons for its opposition.

iv. The parties shall provide to the Court two (2) courtesy copies of its discovery letter and any other document filed in support of any letter (*i.e.*, appendices, exhibits, declarations, affidavits etc.). This provision also applies to papers filed under seal. All courtesy copies shall be double-sided.

v. Should the Court find further briefing necessary upon conclusion of the conference, the Court will order it. Alternatively, the Court may choose to resolve the dispute prior to the conference and will, in that event, cancel the conference.

8. Claim Construction. The parties have determined that claim construction may be necessary in this case. By August 27, 2021, the parties shall determine whether or not claim construction is necessary and further notify the Court of their decision, and if claim construction is necessary, the parties will propose a claim construction schedule for the Court's consideration.

9. Motions to Amend / Motions to Strike.

(a) Any motion to amend (including a motion for leave to amend) a pleading or any motion to strike any pleading or other document shall be made pursuant to the discovery dispute procedure set forth in Paragraph 7(g) above.

(b) Any such motion shall attach the proposed amended pleading as well as a "redline" comparison to the prior pleading or attach the document to be stricken.

10. Case Dispositive Motions.

(a) All case dispositive motions, an opening brief, and affidavits, if any, in support of the motion shall be served and filed on or before June 13, 2022. Briefing will be presented pursuant to the Court's Local Rules. No case dispositive motion under Rule 56 may be filed more than ten (10) days before the above date without leave of the Court.

(b) Concise Statement of Facts Requirement. Any motion for summary judgment shall be accompanied by a separate concise statement, not to exceed six (6) pages, which details each material fact which the moving party contends is essential for the Court's resolution of the summary judgment motion (not the entire case) and as to which the moving party contends there is no genuine issue to be tried. Each fact shall be set forth in a separate numbered paragraph and shall be supported by specific citation(s) to the record.

Any party opposing the motion shall include with its opposing papers a response to the moving party's concise statement, not to exceed six (6) pages, which admits or disputes the facts set forth in the moving party's concise statement on a paragraph-by-paragraph basis. To the extent a fact is disputed, the basis of the dispute shall be supported by specific citation(s) to the record. Failure to respond to a fact presented in the moving party's concise statement of facts shall indicate that fact is not in dispute for purposes of summary judgment. The party opposing the

motion may also include with its opposing papers a separate concise statement, not to exceed four (4) pages, which sets forth material facts as to which the opposing party contends there is a genuine issue to be tried. Each fact asserted by the opposing party shall also be set forth in a separate numbered paragraph and shall be supported by specific citation(s) to the record.

The moving party shall include with its reply papers a response to the opposing party's concise statement of facts, not to exceed four (4) pages, on a paragraph-by-paragraph basis. Failure to respond to a fact presented in the opposing party's concise statement of facts shall indicate that fact remains in dispute for purposes of summary judgment.

11. Applications by Motion. Except as otherwise specified herein, any application to the Court shall be by written motion. Any non-dispositive motion should contain the statement required by Local Rule 7.1.1.

12. Motions *in Limine.* Motions *in limine* shall not be separately filed. All *in limine* requests and responses thereto shall be set forth in the proposed pretrial order. Each party shall be limited to three (3) *in limine* requests, unless otherwise permitted by the Court. The *in limine* request and any response shall contain the authorities relied upon; each *in limine* request may be supported by a maximum of three (3) pages of argument, may be opposed by a maximum of three (3) pages of argument, and the party making the *in limine* request may add a maximum of one (1) additional page in reply in support of its request. If more than one party is supporting or opposing an *in limine* request, such support or opposition shall be combined in a single three (3) page submission (and, if the moving party, a single one (1) page reply), unless otherwise ordered by the Court. No separate briefing shall be submitted on *in limine* requests, unless otherwise permitted by the Court.

13. Pretrial Conference. On **September ___, 2022**, the Court will hold a pretrial conference in Court with counsel beginning at 10:00 a.m. The parties shall file with the Court the joint proposed final pretrial order in compliance with Local Rule 16.3(c) and the Court's Preferences and Procedures for Civil Cases not later than seven (7) days before the pretrial conference. Unless otherwise ordered by the Court, the parties shall comply with the timeframes set forth in Local Rule 16.3(d)(1)-(3) for the preparation of the joint proposed final pretrial order. The Court will advise the parties at or before the above-scheduled pretrial conference whether an additional pretrial conference will be necessary.

The parties shall provide the Court two (2) double-sided courtesy copies of the joint proposed final pretrial order and all attachments. The proposed final pretrial order shall contain a table of contents and the paragraphs shall be numbered.

14. Jury Instructions, Voir Dire, and Special Verdict Forms. Where a case is to be tried to a jury, pursuant to Local Rules 47.1(a)(2) and 51.1 the parties should file (i) proposed voir dire, (ii) preliminary jury instructions, (iii) final jury instructions, and (iv) special verdict forms seven (7) full business days before the final pretrial conference. This submission shall be accompanied by a courtesy copy containing electronic files of these documents, in Microsoft Word format, which may be submitted by e-mail to mn_civil@ded.uscourts.gov.

15. Trial. This matter is scheduled for a four (4) day jury trial beginning at 9:30 a.m. on **September __, 2022**, with the subsequent trial days beginning at 9:00 a.m. Until the case is submitted to the jury for deliberations, the jury will be excused each day at 4:30 p.m. The trial will be timed, as counsel will be allocated a total number of hours in which to present their respective cases.

The Honorable Maryellen Noreika

United State District Judge

EXHIBIT A

EVENT	DEADLINE
Submission of Joint Scheduling Order	June 24, 2021
Rule 26(a)(1) Initial Disclosures	Within 5 days of the date of the Scheduling Order
Application to Court for Protective Order	Within 10 days of the date of the Scheduling Order
Determination of Whether Claim Construction is Necessary and Advise Court	August 27, 2021
Substantial Completion of Document Production	October 8, 2021
Fact Discovery Cut-Off	December 14, 2021
Initial Expert Reports	January 18, 2022
Rebuttal Expert Reports	February 22, 2022
Reply Expert Reports	March 8, 2022
Expert Discovery Cut-Off	April 13, 2022
Case Dispositive Motions	June 13, 2022
Pretrial Conference	September ___, 2022
Trial (4-day jury)	September ___, 2022

Judge Noreika,

I write on behalf of the parties in response to the Court's direction that the parties confer on a proposed scheduling order. The parties have fundamentally different positions because they disagree about what counts are properly in the case and whether a jury trial is needed on Plaintiffs' inventorship counts. Each side states its position below. The parties request a scheduling conference to further explain their positions and answer any questions the Court may have.

Lancium's Position

This case is a narrow inventorship dispute about whether Lancium's '433 patent was based on Lancium's own work or a single email and several texts sent to Lancium's CEO by Plaintiff Austin Storms, the contents of which are predated by Lancium's own work. (D.I. 23 at pp. 27-32.) In addition to Counts I and II for correction of inventorship, Plaintiffs also allege conversion, unjust enrichment, and negligent misrepresentation (Counts III-V). The allegations in Counts III-V show that inventorship is essential to the resolution of these counts. *See* D.I. 19 at ¶ 61 (conversion: alleging Lancium's dominion over the BearBox Technology by claiming it in the '433 patent; unjust enrichment: alleging Lancium unlawfully used property by asserting inventorship over the BearBox Technology; negligent misrepresentation: alleging Lancium recklessly incorporated the BearBox Technology into a patent application). Because inventorship is essential to the resolution of these claims, they are preempted and should be dismissed. *See, e.g, Speedfit LLC v. Woodway USA, Inc.*, 226 F. Supp. 3d 149, 160 (E.D.N.Y. 2016) (dismissing conversion count because it "turn[ed] on a determination of inventorship").

The pleadings closed yesterday when Plaintiffs filed their Answer to Counterclaims one day early. Lancium plans to file a Rule 12(c) motion for judgment on the pleadings to dismiss Plaintiffs' conversion, unjust enrichment, and negligent misrepresentation counts early next week. This motion will be based on preemption and other legal deficiencies in these claims. If granted, the only remaining counts will be for correction of inventorship, to which no right to a trial by jury attaches. *See, e.g., MCV, Inc. v. King-Seeley Thermos Co.*, 870 F.2d 1568, 1570 (Fed. Cir. 1989) ("section 256 [] explicitly authorizes judicial resolution of co-inventorship contests over issued patents"). While the Federal Circuit has held that commonality between an inventorship claim and a fraud claim required a trial by jury, *Shum v. Intel Corp.*, 499 F.3d 1272, 1279 (Fed. Cir. 2007), this is a different case without a fraud claim. And, in any event, Plaintiffs' other claims should be dismissed as preempted.[1]

Recognizing that it will take time to brief Lancium's motion and for the Court to decide it, Lancium proposes that the Court should allow the parties to continue discovery on the inventorship

[1] During the parties' meet and confer, Plaintiffs took the position that a jury trial is needed on all counts and a full schedule through trial should be entered now. Despite the fact that inventorship is an equitable issue, Plaintiffs contended that they have a right to a jury trial on inventorship because of factual issues in common with their conversion, unjust enrichment, and negligent misrepresentation counts. This factual commonality, however, only reinforces that Plaintiffs' conversion, unjust enrichment, and negligent misrepresentation claims are preempted by federal law and should be dismissed.

issue that has already begun and convene a scheduling conference after the Court's decision on Lancium's motion. Lancium believes this is the most efficient path forward.

While Lancium believes considering and entering a scheduling order after a decision on its motion is the most efficient path forward, the parties met and conferred and jointly submit the proposed schedule attached to this letter. If the Court decides to issue a full scheduling order now, Lancium agrees to the attached scheduling proposal while reserving the right to seek to amend that schedule depending on the outcome of its motion. For instance, if inventorship is the only surviving claim, Counts I and II could and should be tried to the bench on an abbreviated schedule.

III. ARGUMENT

A. The Court Should Adopt Defendants' Proposed Claim Constructions

1. Plaintiffs' Attempt To Avoid Claim Construction Is Meritless And Invites Reversible Error.

The inventorship analysis, like an infringement or invalidity analysis, "first ***requires*** the construction of each disputed claim to determine the subject matter encompassed thereby." *Gemstar-TV Guide Int'l, Inc. v. Int'l Trade Comm'n*, 383 F.3d 1352, 1381-82 (Fed. Cir. 2004) (emphasis added). Where, as here, "reliance on a term's 'ordinary' meaning does not resolve the parties' dispute," the court, not the jury, ***must resolve that dispute***." *O2 Micro Int'l Ltd. v. Beyond Innovation Tech. Co*., 521 F.3d 1351, 1360-61 (Fed. Cir. 2008) (emphasis added).

Here, the parties' dispute the plain and ordinary meaning of the terms "power option agreement" and "minimum power threshold." The '433 patent describes and claims systems and methods that, among other things, help stabilize the power grid by utilizing "a power option agreement" and a "set of minimum power thresholds" to give a power entity the ability to balance power supply with demand. As discussed in Defendants' Opening Brief (D.I. 149 at 3-5), the claimed system does this by giving a power entity (such as a grid operator) the "option" (through a "power option agreement") to control a load by giving the power entity the ability to instruct the load to reduce the amount of power it is using (i.e., "curtail" the load). D.I. 151, Ex. 17 at 43:46-44:35; 59:2-62:38. To make that option possible, the load (per the power option agreement) is required to use a specified amounts of power (*i.e*., "minimum power thresholds") over specified time periods, regardless of whether it is profitable for the load to use that power.[2] *Id.* at 43:57-44:2. By giving the power entity the ability to reduce the amount of power used by the load, the

[2] This is also consistent with Plaintiffs' expert, Frank McCamant's explanation of the requirements of agreements to provide ancillary services for ERCOT." Ex. 33 at 59:1-13; 65:4-13.

power entity can make this now unused power available to the grid for use by others and thus provide stability to the grid during times of emergency when demand for power may exceed supply. *Id*.

Storms' "system" (actually a simulation of a system) is completely different. As Dr. McClellan concedes, Storms' "system"[3] was designed to maximize profits for the Bitcoin miner by determining a breakeven mining price: "[I]t's [Storms' simulation/system] focusing on ways to make positive dollars by choosing a performance strategy that enhances the choice of mining versus sell back." Ex. 30 at 235:9-239:10. Storms' "system" (as described in the May 9, 2019 email and attachments he sent McNamara) ***does not teach*** that the system must use a minimum amount of power under any circumstances, much less if it is not profitable to do so. *See* Ex. 30 at 235:19-236:18 (testifying Storms' system "doesn't teach that"); *see also* 236:19-239:10 (explaining Storms' simulation is designed only to use power to mine Bitcoin when it is profitable to do so and the simulation ignores the allegedly "nonsensical case" of using power when it would not be profitable to mine)).[4]

Plaintiffs, through their expert Dr. McClellan, attempt to circumvent these differences by proffering purported plain and ordinary meanings for "power option agreement" and "minimum power threshold" that are completely at odds with the specification and with how one of ordinary skill in the art would understand these terms in the context of the intrinsic evidence. For example, Dr. McClellan's plain and ordinary meaning of "power option agreement" reads out the option: a "power option agreement" is "a contract to buy power at a certain price" ("essentially the same

[3] Dr. McClellan indicates that the "system" in this context is the Bitcoin mine. Ex. 30 at 216:5-217:8.

[4] Nor is there evidence that Mr. Storms' simulation/"system" could determine the amount of power it was consuming so as to be able to maintain a power consumption target equal to or greater than a minimum power threshold for a given time interval. Ex. 30 at 129:14-133:17.

as" a Power Purchase Agreement (PPA), "I don't know if power option agreement means you must consume – you must expend the power you contracted to buy … that's a question for McCamant … that's an ERCOT marketplace thing."[5] Ex. 30 at 83:3-87:1, 90:2-13, 156:3-22, 157:1-18. Similarly, with respect to "minimum power threshold," Dr. McClellan ascribes various plain and ordinary meanings to the term depending on context. When discussing the '433 patent, he asserts it means "the amount of power you're contracted to consume" (consume meaning either use, sell back, or both) but it is "a business question really … the contract amount that your going to pay – I don't think you have to use it … this is a question for Mr. McCamant … ." *Id.* at 83:21-85:8; 90:14-92. But when discussing Storms' system he asserts that "minimum power thresholds" relate to the breakeven calculation and price of Bitcoin: "the breakeven gives you the minimum power thresholds … It's [the minimum power threshold] whatever power is driving the calculation of the breakeven mining cost based on what the bitcoin mining cost bitcoin difficulty is." *Id.* at 218:23-223:9. Plaintiffs' Opposition, moreover, applies yet another interpretation, asserting that the plain and ordinary meaning is "the agreed upon amount of power by which the power entity may reduce power delivered to the load." D.I. 176 at 18. Thus, claim construction is needed because the meaning of claim terms cannot be twisted like a "nose of wax" to suit Plaintiffs' changing needs. *See Innova/Pure Water, Inc. v. Safari Filtration Sys., Inc.*, 381 F.3d 1111, 1117 (Fed. Cir. 2004), quoting *White v. Dunbar*, 119 U.S. 47, 51-52 (1886).[6]

[5] Mr. McCamant does not opine on the plain and ordinary meaning of any terms of the '433 patent and has not read it. Ex. 33 at 15:8-16:22.

[6] Plaintiffs' assertion that Defendants should have sought claim construction sooner is meritless. As explained in Defendants' Opening Brief, it was not until Defendants received Plaintiffs' expert reports and deposed Plaintiffs' experts that it became clear how Plaintiffs' interpreted the plain and ordinary meaning of "power option agreement" and "minimum power threshold" as used in the '433 patent and that the parties disagreed about their plain meaning. *See* D.I. 149 at 12-13. Plaintiffs provide no evidence to the contrary. Furthermore, Plaintiffs' contention that Defendants should have raised the claim construction dispute in the 32 days between the close of expert

2. Plaintiffs' Arguments Against Defendants' Construction Of "Power Option Agreement" Are Meritless.

The specification—as thoroughly addressed in Defendants' Opening Brief—"is always highly relevant to the claim construction analysis." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1315 (Fed. Cir. 2005) (en banc). Put differently, "the ordinary meaning of a claim term is not 'the meaning of the term in the abstract.' … [rather] the 'ordinary meaning' of a claim term is its meaning to the ordinary artisan after reading the entire patent." *AstraZeneca AB v. Mylan Pharm. Inc.*, 19 F.4th 1325, 1330 (Fed. Cir. 2021). Plaintiffs' Opposition largely ignores the specification, and instead posits three meritless, easily-dispelled criticisms of Defendants' construction.[7]

First, Plaintiffs assert that Defendants' construction is "internally inconsistent because it does not allow for scenarios in which the option is exercised by a power entity." D.I. 176 at 17. Not so. As Defendant's Opening Brief makes clear, a key aspect of a power option agreement is that it gives the power entity the "option" to reduce the amount of power used by the load. Defendants' proposed construction explicitly explains, *inter alia*, that a power option agreement "provides the power entity with the option to reduce the amount of power delivered to the load." Nonetheless, Defendants would not oppose a construction (adding the underlined portion below) that "power option agreement" means "an agreement between a power entity associated with the delivery of power to a load and the load, wherein the load provides the power entity with the option

discovery and the summary judgment deadline is misplaced. Summary judgment was the most efficient and practical way for the Court to timely resolve the dispute. And Plaintiffs do not and cannot dispute that claim construction may properly be conducted as part of the summary judgment process. *Compare* D.I. 149 at 11 (citing *Level Sleep LLC v. Sleep No. Corp.*, No. 2020-1718, 2021 WL 2934816, at *3 (Fed. Cir. July 13, 2021), *with* D.I. 176 at 15-17.

[7] Plaintiffs' assertion that Defendants' expert, Dr. Ehsani "performs no claim construction of his own" is also a mischaracterization. D.I. 176 at 17. Dr. Ehsani did analyze and apply the meaning of "power option agreement" and "minimum power threshold" as used in the '433 patent. *See, e.g.*, Ex. 41 at ¶¶ 44, 106-109.

to reduce the amount of power delivered to the load up to an agreed amount of power during an agreed upon time interval such that the load must use at least the amount of power subject to the option during the interval unless the power entity exercises the option."

Second, Plaintiffs assert that Defendants' construction is "inconsistent with the remaining language of the claim" because allegedly "[t]he claim itself defines the 'power option agreement' in terms of its 'data,' which includes 'minimum power thresholds.'" D.I. 176 at 17-18. Plaintiffs thus contend that any construction of "power option agreement" should "continue to use the term 'minimum power threshold'" so that these terms are not applied inconsistently. *Id.* at 18. Plaintiffs' are again wrong. To begin, Plaintiffs' argument is inconsistent with its own expert's proposed plain and ordinary meaning for "power option agreement," which does not include "minimum power thresholds." Ex. 30 at 83:3-87:1; 90:2-13; 156:3-22; 157:1-18. Also, the claim does not define "power option agreement" in terms of its "data." Rather, the claim makes clear that the "power option data" is supplied "at least in part" based on a "power option agreement." A patentee's use of different words in a patent's claim creates a presumption that those different words have different meanings. *See, e.g.*, *Wilson Sporting Goods Co. v. Hillerich & Bradsby Co.*, 442 F.3d 132, 1328 (Fed. Cir. 2006). Finally, although Plaintiffs assert any construction of "power option agreement" should include "minimum power threshold," they also argue that "the plain meaning of minimum power threshold is recited in the claim itself: the amount of power subject to the power option agreement." D.I. 176 at 18. Thus, they propose circular meanings that refer to each other, but this circular reasoning "constitutes improper claim construction." *ACTV, Inc. v. Walt Disney Co.*, 346 F.3d 1082, 1090 (Fed. Cir. 2003); *see also Univ. of Fla. Rsch. Found. v. Motorola Mobility, LLC*, 3 F. Supp. 3d 1374, 1377 (S.D. Fla. 2014).

Finally, Defendants' construction is not "inconsistent with the specification." D.I. 176 at

18. To the contrary, as thoroughly explained in Defendants' Opening Brief, Defendants' construction is based explicitly on the specification's definition of the term, which, as discussed below, would permit a minimum power threshold of zero for some time intervals.

3. Plaintiffs' Arguments Against Defendants' Construction Of "Minimum Power Threshold" Are Meritless.

Plaintiffs' assertion in their Opposition that the "plain meaning" of "minimum power threshold" is "the amount of power subject to the power option agreement, *i.e*. the agreed amount of power by which the power entity may reduce power delivered to the load" seeks to eliminate the clear requirement that the "minimum power threshold" is an amount of power the load must use.[8] As set forth in Defendants' Opening Brief, the specification repeatedly emphasizes this aspect of the term's meaning. For example, the specification states:

> "As part of the power option agreement, the load (e.g., load operator, contracting agent for the load, semi-automated control system associated with the load, and/or automated control system associated with the load) provides the power entity 1140 with the right, but not obligation, to reduce the amount of power delivered (e.g., grid power) to the load up to an agreed amount of power during an agreed upon time interval. In order to provide the power entity 1140 with this option, the load needs to be ***using*** at least the amount of power subject to the option (e.g., a ***minimum power threshold***)." D.I. 151, Ex. 17 at 43:50-60 (emphasis added).

Similarly, the specification further explains that:

> "To illustrate an example, a power option agreement may specify that a load (e.g., the datacenters 1102-1106) is required to use at least 10 MW or more at all times during the next 12 hours. Thus, the ***minimum power threshold*** according to the power option agreement is 10 MW and this minimum threshold extends across the time interval for the next 12 hours. In order to comply with the agreement, the load must subsequently operate ***using*** 10 MW or more power at all times during the next 12 hours." D.I. 151, Ex. 17 at 44:17-25 (emphasis added).

Plaintiffs' assertions that Defendants' construction is "internally inconsistent" and

[8] And as explained above, their expert Dr. McClellan applies different alleged "plain and ordinary" meanings of "minimum power threshold." Those interpretations also seek to eliminate the use requirement.

"inconsistent with the language of the claim" are baseless and Plaintiffs provide no explanation in support of these assertions. And again Plaintiffs' circular position that the constructions of "power option agreement" and "minimum power threshold" should each include the other term, is wrong and would improperly inject ambiguity into the claims. *See ACTV*, 346 F.3d at 1090; *Univ. of Fla. Rsch. Found.*, 3 F. Supp. 3d at 1377. Finally, Plaintiffs argue that Defendants' construction fails because it does not permit the minimum power threshold to be zero for the entire duration of the power option agreement. But the portions of the specification cited by Plaintiffs refer only to the minimum power threshold being zero for a time interval during the duration of the power option agreement, not for all time intervals during the duration of the power option agreement. D.I. 176 at 18-19 (citing specification). Defendants' proposed construction contemplates and allows the minimum threshold to be zero (or not specified) for certain time intervals, as further discussed in the next sections.

B. Plaintiffs' Sole Inventorship Claim Fails As A Matter Of Law

1. Plaintiffs' Attempt To Rely On Attorney Argument Rather Than Actual Evidence To Avoid Summary Judgment Should Be Rejected.

Although Plaintiffs argue against summary judgment on their sole inventorship claim by repeatedly asserting that there are genuine issues of material fact, notably absent from their eight pages of argument is any evidence to support their position. This is unsurprising because Plaintiffs' inventorship claims are based on a fundamental misinterpretation of the '433 patent and its claims. Thus, Plaintiffs must rely on pure attorney argument for their contention that Storms' conceived of and communicated the inventions of the '433 patent as properly construed. But this is insufficient to avoid summary judgment.[9]

[9] Moreover, although they acknowledge that "[t]o prevail on sole inventorship at trial, Plaintiffs must prove (1) that Storms independently conceived the inventions claimed in the '433 Patent, and (2) that he communicated those inventions to Defendants" (D.I. 176 at 14), Plaintiffs' expert Dr.

established?
A. No.
Q. Do you know whether or not cryptocurrency market prices are real-time prices?
A. No. 09:16
Q. You're not -- you are not an expert on data centers that may be used to mine cryptocurrencies, correct?
MR. HORTON: Objection to form.
A. Can you repeat the question, please? 09:16
Q. You are not an expert on data centers that may be used to mine cryptocurrencies, correct?
A. I'm -- I'm not an expert, but I do have a rudimentary understanding of how data centers operate.
Q. Can you explain your understanding of how data 09:16 centers operate?
A. Well, my understanding is data centers are large computing centers that require a lot of, uh, electrical power. Uh, so they are large load and that data centers may or may not be able to have, uh, control systems that 09:17 would allow them to respond to different signals that could, uh, change their load settings.
Q. What do you mean by load settings?
A. Uh, power consumption.
Q. Do you understand that in this case 09:18

Austin Storms claims that he is either a sole or a joint inventor of U.S. Patent No. 10608433, which is also referred to as the '433 Patent?
MR. HORTON: Objection, form.
A. Those details about Mr. Storm I do not -- I'm 09:18 not aware of. I'm aware that he's the -- the, uh, plaintiff in this case.
Q. You are not offering any opinions regarding who invented U.S. Patent No. 10608433, also called the '433 Patent, right? 09:18
A. I am not.
Q. If I refer to the '433 Patent, do you understand that I'm referring to U.S. Patent No. 10608433?
A. I don't -- I don't know what patent that is.
Q. Have you reviewed any patents as part of your 09:19 work on this case?
A. I have not.
Q. You do not cite to any patents in the reports you offered in this case, correct?
A. That is correct. 09:19
Q. And you are not relying on any patents for any of the opinions that you are offering in this case, right?
A. That's correct.
Q. You have not read the prosecution history of any 09:19

patents as part of your work in this case, correct?
A. I have not.
Q. You are not relying on the prosecution history of any patents for the opinions that you're offering in this case, correct? 09:20
A. That is correct.
Q. You are not offering any opinions on the meaning of any terms used in patents in this case, correct?
A. That is correct.
Q. You are not offering any opinions on what a 09:20 power option agreement is as used in the '433 Patent in this case, correct?
A. That is correct.
Q. You are not offering any opinions on what power option data is as used in the '433 Patent in this case, 09:21 correct?
A. That is correct.
Q. You are not offering any opinions regarding whether or not Michael McNamara, Ray Cline, or Lancium converted any property owned by Mr. Storms or BearBox, 09:21 correct?
A. That is correct.
Q. You were retained by Austin Storms and BearBox in this case, right?
A. Through their legal counsel, yes. 09:22

Q. When were you retained in this case?
A. Uh, I don't remember the exact date. It was the first of this year.
Q. It was January 1st of this year?
A. Some -- somewhere around the first of this year. 09:22 I don't remember the exact date.
Q. Did you begin working on this case around the first of January, 2022?
A. Uh, yes, I believe so sometime in that month, to the best of my memory. 09:22
Q. You are being paid $300 an hour for your work on this case, correct?
A. That's correct.
Q. Is $300 per hour your standard billing rate?
A. For this type of work it is. 09:23
Q. When you say for this type of work, what do you mean?
A. Well, in terms of, uh, doing expert testimony.
Q. Do you have a different rate that you charge for other types of work? 09:23
A. Uh, well, it depends on what the work is. I have some clients that are on a retainer type of, uh, contract.
Q. Are you paid an hourly rate for any consulting work that you do separate from litigation work? 09:23

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On Mon, May 6, 2019 at 3:17 PM Todd Garland <todd@buysellads.com> wrote:

> Hi Austin,
>
> I hope you had a nice time in Boston last week. It was great to put a face to the name and meet in person.
>
> Question about the sheets... what do you factor into the "breakeven_mining_cost"? Is it _all_ of the costs (hardware, labor, etc etc) or something else with less subjectivity to it (e.g. the amortization period of the hardware is definitely subjective)?
>
> Do you have a sense what it would take cost wise to get your PDU's certified?
>
> - Todd
>
> Austin Storms wrote on 5/3/19 3:51 PM:
>
> See attached.
>
> Begin forwarded message:
>
> **From:** Austin Storms <austin@bearbox.io>
> **Date:** May 3, 2019 at 12:15:58 PM EDT
> **To:** Austin Storms <austin@bearbox.io>
> **Cc:** Ben Hakes <ben@paretoadvisors.com>
> **Subject: EXELON DATA MODELING DUMP 2**
>
> See attached.
>
> Austin M. Storms
> BearBox, LLC
> 611 O' Keefe Avenue
> New Orleans, LA 70113
> austin@bearbox.io
>
> CONFIDENTIALITY NOTICE: This email communication may contain private, confidential, or legally privileged information intended for the sole use of the designated and/or duly authorized recipient(s). If you are not the intended recipient or have received this email in error, please notify the sender immediately by email and permanently delete all copies of this email including all attachments without reading them. If you are the intended recipient, secure the contents in a manner that conforms to all applicable state and/or federal requirements related to privacy and confidentiality of such information.

43. I note that Dr. McClellan did not perform any claim construction. Instead, he applied the "plain and ordinary meaning of the claim terms." (McClellan Report, at ¶ 49). But Dr. McClellan did not provide his understanding of the "plain and ordinary meaning" for any claim terms. I understand that Plaintiffs have the burden of proof on the inventorship issue.

44. To determine conception, I also apply the plain and ordinary meaning of the claim terms as would have been understood by a POSITA and, for certain terms, I discuss the specification's use of those terms. I reserve the right to supplement my report should Plaintiffs' or any of Plaintiffs' experts use a different construction, or provide their understanding of the plain and ordinary meaning that is different than my understanding of the plain and ordinary meaning.

VII. LANCIUM INDEPENDENTLY DEVELOPED, CONCEIVED, AND REDUCED ITS TECHNOLOGY TO PRACTICE, INCLUDING EACH OF THE INVENTIONS CLAIMED IN THE '433 PATENT

45. It is my opinion that Lancium independently developed, conceived, and reduced its technology to practice, including each of the inventions claimed in the '433 patent, and that such development, conception, and reduction to practice did not involve the use of any information allegedly provided to Mr. McNamara by Mr. Storms. As discussed above, my opinions are based on, among other things, my review of: (1) pleadings; (2) the '632 application and the '433 patent and its file history; (3) the parties' Responses to Discovery (including documents cited in those responses); (4) the deposition testimony from this case and exhibits cited in same; (5) my review of other documents and materials; (6) the communications between Mr. Storms and Mr. McNamara; and (7) my education and forty-plus years of experience. I also relied in part on Mr. Siddiqi's analysis as set forth in his report, and Mr. Baer's analysis of the source code produced by Mr. Storms and relied upon by Dr. McClellan as discussed in Mr. Baer's report.

monetary consideration.[104] The power entity may use the power option agreement to reserve the right to reduce the amount of grid power delivered to the load during a set time frame such as when the grid power may be better directed to other loads.[105]

108. The remote master control system can serve as a control system to the load and can do so by, for example, monitoring conditions[106] in concert with the minimum power thresholds and time intervals set forth in (or derived from) the power option agreement (*e.g.*, power option data) to determine performance strategies and issue instructions based on those strategies that enable the load to meet the expectations of the power option agreement while efficiently using power to accomplish computational operations.[107] The patent explains that the power entity may be a grid operator, local station control system, power generation source, or a qualified scheduling entity (QSE).[108]

109. The patent explains that power option agreements may be fixed duration power option agreements or dynamic power option agreements.[109] Referring to Figure 12 (below), which represents power option data based on a fixed duration power option agreement, the dark, multi-level line distinguishing the more darkly-shaded area represents the minimum power thresholds in

[104] *Id.* at 43:65-44:2.

[105] *Id.* at 44:3-35.

[106] The patent provides examples of monitored conditions, including, but not limited to, power availability, power prices, computing system parameters, cryptocurrency prices, computational operation parameters, and weather conditions. *Id*. at 47:57-48:61.

[107] *Id.* at 45:5-21.

[108] *Id.* at 45:52-60; 46:20-30.

[109] *See generally* Columns 46-47; *see also* 50:53-51:7

I. INTRODUCTION

The unsupported factual allegations in Plaintiffs' Brief in Opposition to Defendants' First Motion for Summary Judgment (Plaintiffs' "Opposition," D.I. 176) are a work of fiction that would make J.K. Rowling proud. Through cherry-picked citations, strategic omissions, and attributing functionality to Storms' alleged technology that is in no way supported by the evidence, Plaintiffs' Opposition incorrectly portrays Lancium as a struggling company that allegedly resurrected itself by converting and patenting Storms' "technology." The non-fiction version is different, but rather than address every misstatement and omission, Defendants focus on the issues important to deciding this motion.

Plaintiffs first attempt to avoid summary judgment by arguing that no claim construction is necessary for the terms "power option agreement" and "minimum power threshold" and fault Defendants for raising the issue in the context of summary judgment. *See* D.I. 176 at 15-19. But it was only during the deposition of Plaintiffs' expert, Dr. McClellan, that Defendants learned Plaintiffs' proposed plain and ordinary (and often contradictory) meanings of these terms. *See, e.g.*, Ex. 30 at 83:5-10; 90:2-13; 156:3-22; 157:1-18 (discussing "power option agreement") 83:21-85:8; 90:14-92:24; 154:21-156:24; 218:23-223:9 (discussing "minimum power thresholds"). Prior to that deposition, Plaintiffs had failed to disclose the plain and ordinary meaning of these terms in discovery, their experts' reports, and even in their Opposition (which fails to actually provide Plaintiffs' understanding of the plain and ordinary meaning of "power option agreement"). Defendants also learned during Dr. McClellan's deposition that Plaintiffs' plain and ordinary meanings are completely at odds with the '433 patent's specification and claims. The Court, therefore, should resolve the legal meaning of these disputed terms.

Plaintiffs next advance a variety of arguments relating to whether Storms conceived the systems and methods of the '433 patent, communicated these inventions to McNamara, and

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September 29, 2022

The Honorable Gregory B. Williams
United States District Court
844 N. King Street
Wilmington, DE 19801

VIA ELECTRONIC FILING

Re: *Bear Box LLC, et al. v. Lancium LLC, et al.,*
C.A. No. 21-534- GBW-CJB

Dear Judge Williams:

I write on behalf of Plaintiffs BearBox LLC and Mr. Austin Storms in response to Defendants' letter to Your Honor dated September 28, 2022, renewing Defendants' request for oral argument on their summary judgment motions and noting that "the Court has not previously conducted claim construction in this case." D.I. 209.

What Defendants letter omits, however, is that the Court has not previously conducted claim construction because Defendants said it was not necessary, and even opposed Plaintiffs' request to extend the deadline by which to advise the Court of a claim construction dispute. D.I. 54 ("Defendants do not believe claim construction will be needed, and Defendants oppose Plaintiffs' attempt to extend the deadline in Paragraph 8 of the Scheduling Order until October 15, 2021."). At no point subsequent to that letter, prior to summary judgment, did Defendants change their position or notify the Court that claim construction was, in fact, needed.

Plaintiffs do not agree that Defendants are now entitled to raise a claim construction dispute, nor that there is even a genuine claim construction dispute that needs to be resolved, as set forth in Plaintiffs' summary judgment opposition brief. D.I. 176 at 15-19. Alternatively, if there is a dispute about a claim term, the parties have briefed the dispute in their summary judgment briefs, and any dispute can be resolved on the papers.

Should the Court wish to hear oral argument on summary judgment, Plaintiffs are available at the Court's convenience.

Respectfully,

/s/ Andrew C. Mayo

Andrew C. Mayo (#5207)

cc: All counsel of record (via electronic mail)

{01841881;v1 }

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

BEARBOX LLC and AUSTIN STORMS, Plaintiffs, v. LANCIUM LLC, MICHAEL T. MCNAMARA, and RAYMOND E. CLINE, JR., Defendants.	Civil Action No. 21-534-GBW

MEMORANDUM OPINION

This action stems from a dispute regarding the proper inventorship of U.S. Patent No. 10,608,433 ("the '433 patent"), as well as other related state-law claims. *See generally* D.I. 103. On March 16, 2022, Defendants Lancium LLC, Michael T. McNamara, and Raymond E. Cline, Jr. (collectively, "Lancium") filed a motion, under Federal Rule of Civil Procedure 12(b)(6), to dismiss Plaintiffs BearBox LLC's and Austin Storms's (collectively, "BearBox") conversion and unjust enrichment claims from BearBox's Second Amended Complaint (the "Motion"). D.I. 120. The parties briefed the issues and Magistrate Judge Burke heard oral argument on May 23, 2022. *See, e.g.*, D.I. 121; D.I. 128; D.I. 133; D.I. 136. On May 26, 2022, Magistrate Judge Burke issued a Report and Recommendation (the "Report") recommending that the Court grant-in-part Lancium's Motion and dismiss BearBox's unjust enrichment claim (Count VI) but deny Lancium's Motion as to BearBox's conversion claim (Count V). D.I. 143. Lancium filed objections to the Report on June 9, 2022 (D.I. 146), and BearBox filed its response to the objections on June 23, 2022 (D.I. 158).

a. Legal Standard

To state a claim on which relief can be granted, a complaint must contain "a short and plain statement of the claim showing that the pleader is entitled to relief . . . ." Fed. R. Civ. P. 8(a)(2). Such a claim must plausibly suggest "facts sufficient to 'draw the reasonable inference that the defendant is liable for the misconduct alleged.'" *Doe v. Princeton Univ.*, 30 F.4th 335, 342 (3d Cir. 2022) (quoting *Ashcroft v. Iqbal*, 556 U.S. 662, 678 (2009)) (citing *Bell Atl. Corp. v. Twombly*, 550 U.S. 544, 557 (2007)). "A claim is facially plausible 'when the plaintiff pleads factual content that allows the court to draw the reasonable inference that the defendant is liable for the misconduct alleged.'" *Klotz v. Celentano Stadtmauer & Walentowicz LLP*, 991 F.3d 458, 462 (3d Cir. 2021) (quoting *Iqbal*, 556 U.S. at 678). However, the Court will "'disregard legal conclusions and recitals of the elements of a cause of action supported by mere conclusory statements.'" *Princeton Univ.*, 30 F.4th at 342 (citation omitted).

"'The issue is not whether a plaintiff will ultimately prevail but whether the claimant is entitled to offer evidence to support the claims.'" *Pinnavaia v. Celotex Asbestos Settlement Tr.*, 271 F. Supp. 3d 705, 708 (D. Del. 2017) (quoting *In re Burlington Coat Factory Sec. Litig.*, 114 F.3d 1410, 1420 (3d Cir. 1997)), *aff'd*, 2018 WL 11446482 (3d Cir. Apr. 6, 2018). "A motion to dismiss 'may be granted only if, accepting all well-pleaded allegations in the complaint as true, and viewing them in the light most favorable to plaintiff, plaintiff is not entitled to relief.'" *McCrone v. Acme Markets*, 561 F. App'x 169, 172 (3d Cir. 2014) (quoting *Burlington Coat Factory*, 114 F.3d at 1420).

b. Unjust Enrichment

The Report recommended dismissing BearBox's unjust enrichment claim (Count VI) with prejudice because BearBox has pled the existence of other remedies at law, which precludes a

claim of unjust enrichment. D.I. 143. Neither party objects to this part of the Report. D.I. 143; D.I. 158. Thus, to accept the Report's findings, the Court need only satisfy itself that there "is no clear error on the face of the record." FED. R. CIV. P. 72(b) Advisory Committee Notes.

Accordingly, the Court agrees with the Report's conclusion. Under Louisiana law, which both parties agree applies to BearBox's state law claims (*see* D.I. 92 at 5 n.4), unjust enrichment is an equitable claim that is "only applicable to fill a gap in the law where no express remedy is provided." *Walters v. Medsouth Record Mgmt. LLC*, 38 So. 3d 243, 244 (La. 2010) (quoting *Mouton v. State*, 525 So.2d 1136, 1142 (La. App. 1st Cir. 1988)). However, and as the Report correctly notes, BearBox has pled another type of legal remedy—damages for Lancium's purported conversion of BearBox's technology—for the same conduct that is at issue in its unjust enrichment claim. D.I. 103 at ¶¶ 84-90. Thus, BearBox is precluded from seeking an unjust enrichment remedy for that conduct regardless of whether it is ultimately unable to pursue its remedy for conversion in this proceeding. *See Ferrara Fire Apparatus, Inc. v. JLG Indus.*, 581 F. App'x 440, 443-44 (5th Cir. 2014) (citing *Garber v. Badon & Rainer*, 981 So.2d 92, 100 (La. App. 3 Cir 2008) ("[I]t is not the success or failure of other causes of action, but rather the existence of other causes of action, that determine whether unjust enrichment can be applied."). BearBox's unjust enrichment claim (Count VI) is dismissed with prejudice.

c. Conversion

The Report recommended denying Lancium's Motion as to BearBox's conversion claim because BearBox has pled sufficient facts to establish the elements of conversion under Louisiana law. D.I. 143. Neither party disputes that BearBox's conversion claim is premised on the alleged conversion of electronic documents. Rather, Lancium asserts that such conduct is insufficient to establish a conversion claim under Louisiana law because "[d]eprivation of possession is a

necessary element," and BearBox was never deprived of its electronic documents. D.I. 146 at 4-5. Both parties agree that BearBox retained copies of electronic documents even after they were allegedly converted by Lancium. D.I. 103 at ¶¶ 84-90; D.I. 146 at 3; D.I. 143. Thus, the dispute centers around whether, under Louisiana law, a claim of conversion can be brought where an owner is not completely deprived of the property at issue, i.e., the owner has retained copies of the property.

BearBox contends that retaining copies of electronic documents does not negate a claim of conversion because Louisiana law broadly interprets conversion to include any unlawful interference with ownership or possession of one's movable property. *Dual Drilling Co. v. Mills Equip. Invs., Inc.*, 721 So. 2d 853, 857 (La. 1998); D.I. 158 at 5, 7. Thus, "even if a plaintiff is not completely dispossessed of all copies of its property, a defendant could still be said to have taken steps to have wrongfully deprived the plaintiff of 'ownership' of the property." D.I. 158 at 7 (quoting D.I. 143). Lancium avers that wrongful interference with a party's ownership of its property is not an independent basis for a conversion claim. D.I. 146 at 7. Rather, wrongful deprivation of one's property—which necessitates ***complete*** dispossession—is an underlying requirement for a conversion claim. *Id.* at 6 (emphasis added).

Louisiana defines conversion as "an act in derogation of the plaintiff's possessory rights, ***and*** any wrongful exercise or assumption of authority over another's goods, depriving him of the possession, permanently or for an indefinite time . . . ." *Quealy v. Paine, Webber, Jackson & Curtis, Inc.*, 475 So. 2d 756, 760 (La. 1985) (emphasis added); *see also Dileo v. Horn*, 189 So. 3d 1189, 1198 (La. Ct. App. 5 Cir. 2016) ("Conversion is committed when one wrongfully does any act of dominion over the property of another in denial of or inconsistent with the owner's rights.").

Guided by the Louisiana Supreme Court's illustrations,[1] a conversion is committed when:

> 1) possession is acquired in an unauthorized manner; 2) the chattel is removed from one place to another with the intent to exercise control over it; 3) possession of the chattel is transferred without authority; 4) possession is withheld from the owner or possessor; 5) the chattel is altered or destroyed; 6) the chattel is used improperly; or 7) ownership is asserted over the chattel.

Dual Drilling, 721 So.2d at 857 (La. 1998).

Based on the Court's review of Louisiana case law, conversion is not solely limited to instances of depriving an owner of its possessory rights in its property. Rather, conversion is a broadly defined tort that seeks to remedy "acts inconsistent with the owner's rights." *F.G. Bruschweiler (Antiques), Ltd. v. GBA Great British Antiques, L.L.C.*, 860 So. 2d 644, 649 (La. Ct. App. 5 Cir. 2003). Such acts can, and do, include wrongfully interfering with an owner's electronic documents, regardless of whether the owner has retained copies of the documents. *See Mabile v. BP, P.L.C.*, 2016 WL 5231839, at *1, *23 (E.D. La. Sept. 22, 2016) (permitting a conversion claim that was premised on the defendants obtaining plaintiff's electronic schematic although plaintiff also retained a copy). Contrary to Lancium's assertion, "deprivation of possession" is not a necessary element to conversion, but instead is one example of many enumerated by the Louisiana Supreme Court. *See, e.g., Dual Drilling*, 721 So.2d at 857 (La. 1998); *MCI Commc'ns Servs., Inc. v. Hagan*, 74 So. 3d 1148, 1154 (La. 2011).

Furthermore, the Court is not persuaded by Lancium's citation to *CamSoft Data Sys., Inc. v. S. Elecs. Supply, Inc.*, 2019 WL 2865359 (La. Ct. App. 1 Cir. 2019). *CamSoft*, a decision by the Court of Appeal of Louisiana, First Circuit, held that plaintiff's conversion claim could not

[1] Lancium is correct that "a federal court applying state law has a duty to decide a case as it believes the state's highest court would have done." D.I. 146 at 6 n. 4 (citing *Valley Forge Ins. Co. v. Jefferson*, 628 F. Supp. 502, 510 (D. Del. 1986)). Yet in the same breath, Lancium ignores binding Louisiana Supreme Court precedent illustrating seven examples where a conversion has been committed.

survive summary judgment where plaintiff retained copies of its allegedly converted property—confidential business information—and thus did not dispute that it was not completely deprived of its property. *See CamSoft*, 2019 WL 2865359, at *2-3. On this basis, Lancium extrapolates that total deprivation of an owner's possessory rights is a required element and, thus, the existence of copies vitiates a conversion claim. D.I. 146 at 6-7. The Court does not read *CamSoft*[2] so narrowly. As *CamSoft* acknowledges, Louisiana law is clear that a conversion claim can be made out not only when a party unlawfully interferes with an owner's possession of a movable, but also when a party unlawfully interferes with the party's ownership of a movable. *See CamSoft*, 2019 WL 2865359, at *2 (citing *Dual Drilling*, 721 So.2d at 856). Thus, as the Report correctly concludes, "this leaves some room for a conversion claim as to property (such as the electronic data at issue here), where, even if a plaintiff is not completely dispossessed of all copies of that property, a defendant could still be said to have taken steps to have wrongfully deprived the plaintiff of 'ownership' of the property." D.I. 143.

Accordingly, conversion under Louisiana law includes unlawfully interfering with a plaintiff's ownership of movable property regardless of whether the plaintiff retains a copy of that movable property. That is what BearBox has alleged. D.I. 103 at ¶¶ 84-90. BearBox's Second Amended Complaint asserts that Lancium took BearBox's technology that BearBox rightfully owned, wrongfully assumed dominion and control over that technology, and then improperly used

[2] Although the Court declines to harmonize *CamSoft*'s holding with Louisiana's conversion jurisprudence, the Court acknowledges BearBox's assertion that *CamSoft*'s holding—which "decline[d] to extend the tort of conversion to immovable, intangible information [in electronic form]"—appears at odds with established Louisiana precedent. D.I. 158 at 9; *cf. South Central Bell Telephone Co. v. Barthelemy*, 643 So. 2d 1240, 1246 (La. 1994) (recognizing that conversion protects digital or electronic property); *State v. Williamson*, 81 So. 3d 156 (La. Ct. App. 5 Cir. 2011) (same); *see also First Am. Bankcard, Inc. v. Smart Bus. Tech., Inc.*, 2016 WL 5869787, at *5 (E.D. La. Oct. 7, 2016) (rejecting the argument that digital information stored on the cloud is not subject to conversion under Louisiana law).

that technology in Lancium's Smart Response software, i.e., in a manner indicating to the world that they—not BearBox—owned that technology. *Id.* at ¶¶ 87-90. As such, the Court, having reviewed the record *de novo*, agrees with the Report's conclusion that BearBox has pled sufficient facts to state a claim of conversion under Louisiana law. Lancium's objection is overruled, and Lancium's Motion is denied as to BearBox's conversion claim (Count V).

The Court will issue an order consistent with this Memorandum Opinion.

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

BEARBOX LLC AND AUSTIN STORMS Plaintiffs, v. LANCIUM LLC, MICHAEL T. MCNAMARA, and RAYMOND E. CLINE, JR. Defendants.	)	C.A. No. 21-534- GBW-CJB

DEFENDANTS' MOTION FOR BIFURCATION AND
TO EXPEDITE BRIEFING AND CONSIDERATION OF THIS MOTION

Defendants Lancium LLC, Michael T. McNamara, and Raymond E. Cline Jr., ("Defendants") move to bifurcate the trial in this matter whereby the Court will first hold a bench trial on the claims of sole inventorship (Count I) and joint inventorship (Count II) followed by a jury trial on the conversion claim (Count V). The reasons for this motion are set forth in Defendants' Opening Brief, filed herewith.

Because the pretrial conference is scheduled for November 22, 2022 and trial is set to begin on December 5, 2022, just weeks away, Defendants seek expedited consideration of this motion. Defendants' propose a briefing schedule where Bearbox LLC and Austin Storms ("Plaintiffs") answering brief is due on November 7, 2022 and Defendants' reply brief is due on November 11, 2022.

The Court may recall that Plaintiffs indicated they opposed bifurcation during the October 20, 2022 hearing. Oct. 20, 2022 Hr'g Tr. at 44:2-12 & 45:11-22. Defendants understand that Plaintiffs still oppose this motion.

Dated: October 31, 2022

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IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

BEARBOX LLC and AUSTIN STORMS, Plaintiffs, v. LANCIUM LLC, MICHAEL T. MCNAMARA, and RAYMOND E. CLINE, JR. Defendants.	)	C.A. No. 21-534-GBW-CJB

[PROPOSED] ORDER GRANTING DEFENDANTS' MOTION FOR BIFURCATION

Having read and considered Defendants Lancium LLC, Michael T. McNamara and Raymond E. Cline's ("Defendants") Motion for Bifurcation (the "Motion") and Plaintiffs' Opposition to the Motion, and all parties having received due notice and an opportunity to be heard,

IT IS HEREBY ORDERED THAT:

1. The Motion is GRANTED. To the extent claims remain after the Court's ruling on the Parties' summary judgment briefing, the Court will first hold a bench trial on the claims of sole inventorship (Count I) and joint inventorship (Count II) followed by a jury trial on the conversion claim (Count V).

IT IS SO ORDERED.

Dated: _____, 2022

_____
The Honorable Gregory B. Williams
United States District Judge

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

BEARBOX LLC and AUSTIN STORMS, Plaintiffs, v. LANCIUM LLC, MICHAEL T. MCNAMARA, and RAYMOND E. CLINE, JR. Defendants.	)	C.A. No. 21-534-GBW-CJB **FILED UNDER SEAL**

DEFENDANTS' OPENING BRIEF IN SUPPORT OF THEIR
MOTION FOR BIFURCATION

Dated: October 31, 2022

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INTRODUCTION

"[Bearbox's] conversion claim is based on the theft of material that is *not* included in the '433 Patent, and therefore does *not* seek 'patent-like' relief, or turn on questions of patent inventorship or ownership." – Plaintiffs' Brief In Opposition to Defendants' First Motion For Summary Judgment (D.I. 176), at 34 (emphasis original)

A court may order separate trials on one or more issues for convenience, to avoid prejudice, or to expedite and economize. Fed. R. Civ. P. 42(b). Plaintiffs BearBox LLC and Austin Storms (collectively "Plaintiffs") originally asserted six causes of action of which three remain—sole inventorship (Count I), joint inventorship (Count II), and conversion (Count V). Plaintiffs admit their patent inventorship claims (Counts I and II) are different than their conversion claim. Defendants Lancium LLC, Michael T. McNamara, and Raymond E. Cline, Jr. (collectively, "Lancium") request this Court take Plaintiffs at their word and bifurcate the patent inventorship claims from the conversion claim, first conducting a bench trial on the patent inventorship claims, and then holding a jury trial on the conversion claim. As demonstrated below, bifurcation is appropriate here because it will (i) enhance juror comprehension of the issues, (ii) avoid prejudice, and (iii) promote convenience and economy by having the Court decide the more complex patent inventorship issues, while the jury decides the more straightforward conversion state law claim. In sum, bifurcation is most likely to result in a just, final disposition of the litigation by eliminating substantial risk of jury confusion and prejudice. *See Ciena Corp. v. Corvis Corp.*, 210 F.R.D. 519, 520 (D. Del. 2002); *see also Audio MPEG, Inc.* v. *Dell Inc.*, 254 F. Supp. 3d 798, 803-04 (E.D. Va. 2017).

FACTUAL BACKGROUND

Plaintiffs allege that Austin Storms should be declared to be the sole inventor (or, alternatively, at least a joint inventor) of U.S. Patent No. 10,608,433 ("the '433 patent"). Plaintiffs

seek no monetary relief for these claims. If tried,[1] resolution of these claims will require, among other things, consideration of the '433 patent, its claims, the Court's construction of those claims, Plaintiffs' "evidence," including a conversation during a dinner attended by approximately eight persons that occurred immediately following a cocktail hour where Messrs. Storms and McNamara allegedly met for the first time, a handful of ensuing text messages between the two men, and a single email with five attachments, four of which Plaintiffs concede were made publicly available *See* Lancium's Brief in Support of its Motion for Summary Judgment ("MSJ Motion") (D.I. 149) (and exhibits cited therein), at 35; Lancium's Reply Brief in Support of Motion for Summary Judgment ("MSJ Reply") (D.I. 195), at 20 (and exhibits cited therein)). It is expected that Plaintiffs will also rely on source code Plaintiffs contend demonstrates that Mr. Storms had "conceived" of the inventions of the '433 patent at the time he communicated with Mr. McNamara.[2] In addition, resolution will require consideration of Lancium's evidence of its independent technology development, including its conception of the subject matter claimed in the '433 patent.

Plaintiffs' conversion allegation is narrower. Plaintiffs assert a Louisiana state law claim for conversion of a "breakeven arbitrage" method allegedly described in a spreadsheet and a drawing that were attached to Mr. Storms' May 9, 2019 email to Mr. McNamara. *See, e.g,* MSJ Reply, at 20, n. 13, citing Ex. 33 (Plaintiffs' expert, Dr. McClellan), at 96:6-97:19. The drawing was made public numerous times, including being posted on BearBox's Twitter. *See* MSJ Reply, at 20 (Ex. 40 thereto). Versions of the allegedly confidential information in the spreadsheet were, likewise, provided to third parties. *Id*. (and exhibits cited therein). Plaintiffs seek millions of

[1] Lancium maintains summary judgment on Plaintiffs' inventorship claims is appropriate for the reasons identified in its Motion for Summary Judgment. (*See* D.I. 148, 195).

[2] It is undisputed that Mr. Storms never provided his source code to Mr. McNamara.

dollars in damages for Lancium's alleged conversion. If tried,[3] resolving the conversion issue will involve evidence of the origins of Plaintiffs' so-called "breakeven arbitrage" method, whether Plaintiff made it public, whether he communicated it to Lancium, whether such communication was voluntary, whether Lancium used Plaintiffs' method, Lancium's development of its own technology, a comparison of Lancium's and Plaintiffs' technologies, and damages issues and related witnesses.

ARGUMENT

I. The Court Should Bifurcate The Patent Inventorship Claims From The Conversion Claims.

A. Applicable Legal Principles

"[A] district court has broad discretion in separating issues and claims for trial as part of its wide discretion in trial management." Fed. R. Civ. P. 42(b); *Ciena Corp.*, at 520 (internal quotation marks omitted). To determine whether to bifurcate, Courts "should consider whether bifurcation will avoid prejudice, conserve judicial resources, and enhance juror comprehension of the issues presented in the case." *Id*; *see also Lab. Skin Care, Inc. v. Ltd. Brands, Inc.*, 757 F. Supp. 2d 431, 442 (D. Del. 2010) (granting bifurcation in a patent case where, among other things, bifurcation would reduce "risk of juror confusion"). "In the context of patent cases, experienced judges use bifurcation and trifurcation both to simplify the issues [] and to maintain manageability of the volume and complexity of the evidence presented to a jury." *Ciena Corp.*, 201 F.R.D. at 521; *Audio MPEG*, 254 F. Supp.3d at 803 (same). "[B]ifurcation of complex patent trials has become common." *Ciena Corp.*, 201 F.R.D. at 521.

[3] Lancuim also maintains summary judgment is proper on Plaintiffs' conversion claim for the reasons set forth it its MSJ Motion and MSJ Reply. (D.I. 148, 195).

B. Bifurcation Is Appropriate In This Case.

The major consideration in deciding whether to bifurcate is whether bifurcation will result in a just final disposition of the litigation. *Audio MPEG*, 254 F. Supp.3d at 806. Here, bifurcating the patent inventorship claims from the conversion claim and trying the patent inventorship issues to the bench, will help ensure a just final disposition because doing so will: (1) enhance juror comprehension, (2) avoid prejudice by ensuring the jury does not conflate the evidence relating to the patent inventorship allegations with those relating to the conversion allegation, and (3) simplify both trials.

1. Bifurcation will enhance juror comprehension.

Bifurcation will enhance juror comprehension (*i.e.*, help avoid juror confusion) with respect to the applicable legal principles, the burdens of proof, and the comprehension of the relevant evidence.

First, bifurcation will enhance juror comprehension with respect to the applicable legal standards. As one Court in this District has stated, in complicated patent cases, it is best to conduct a trial "in a way that reduces the number of legal principles the jury must consider and apply." *Ciena Corp.*, 210 F.R.D. at 521; *Audi*MPEG, 254 F. Supp. 3d at 807 (finding bifurcation enhanced jury decision making by, among other things, "limiting the number of legal issues the jury must address at any particular time"). Here, a jury is well-equipped to decide the simple question of whether Lancium converted information Plaintiffs voluntarily sent to Mr. McNamara in a single email. Generally, the jury will be asked to decide if Defendants acted in derogation of the Plaintiffs' possessory rights and wrongfully exercised or assumed authority over Plaintiffs' goods, thereby depriving Plaintiffs of possession of those goods either permanently or indefinitely. *Quealy v. Paine, Webber, Jackson & Curtis, Inc.*, 475 So. 2d 756,760 (La. 1985) (emphasis added); *see also Dileo v. Horn*, 189 So. 3d 1189, 1198 (La. Ct. App. 5 Cir. 2016).

The inventorship determination, on the other hand, involves different, and more numerous legal requirements. To begin, inventorship is a question of law. *Eli Lilly and Co. v. Arandigm Corp.*, 376 F.3d 1352, 1362 (Fed. Cir. 2004). The analysis first requires construction of each disputed claim term (*Gemstar-TV Guide Int'l, Inc. v. Int'l Trade Comm'n*, 383 F.3d 1352, 1381-82 (Fed. Cir. 2004)). This Court issued its claim construction ruling on October 28, 2022. D.I. 218-219. To succeed on their sole inventorship claim, Plaintiffs must establish that "(1) the erroneously omitted inventor conceived [each of] the invention[s] claimed in the patent, *and* (2) the named inventor[s] on the patent did *not* conceive the invention[s]." *Iceotope Grp. Ltd. Liquid Cool Sols., Inc.*, No. 20-CV-2644, 2022 WL 204923, at 2 (D. Min. Jan. 24, 2022) (emphasis original). This analysis involves application of the claim construction to a myriad of technical issues regarding Mr. Storms' "technology" to determine whether he "conceived"[4] each of the 20 claims). In addition, the sole inventorship analysis requires consideration of what Mr. Storms communicated to Lancium, and involves analyzing Lancium's technology development and timeline to determine whether Messrs. McNamara and Cline did *not* conceive the inventions claimed in the '433 patent. *See* D.I. 149, at 24-25 (Defendants' MSJ explaining legal principles). The joint inventorship analysis involves determining whether Mr. Storms made a contribution "not insignificant in quality, when that contribution is measured against the dimension of the full invention," as opposed to merely explaining well-known concepts and/or the state of the art to the real inventors. *See* D.I. 149, at 24-25 (Defendants' MSJ explaining legal principles). It also involves determining what Mr. Storms communicated to Mr. McNamara, analyzing Lancium's technology development and timeline to determine whether Messrs. McNamara and Cline

[4] Conception is "the formation in the mind of the inventor of a definite and permanent idea of the complete and operative invention." *See Gemstar*, 383 F.3d at 1381.

conceived the claimed technology, and determining whether there was any collaboration between Mr. Storms and Messrs. McNamara and Cline for the invention. Moreover, both inventorship claims involve issues of corroboration and, ultimately, application of the rule of reason analysis. *See* D.I. 149, at 9-11, 30; D.I. 195, at 15-17. The conversion analysis does not implicate these legal requirements.

Second, bifurcation will enhance juror comprehension with respect to the burdens of proof. As discussed in connection with Lancium's Motion for Summary Judgment, patent issuance creates a presumption that the named inventors are the true and only inventors, and that people not named are not to be inventors. *Scott v. Zimmer*, 889 F. Supp. 2d 657, 662 (D. Del. 2012). Plaintiffs seeking to add Mr. Storms as an inventor, therefore, must meet "the heavy burden of proving [their] case by clear and convincing evidence." *Id.* But the standard for conversion is preponderance of the evidence. Trying the patent inventorship claims and the conversion claim together to a jury increases the likelihood of juror confusion regarding the respective burdens of proof and, ultimately, of the jury misapplying the respective burdens of proof.

Third, bifurcation will enhance juror comprehension of the evidence. To decide the inventorship claims, a jury will be asked to decipher the testimony of Mr. Storms, both parties' technical experts, source code issues, and the application of the claim construction to the respective parties' technology. Conversely, to decide conversion, the jury will be asked to decide issues of public availability/confidentiality, whether Mr. Storms voluntarily provided the allegedly converted information, and whether Lancium converted such information. However, based on the manner in which Plaintiffs appear to be presenting the evidence, the jurors' job would be further complicated because Plaintiffs' technical expert, Dr. McClellan, conflates the inventorship subject matter with the conversion subject matter in his report. *See*, *e.g.*, Expert Report of Dr. Stan

McClellan (D.I. 149, Ex. 3), at ¶ 62 (for claim 1, element c, discussing "comparing mining profitability based on, inter alia, current power usage and energy price conditions on the one hand with profitability based, inter alia, on expected future power usage and energy price conditions"); ¶ 66 (discussing similar analysis for claim 1, element d).[5] During his deposition, Dr. McClellan testified "the patent doesn't contemplate selling it [the power] back at all," and defers to Mr. McCamant regarding the meaning of power option agreement. *See* Ex. 5 to D.I. 149, at 154:24-156:11 (quote is at 155:5-6). For this reason, bifurcation should be granted because it would permit the evidence to be presented in a manner "that is easier for the jurors to understand." *Audio MPEG*, 254 F. Supp. 3d at 807.

Finally, Plaintiffs are legally precluded from seeking damages for their patent inventorship claims, but are seeking tens of millions for conversion. A jury is likely to be confused when Plaintiffs' damages expert attempts to (wrongfully) explain why Plaintiffs should receive money for conversion, but nothing for patent inventorship.

2. Bifurcation will reduce the risk of prejudice.

Bifurcation is also warranted because it will reduce the risk of prejudice by reducing the risk of the jury conflating the evidence relating to the patent inventorship claims with the evidence relating to the conversion claims. As discussed above, a focus of the inventorship analysis is whether Mr. Storms conceived of the claimed inventions and communicated them to Mr. McNamara during the public dinner and/or later in text messages or via the single email. Because the materials that form the basis of Plaintiffs' conversion claim were attachments to Mr. Storms' email, there will likely be some evidentiary overlap between the evidence regarding inventorship

[5] Dr. McClellan repeats this analysis for independent claims 17 and 20. *See* D.I. 149 (Ex. 3), at ¶¶ 254-55, 272-73.

and the evidence regarding conversion.[6] But based on Plaintiffs' expert Dr. McClellan's report, he conflates so-called "breakeven" power sell-back determinations, which Lancium understands is the basis for the conversion claim, with power option agreements and minimum power thresholds, which are limitations recited in the '433 patent's claims. As such, if the patent inventorship issues are not bifurcated, the likelihood of juror confusion (discussed above) also creates a significant risk of Lancium being prejudiced by the jury conflating the separate, legally distinct issues and evidence relating to Plaintiffs' sole and joint inventorship allegations with the issues and evidence relating Plaintiffs' conversion allegation.

This risk is further heightened here because Plaintiffs repeatedly describe Lancium's alleged conversion and wrongdoing in highly inflammatory terms (*e.g.*, "stole," "hatched a plan," "stolen").[7] *See*, *e.g.*, Second Amended Complaint (D.I. 103), at ¶¶ 4, 41, 50. Bifurcation is, therefore, warranted to minimize the risk of Plaintiffs' conversion arguments tainting the entire trial. *See Massimo Corp. v. Philips Electronics N. Am. Corp.*, No. 09-80-JFF-MPT, 2010 WL 925864, at *2 (D. Del. Mar. 11, 2010); *Audio MPEG*, 254 F. Supp. 3d at 807 (finding allegations of anticompetitive conspiracies, improper market monopolization, and breach of promises could bias a jury against Plaintiffs when it evaluates the patent infringement claims). Indeed, if the jury is inclined to find for Lancium on conversion and thus award no damages, it could lead the jury to find for Plaintiffs on inventorship to award him something.

[6] Plaintiffs may argue that evidentiary overlap cuts against bifurcation, but the law is clear that there is "a fundamental different between *evidence* and *issues*." *See Guardco Mfg., Inc. v. Herst Lighting Co.*, 820 F.2d 1209, 1213 (Fed. Cir. 1987) (emphasis original) (bifurcating inequitable conduct issue).

[7] Lancium objects to the use of such pejorative terms as violating at least FRE 401 and 403.

3. Bifurcation will promote convenience and economy.

Bifurcation will promote convenience and economy by simplifying and streamlining the issues and evidence for both trials. For example, because Plaintiffs cannot recover monetary damages for inventorship, the inventorship bench trial will not require testimony from damages experts. Also, the testimony regarding Lancium's business operations will likely be shorter, as will be the technical and power market experts' testimony. Similarly, because the conversion claim appears focused on the spreadsheet attached to Mr. Storm's email, the evidence and testimony presented to the jury will be streamlined to that issue. Thus, while there may be some overlap regarding evidence, bifurcation will greatly simplify both trials and is warranted. *See Audio MPEG*, 254 F. Supp. 3d at 805 (finding convenience factor favored bifurcation of antitrust and misuse claims from patent claims despite some evidentiary overlap); *Gardco*, 820 F.2d at 1213 (bifurcating inequitable conduct from infringement/validity despite some evidentiary overlap).

C. Bifurcation Will Not Deprive Plaintiffs Of Their Right To A Jury Trial.

It is expected that Plaintiffs will argue that bifurcation will deprive them of their Seventh Amendment right to a jury trial. *See*, *e.g.*, *Shum v. Intel Corp.*, 499 F.3d 1272 (2007) (remanding district court's decision to bifurcate inventorship claim and fraud claim because doing so deprived Plaintiff right to jury trial on the fraud claims). In *Shum*, Plaintiff's inventorship and fraud claims were "inextricably intertwined" because Shum's fraud claim was based, in part, on his assertion of misrepresentations by Verdiell (the named inventor) to the patent office and to third parties that Verdiell was the sole inventor. *Id*. at 1277-78. To prove his fraud claim, Shum would have to establish that Verdiell was not the sole inventor, a claim the court found would be eviscerated if Verdiell, not Shum, had invented the claimed technology. *Id.* The *Shum* court distinguished bifurcation cases involving inequitable conduct noting that "while inequitable conduct and validity questions 'overlap in the consideration of some aspects of the same relevant evidence, they do not

involve a common issue.'" *Shum*, at 1270 (distinguishing *Afga Corp. v. Creo Prods Inc.*, 451 F.3d 1366, 1372 (Fed. Cir. 2006)).

The *Shum* case is readily distinguished from the present case. Here, Plaintiffs admit there is no common issue: "[Bearbox's] conversion claim is based on the theft of material that is ***not*** included in the '433 Patent, and therefore does ***not*** seek 'patent-like' relief, or turn on questions of patent inventorship or ownership." *See* D.I. 176, at 34; *See also* Plaintiffs' Brief in Opposition to Defendants' Motion for Judgment on the Pleadings (D.I. 42), at 5 ("The tort of conversion is accordingly directed to *ownership* of property, not *inventorship*.") (emphasis original). This case, therefore, is similar to *Afga*, *Gardco*, *Ciena*, and *Audio MPEG*, among others, where, despite some overlap in evidentiary issues, the court exercised its discretion to bifurcate patent infringement/validity issues from inequitable conducts, antitrust, or other issues because doing so enhanced juror comprehension of the issues, avoided prejudice, and promoted convenience and economy.

CONCLUSION

For the reasons set forth above, the Court should bifurcate the patent inventorship claims from the conversion claim and try the inventorship claims to the bench followed by the conversion claim to the jury.

Dated: October 31, 2022

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IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

BEARBOX LLC and AUSTIN STORMS,	)	
	)	
Plaintiffs,	)	
	)	
v.	)	C.A. No. 21-534-MN
	)	
LANCIUM LLC, MICHAEL T. MCNAMARA, and RAYMOND E. CLINE, JR.	)	
	)	
Defendants.	)	

CERTIFICATE OF SERVICE

I certify that on October 31, 2022, I caused a sealed copy of **Defendants' Opening Brief In Support of their Motion for Bifurcation** to be served on the following counsel of record by electronic mail.

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IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

BEARBOX LLC and AUSTIN STORMS, Plaintiffs, v. LANCIUM LLC, MICHAEL T. MCNAMARA, and RAYMOND E. CLINE, JR. Defendants.	)	**CONFIDENTIAL:** **FILED UNDER SEAL** C.A. No. 21-534-GBW-CJB

PLAINTIFFS' BRIEF IN OPPOSITION TO DEFENDANTS' MOTION FOR BIFURCATION

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I. INTRODUCTION

The parties have litigated for months with a Scheduling Order (D.I. 35) that calls for a jury trial. Defendants have not objected to the fact that all claims were scheduled for a jury trial, until now, just weeks before trial. In fact, Defendants filed summary judgment motions attacking all claims with lengthy supporting briefs, which the Court typically would not entertain in advance of a bench trial. If Plaintiffs desired a bench trial on inventorship, they should have sought to bifurcate the trial months ago, avoiding the need for summary judgment briefing on the bench-trial issues, and allowing the parties to consider the bifurcation request before investing resources into preparation for a jury trial.

Plaintiffs remain entitled to a jury trial due to common factual issues raised by their patent inventorship and conversion claims. Even if the Court were to find that Plaintiffs do not have a right to a jury trial on inventorship, the parties should nevertheless present all the evidence to a jury in a single trial. Defendants' proposal, cloaked in "efficiency," would result in the opposite, requiring multiple witnesses to give much of their testimony twice: once in the bench trial and then for the jury. Defendants do not contend (nor can they) that disposition of the inventorship claim may render the conversion claim moot. Conducting two trials (instead of one) would be the opposite of judicial efficiency, particularly if the Court conducted a bench trial first, as Defendants propose.

II. BACKGROUND

The Court entered a Scheduling Order on July 6, 2021, scheduling this case for a jury trial on December 5, 2022. (D.I. 35.) Defendants contacted counsel for Plaintiffs on October 31, 2022 at 12:26 ET indicating they planned to file a motion that day seeking a bifurcated bench trial on inventorship. A few hours later, after waiting months to raise the issue, Defendants filed their Motion for Bifurcation, and in it requested expedited briefing. (D.I. 222, D.I. 223.)

III. ARGUMENT

A. BearBox is entitled to a jury trial on all remaining claims because the factual issues to be decided are substantially common among them

Lancium's motion is premised on its incorrect contention that "inventorship is a question of law" (D.I. 223 at 5) and its assumption that BearBox is not entitled to a jury trial on the issue of inventorship.

1. Inventorship presents a mixed question of law and fact, which is appropriate for a jury to decide

Although Lancium contends that inventorship is an issue of law, in the case Lancium cites for that proposition (D.I. 223 at 5), the district court tried inventorship to a jury. *Eli Lilly & Co. v. Aradigm Corp.*, 376 F.3d 1352, 1362 (Fed. Cir. 2004). "Inventorship is a mixed question of law and fact: The overall inventorship determination is a question of law, but it is premised on underlying questions of fact." *Id.* In *Eli Lilly*, although the Federal Circuit reversed the district court's denial of judgment as a matter of law, it did not question the district court's decision to try inventorship to a jury. *Id.* at 1370.

Inventorship presents a mixed question of law and fact just like the defense of obviousness, which is routinely tried to juries. *Kinetic Concepts, Inc. v. Smith & Nephew, Inc.*, 688 F.3d 1342, 1356 (Fed. Cir. 2012) ("[O]bviousness is a mixed question of law and fact . . . ."). In *Kinetic Concepts*, the Federal Circuit explained: "[I]t is neither error nor dangerous to justice to submit legal issues to juries, the submission being accompanied by appropriate instructions on the law from the trial judge." *Id.* at 1358 (quoting *R.R. Dynamics, Inc. v. A. Stucki Co.*, 727 F.2d 1506, 1515 (Fed. Cir. 1984)). By submitting mixed issues of law and fact to a jury, a district court can avoid the "risk of effectively denying the constitutional right" to a jury, while at the same time remaining the "ultimate arbiter" of the legal issues and

exercising a "guardianship role" through proper jury instructions and review of the verdict on a motion for judgment as a matter of law or a new trial. *R.R. Dynamics*, 727 F.2d at 1515.

2. Plaintiffs have a right to a jury trial on all claims with common issues

No amount of judicial efficiency can justify denying a jury trial where a party has a right to one. In deciding whether to try a case to a jury, a district court's "discretion is very narrowly limited and must, wherever possible, be exercised to preserve jury trial." *Beacon Theatres, Inc. v. Westover*, 359 U.S. 500, 510 (1959); *see also Dairy Queen, Inc. v. Wood*, 369 U.S. 469, 479 (1962) (finding "the district judge erred in refusing to grant petitioner's demand for a trial by jury on the factual issues related to the question of whether there has been a breach of contract"). Where an equitable claim presents issues that "are common with those upon which [a] claim to equitable relief is based, the legal claims involved in the action must be determined prior to any final court determination of [the] equitable claims." *Dairy Queen*, 369 U.S. at 479.

Although Defendants correctly note that Plaintiffs conversion claim is based on misuse of Plaintiffs' materials containing information that Defendants did not include in the patent-in-suit, there are nevertheless common factual issues between Plaintiffs' conversion and inventorship claims. The finder of fact will be asked to decide the common issue of whether Mr. Storms communicated anything of value to Defendants or whether he merely communicated documents reflecting prior art methods, as Defendants contend. All of this information was communicated to Defendants at the same time as part of the same oral and written communications. Further, the finder of fact will be asked to decide common issues about how Defendants used Plaintiffs' documents and information, relying on findings about the same documents and testimony about Defendants' pursuit of the patent-in-suit and their commercialization and unauthorized use of the converted property. The common issue of whether Mr. Storms contributed anything of value to the Defendants presents intertwined factual issues that the jury should resolve for all claims.

Deciding the issue of inventorship will resolve the common factual question of whether Plaintiffs communicated anything of value to Defendants, an issue that a single fact-finder should decide. *See Shum v. Intel Corp.*, 499 F.3d 1272, 1279 (Fed. Cir. 2007) (reversing district court's decision to try inventorship before a jury trial on a fraud claim due to "commonality . . . between the factual issues underlying the inventorship and fraud claims").

Finally, at least two of the cases that Lancium relies on to support its motion simply do not address the right to a jury trial, but instead consider whether cases should be bifurcated for two jury trials, not a bench trial and a jury trial. *Audio MPEG, Inc. v. Dell Inc.*, 254 F. Supp. 3d 798, 809 (E.D. Va. 2017) (bifurcating patent infringement and antitrust claims for two jury trials); *Ciena Corp. v. Corvis Corp.*, 210 F.R.D. 519, 521 (D. Del. 2002) (bifurcating patent infringement trial into multiple phases all to be tried to juries).

B. For the sake of judicial efficiency, all issues should be presented in a single trial to a jury

Even if the Court were to find that BearBox does not have a *right* to a jury trial on its inventorship claims, the Court has discretion to try all issues in a single trial to a jury. Whereas "the right to jury trial is a constitutional one," "no similar requirement protects trials by the court." *Beacon Theatres*, 359 U.S. at 510. For example, although the Federal Circuit has held that patent owners do not have a *right* to a jury trial on inequitable conduct, the Federal Circuit has *not* decided "that the factual issues underlying a charge of inequitable conduct *must* be adjudicated by a judge." *Agfa Corp. v. Creo Prods. Inc.*, 451 F.3d 1366, 1375 (Fed. Cir. 2006) (emphasis added).

1. Bifurcation will require two trials, which is inefficient

Here, judicial efficiency calls for a single trial before a jury. Defendants' proposed bifurcation makes little sense. Under Defendants' proposal, the Court would first conduct a

bench trial to be followed by a jury trial requiring testimony from all of the same witnesses who would testify in the bench trial. Defendants do not even contend that the bench trial may somehow obviate the need for the jury trial, making this case different than the inequitable conduct cases the Defendants cite in which district courts first tried the issue of inequitable conduct because a favorable decision for the defendants on that defense would obviate the need for a jury trial about patent infringement. *Agfa*, 451 F.3d at 1371 (affirming district court's decision to try inequitable conduct to the bench, ultimately obviating the need for a jury trial on patent infringement); *Gardco Mfg., Inc. v. Herst Lighting Co.*, 820 F.2d 1209, 1213 (Fed. Cir. 1987) (finding district court "did not abuse its discretion in trying Gardco's inequitable conduct claim first in this case," obviating the need for a jury trial).

Rather than streamline the case in a single trial before a single finder of fact (a jury), the Defendants would call for the Court to conduct two separate trials where all of the witnesses from the first trial would testify again in the second trial, and they would need to repeat much of their testimony for the jury, who would not be present for the first trial. Specifically, Plaintiffs plan to call Mr. Storms and a technical expert, and both of those witnesses will testify about issues related to both inventorship and conversion. Although Plaintiffs also plan to call a damages expert (and possibly a second technical expert) for its conversion case, there is no efficiency to be gained by having those experts testify separately in a second trial. Either way, the Plaintiffs will call their damages expert to testify. By conducting a single trial, however, Mr. Storms and Plaintiffs' technical expert would only need to testify one time.

Moreover, bifurcation may serve to confuse, not streamline the issues, and create frequent and needless issues about the relevance of certain testimony and exhibits. For example, during the jury trial, would Mr. Storms be permitted to tell his whole story about his interactions

with Defendants, or would he be required to restrict that testimony to certain aspects of his communications with Defendants? If he must limit his testimony, this seemingly artificial restriction may confuse the jury and hamper the jury's ability to comprehend all of the facts. In any event, such a restriction would create needless evidentiary disputes about the scope of witness testimony throughout the trial.

2. Defendants cannot support their speculative concerns about a single jury trial

To support their proposal to have two trials, Defendants rely on a litany of speculative concerns about the jury's ability to comprehend patent inventorship or consider different standards of proof. These concerns are nothing but attorney argument questioning the capabilities of juries. As the Court is aware, juries are routinely asked in patent cases to follow the Court's instructions and decide complicated issues, including issues with different standards of proof (for example, infringement and invalidity in patent infringement trials). On the one hand, Defendants contend this is a straightforward case in which Mr. Storms communicated nothing of value to them. On the other hand, Defendants contend that a jury will be unable to process the facts if asked to decide multiple issues. Neither contention is true, but Defendants have submitted no compelling reason that a jury cannot decide all of the issues in a single trial.

Finally, Defendants are wrong to assert they will be prejudiced by a jury trial because the jury will conflate evidence and possibly engage in jury nullification by ignoring the Court's instructions and awarding no damages, but nevertheless finding Mr. Storms to be an inventor. These are purely speculative concerns that could be said about any jury trial. They do not warrant bifurcation in this case.

3. In the alternative, the Court may treat the jury's verdict as advisory

In the event the Court concludes that Plaintiffs do not have a right to a jury trial on their inventorship claims, another option for conserving judicial resources would be to try all the issues to a jury, but treat the jury's verdict as advisory. The Court may treat a verdict as "advisory" in two ways. First, as discussed above, the Court may properly present a mixed issue of law and fact to the jury, while remaining "the ultimate arbiter" of any legal issues by deciding post-trial motions for judgment as a matter of law or for a new trial. *Kinetic Concepts*, 688 F.3d at 1359. Or second, the Court may treat the jury's verdict as entirely advisory under Federal Rule of Civil Procedure 39(c)(1) and ultimately decide the inventorship claims in view of the jury's advisory verdict only after receiving proposed conclusions of law and findings of fact from the parties. *Id.* at 1357. Under either approach, the Court would realize judicial efficiencies by conducting only a single trial.

IV. CONCLUSION

For the foregoing reasons, the Court should deny Defendants' Motion for Bifurcation and try all of the issues in this case in a single trial before a jury.

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Dated: November 10, 2022

CERTIFICATE OF SERVICE

I hereby certify that on the 10th day of November, 2022, the attached **PLAINTIFFS' BRIEF IN OPPOSITION TO DEFENDANTS' MOTION FOR BIFURCATION** was served upon the below-named counsel of record at the address and in the manner indicated:

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From: ded_nefreply@ded.uscourts.gov
Sent: Monday, November 14, 2022 2:18 PM
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Subject: Activity in Case 1:21-cv-00534-GBW-CJB BearBox LLC et al v. Lancium LLC et al Order

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U.S. District Court

District of Delaware

Notice of Electronic Filing

The following transaction was entered on 11/14/2022 at 3:17 PM EST and filed on 11/14/2022
Case Name: BearBox LLC et al v. Lancium LLC et al
Case Number: 1:21-cv-00534-GBW-CJB
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Docket Text:
ORAL ORDER: Having determined that the only issue remaining for the Court to hear is Plaintiffs' claims of sole inventorship, or, alternatively, joint inventorship (D.I. 231), and since inventorship is an issue solely for the Court to determine, see, e.g., 35 U.S.C. § 256; Shum v. Intel Corp., 499 F.3d 1272, 1277 (Fed. Cir. 2007) (holding that "an action for correction of inventorship under § 256, standing alone, is an equitable claim to which no right to a jury trial attaches"), IT IS HEREBY ORDERED that the 4-day jury trial scheduled to begin on December 5, 2022 (D.I. 35 at 15) is now scheduled as a 3-day bench trial beginning on Tuesday, December 6, 2022. The pretrial conference will be held on November 22, 2022, to begin at 3:00 PM (rather than at 4:30 PM). ORDERED by Judge Gregory B. Williams on 11/14/22. (ntl)

1:21-cv-00534-GBW-CJB Notice has been electronically mailed to:

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1:21-cv-00534-GBW-CJB Filer will deliver document by other means to:

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

BEARBOX LLC and AUSTIN STORMS, Plaintiffs, v. LANCIUM LLC, MICHAEL T. MCNAMARA, and RAYMOND E. CLINE, JR. Defendants.	)	C.A. No. 21-534-GBW-CJB **FILED UNDER SEAL**

DEFENDANTS' OPENING LETTER BRIEF IN SUPPORT OF ITS EMERGENCY MOTION TO STRIKE PLAINTIFFS' NEWLY DISCLOSED, UNTIMELY EXPERT REPORT AND REQUEST FOR EXPEDITED BRIEFING

On November 11, 2022, in the latest example of Plaintiffs substantially changing their theories and claims when faced with an adverse ruling or evidence, Plaintiffs served a supplemental report by their expert, Dr. McClellan, offering new opinions and analysis. Faced with Defendants' Motion *in Limine* No. 1 and the Court's rejection of Plaintiffs' asserted "plain and ordinary" meaning of the claim terms "power option agreement" and "minimum power threshold," Dr. McClellan's supplemental report, served without even seeking leave of the Court or any discussion with Defendants, is an improper, highly prejudicial, last minute attempt to bolster Plaintiffs' claims for correction of inventorship. Plaintiffs' asserted justification for the supplemental report—that Dr. McClellan should be allowed "to apply the language of the Court's claim construction"—is both meritless and inconsistent with their prior representation to the Court that "even under sort of the tortured proposed construction … that defendants have proposed, Dr. McClellan's analysis holds." Defendants' MIL 1, Ex. 1 (10/20/2022 Hr'g Tr.) at 31:6-15. Dr. McClellan could and should have analyzed and addressed the proper meaning of the claims in his previous reports but chose not to. Good cause, therefore, does not exist for this supplementation. To the contrary, the *Pennypack* factors strongly weigh in favor of striking Dr. McClellan's new opinions and analysis. The Court should strike Dr. McClellan's supplemental report and the opinions and analysis therein.

As an initial matter, Dr. McClellan's supplemental expert report (attached as Ex. 1) is untimely. Opening expert reports on issues for which a party bears the burden of proof, were due on April 5, 2022, rebuttals to those reports were then due on May 6, 2022, reply reports in support of an expert's opening reports were due on May 20, 2022, and expert discovery closed on June 6, 2022. *See* D.I. 109 (Stipulated Order); 3/3/22 Minute Entry adopting D.I. 109. Dr. McClellan's supplemental report, however, was not served until November 11, 2022 (and even then not until well after the Court's 5:00 pm service deadline to be deemed served that day). Ex. 2 (11/11/22 J. Labbe email serving McClellan Supplemental Report). Thus, Dr. McClellan's supplemental report is untimely and should be stricken. *See Praxair, Inc. v. ATMI, Inc*., 231 F.R.D. 457, 463-64 (D. Del. 2005), *reversed on other grounds by Praxair, Inc. v. ATMI, Inc*., 543 F.3d 1306 (Fed. Cir. 2008) (granting motion to strike and excluding supplemental expert report filed after the close of expert discovery where trial was set to begin in less than a month); *Masimo Corp. v. Philips Elec. North Am. Corp.*, No. 09-80, 2013 WL 2178047, at (D. Del. May 20, 2013) (recommending striking untimely supplemental expert report), recommendation adopted by *Masimo Corp. v. Philips Elec. North Am. Corp.*, 62 F. Supp. 3d 368, 388-389 (D. Del. 2014); *INVISTA North America S.a.r.l. v. M&G USA Corp.*, No. 11-1007, 2013 WL 3216109, at *3-4 (D. Del. June 25, 2013) (striking new opinions in expert declaration served during summary judgment briefing).

Plaintiffs' purported excuse for Dr. McClellan's untimely report rings hollow. When considering a motion to strike untimely expert opinions, courts consider the "validity of the excuse offered by the party" seeking to introduce the new opinions. *See Praxair*, 231 F.R.D. at 463. Here, Plaintiffs contend that Dr. McClellan's supplemental report should be permitted because he allegedly could not have addressed the Court's claim constructions in his previous reports. Not so. Plaintiffs' argument ignores that Dr. McClellan's opening report purports to apply the "plain and ordinary meaning" of all of the '433 patent's claim terms. *See* D.I. 151, Ex. 3 at ¶ 49. It is well-established that this "plain and ordinary meaning" is the meaning a term would have to a person of ordinary skill in the art after reviewing the intrinsic record at the time of the invention." *O2 Micro*, 521 F.3d at 1360 (citing *Philips v. AWH Corp*., 415 F.3d 1303, 1312-13 (Fed. Cir. 2005)); *see also AstraZeneca AB v. Mylan Pharm. Inc.*, 19 F.4th 1325, 1330 (Fed. Cir. 2021) ("[A]s we have explained, the ordinary meaning of a claim term is not the meaning of the term in the abstract.

… Instead, the ordinary meaning of a claim term is its meaning to the ordinary artisan after reading the entire patent." (internal citations and quotations omitted)); *Eon Corp. IP Holdings v. Silver Spring Networks*, 815 F.3d1314, 1321 (Fed. Cir. 2016), quoting *Trustees of Columbia Univ. v. Symantec Corp.*, 811 F.3d 1359, 1363 (Fed. Cir. 2016) ("[T]he question is not whether there is a settled ordinary meaning of the terms in some abstract sense of the words. Rather, as we recently explained, 'The only meaning that matters in claim construction is the meaning in the context of the patent.'"). Nonetheless, in his opening report Dr. McClellan did not provide any analysis of the purported "plain and ordinary meaning" of any claim terms in view of the intrinsic record.[1]

Dr. McClellan also could (and should) have provided his newly minted opinions back in May 2022 in reply to Dr. Ehsani's report. Unlike Dr. McClellan's opening report, Dr. Ehsani's rebuttal report did include an analysis of the meaning of "power option agreement" and "minimum power thresholds" and applied that meaning to his opinions regarding inventorship. *See, e.g.*, Defendants' MIL 1, Ex. 3 (Ehsani Report) at ¶¶ 42-43, 107, 109, 116-117. That analysis was consistent with the Court's construction. Thus, at the very least, Dr. McClellan could and should have responded to those opinions and interpretation of the asserted claims in his reply report. Plaintiffs and Dr. McClellan, in fact, had an obligation to address Dr. Ehsani's interpretation of the claim terms—the same interpretation the Court adopted—in Dr. McClellan's reply report. *See, e.g., St. Clair Intellectual Prop. Consultants, Inc. v. Matshushita Elec. Indus. Co., Ltd.*, No. 04-1436, 2012 WL 1015993, at *5 (D. Del. Mar. 26, 2012) ("When claim construction remains an open issue at the time the parties serve expert reports … the parties have an obligation 'to prepare for the fact that the court may adopt [the other party's claim] construction.'" (quoting *Union Carbide Chems. & Plastics Tech. Corp. v. Shell Oil Co.*, 270 F. Supp. 2d 519, 524 (D. Del. 2003)); *iCeutica Pty Ltd v. Novitium Pharma LLC*, No. 18-99, 2019 WL 4604029, at *2 (D. Del. Sept. 23, 2019) (similar). And Dr. McClellan even noted the dispute in his reply report, stating that "Dr. Ehsani alleges that I fundamentally misunderstand the claim" language and meaning. *See* D.I. 151, Ex. 4 at ¶ 86. But rather than address Dr. Ehsani's analysis and opinions, Dr. McClellan simply asserted in conclusory fashion that "I have applied the plain and ordinary meaning of the claim terms." D.I. 151, Ex. 4 at ¶ 8. Accordingly, the Court should not permit Dr. Ehsani to now provide the opinions and analysis that he chose not to provide during expert discovery.

The *Pennypack* factors also strongly weigh against permitting Dr. McClellan's supplemental report. *See Praxair*, 231 F.R.D. at 463 (striking supplemental expert report based on analysis of *Pennypack* factors). First, the prejudice and surprise to Defendants is substantial. Indeed, Defendants had no opportunity to depose Dr. McClellan regarding his new opinions or have their own experts respond during expert discovery, and now have no opportunity to pursue summary judgment or a *Daubert* motion based on these new opinions. Defendants prepared their case based on the opinions Dr. McClellan originally offered. And although Plaintiffs have represented that they are "open to discussing a schedule for [Defendant's] expert to respond to this supplement, should he wish to do so," this vague offer would only compound the prejudice to Defendants. *See* Ex. 3 (11/11/22 B. Horton email). Defendants and Dr. Ehsani should not be forced

[1] To the extent that Plaintiffs contend that Dr. McClellan's supplemental report should be allowed because he had a duty to supplement his opinions under Fed. R. Civ. P. 26(e) (*see* Ex. 3), this too is wrong. "The duty to supplement or correct pursuant to Rule 26(e) is not for the benefit of the party who has the duty." *Lockhart v. Willingboro High School*, No. 14-3701, 2017 WL 11465996, at *3 (D.N.J. May 3, 2017) (striking supplemental expert report) (quotations and citations omitted); *see also INVISTA*, 2013 WL 3216109, at *1 (similar).

to devote substantial time to preparing a supplemental rebuttal report with only 3 weeks left before trial. Likewise, although Plaintiffs have not offered to make Dr. McClellan available for deposition before trial, the need to prepare for and take such a deposition in the scant time before trial is also unduly prejudicial. *Id.* (finding prejudice due to supplemental expert report where opposing party had "no opportunity conduct rebuttal discovery"); *INVISTA*, 2013 WL 3216109, at *3 ("To allow these new expert opinions, in the middle of summary judgment briefing and just prior to trial, would unduly prejudice Invista."); *Reckitt Benckiser Inc. v. Tris. Pharma, Inc.*, No. 09-3125, 2011 WL 6722707, at *7 (D.N.J. Dec. 21, 2011) (striking supplemental expert report and finding prejudice due to "the resources which have expended [by defendant] in preparing this case in reliance on the expert reports that were initially served").

Second, there is no way to cure the prejudice to Defendants, and allowing Dr. McClellan to offer his new opinions at trial would disrupt the trial process. As addressed above, permitting Defendants to depose Dr. McClellan and/or serve their own new rebuttal expert reports before trial is prejudicial to Defendants' other trial preparation efforts, and delaying trial is prejudicial to Defendants' right to the prompt resolution of the Plaintiffs' lingering claims. *See Praxair*, 231 F.R.D. at 463-464 (noting that allowing "additional expert discovery" to address prejudice due to supplemental expert report "would undoubtedly disrupt the trial process, as trial is set to begin in less than a month"); *Reckitt Benckiser*, 2011 WL 6722707, at *7 (prejudice due to supplemental expert report "could not be cured in time for the agreed upon trial date" which "was scheduled to begin … approximately a month after oral argument" on motion to strike).

In addition, Dr. McClellan's supplemental report continues to offer opinions that are inconsistent with the Court's claim construction rulings, and thus perpetuates the prejudice to Defendants caused by these improper opinions. For example, although the Court noted that "[t]he specification is further replete with examples supporting Lancium's assertion that any construction of 'power option agreement' necessarily requires the load to 'use' or 'consume' at least the amount of power subject to the option (e.g., the minimum power threshold)" (D.I. 218 at 10), Dr. McClellan's supplemental report continues to assert his opinion that "[w]hether I use that power to do something with or whether I sell that power to somebody else, that's separate from the power option agreement." *See* Ex. 1 at 3-4.

Finally, Plaintiffs' providing a supplemental report from Dr. McClellan weeks after the Court's claim construction ruling, after previously representing to the Court that "even under sort of the tortured proposed construction … that defendants have proposed, Dr. McClellan's analysis holds," supports a finding of bad faith. Defendants' MIL 1, Ex. 1 (10/20/2022 Hr'g Tr.) at 31:6-15. Likewise, Plaintiffs' history of changing their allegations and theories in response to adverse rulings and evidence also supports a finding of bad faith. *See, e.g.*, D.I. 19 (Amended Complaint changing claims 12 days after Defendants filed their Answer, D.I. 18); D.I. 103 (Second Amended Complaint asserting new claims and theories after the Court dismissed all of Plaintiffs' state law claims); 4/22/22 Minute Entry (striking Plaintiffs' improperly re-asserted trade secret misappropriation claims). Nonetheless, bad faith is not necessary to strike the report. *Reckitt Benckiser*, 2011 WL 6722707, at *8 (striking supplemental expert report "without an express finding that Plaintiffs acted in bad faith"); *Lockhart*, 2017 WL 11465996, at *6; *see also Praxair*, 231 F.R.D. at 463-464 (striking supplemental expert report without finding bad faith).

The Court should strike Dr. McClellan's supplemental report and opinions.

Dated: November 15, 2022

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Exhibit 1

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

BEARBOX LLC AND AUSTIN STORMS, *Plaintiffs*,	§	
v.	§	**C.A. No. 21-534-GBW-CJB**
LANCIUM LLC, MICHAEL T. MCNAMARA, AND RAYMOND E. CLINE, JR., *Defendants.*	§	

Supplement to Expert Reports of Dr. Stan McClellan

November 11, 2022

(SOURCE CODE – OUTSIDE ATTORNEYS EYES ONLY – RESTRICTED HIGHLY CONFIDENTIAL)

I. INTRODUCTION

[1] I previously submitted expert reports, dated April 5, 2022 ("Original Report") and May 20, 2022 ("Reply Report"), for the above referenced matter. Those opinions have not changed. This Supplement provides clarification regarding conception of certain intellectual property by Mr. Storms, the communication of his ideas to Defendants ("Lancium") in light of the Court's Markman Order dated October 28, 2022 ("Markman Order"). I reserved the right to provide this Supplement should the Court construe any terms after I provided my Reports.

[2] As noted in my Original Report and Reply Report, it is my understanding that Bearbox seeks to correct inventorship of U.S. Patent No. 10,608,433 (hereinafter referred to as "the '433 patent"). My Original Report provides an analysis showing (1) Plaintiffs' conception and possession of the technologies recited in the claims of the '433 patent and/or other power arbitrage methods prior to their meetings with Lancium; (2) Plaintiffs provided an enabling description of this information to Lancium; and (3) Lancium's product offerings, such as its Smart Response service, use the technologies recited in the Asserted Claims. This Supplement reiterates and clarifies some of my earlier analysis in my Original Report and Reply Report in consideration of the Markman Order.

II. NEW INFORMATION CONSIDERED

[3] Since the dates of my Original Report and Reply Report, the Court issued the Markman Order setting forth explicit constructions for the plain and ordinary meaning of the terms "power option agreement" and "minimum power threshold."

[4] Specifically, the Court construed the term "power option agreement" to mean "an agreement between a power entity associated with the delivery of power to a load and the load, wherein the load provides the power entity with the option to reduce the amount of power delivered to the load up to an agreed amount of power during an agreed upon time interval such that the load must use at least the amount of power subject to the option during the interval unless the power entity exercises the option." Dkt. No. 218 at 7. The Court also construed the term "minimum power

threshold" to mean "a minimum amount of power a load must use during an associated time interval." *Id*. at 16.

[5] The Court's constructions of these terms do not change my opinions about Mr. Storms's conception and communication of his proprietary information to Lancium set forth in my earlier reports. Although I did not apply the Court's construction in my earlier reports, my opinions apply with equal weight under the Court's constructions, as I further explain below.

[6] Although I did not expressly apply these claim constructions in my earlier reports, my understanding of these claims terms is consistent with the Court's interpretation. This is evidenced in part by my deposition testimony below:

Q: What's your understanding of the plain and ordinary meaning of power option agreement?
A: My understanding of **power option agreement is it's essentially a contract to buy power at a certain price. It's like a wholesale purchase**. I'm going to buy X number of units at X price.
Q: What's your understanding of **power option data**?
A: **Power option data is the data that's associated with the power option agreement**.
Q: What -- is there any specific data that's required to be power option data, or can it be anything?
A: **I think at least it has intervals and minimum thresholds**. There may be other data that's associated with that, but I think there's thresholds over intervals.
Q: And intervals are intervals of time?
A: Time intervals, yeah.
Q: **And what are thresholds**?
A: You agree to buy power at that -- **you agree to consume that much power at a certain price at that time**.
Q **You agree to buy that much power or consume that much power**?
A: Typically it's consume because you're a load that's not controllable. **If you're a controllable load**, **then you're buying that power with the assumption that you're going to consume it**. If you have ability to sell it back, then you can sell it back. But you don't sell it back to whoever you bought it from, you sell it into a market at that time. **It's an agreement with the seller to consume, right**?
And consume doesn't mean use. Consume means

purchase. **Whether I use that power to do something with or whether I sell that power to somebody else, that's separate from the power option agreement**.
Q: What's your understanding of a minimum power threshold in this case as used in the '433 patent?
A: That's the data that's associated with the option agreement.
Q: **What specifically is a minimum power threshold**?
A: **That's the amount of power that you're contracted to consume**.
Q: And by consume you don't mean use, correct?
A: I may not use it, but I'm going to consume it. I'm purchasing it. Whether I use it or whether I sell it, that's a completely separate issue. I'm agreeing to purchase it at that threshold[1]

[7] As my testimony shows, I understand the plain and ordinary meaning of the term "power option agreement" to be "an agreement with the seller to consume" an amount of power delivered to the load by a power entity that includes time intervals and "minimum power thresholds," which I understand to be "the amount you're contracted to consume" for that time interval. *Id*. These understandings are consistent with and nearly identical to the Court's interpretation of those terms in the Markman Order, and I may offer testimony at trial based on these opinions.

[8] As my deposition testimony cited above demonstrates, I was referring to my understanding of power option agreements in practice, specifically that if the grid exercises the option to reduce power delivery to the load, the load stops "using" that power as it is contractually obligated to do, but the load may be free to liquidate that unused power into the market through its QSE (e.g. sell it).

[9] During my deposition, it seemed to me that Defendants' counsel was attempting to attribute a particular type of consumption to the word "use," such as "use" being limited to "use to mine cryptocurrency." In the below portion of my deposition, I disagreed with that implication, and articulated my understanding of the meanings of "use" and "consume." I also mistakenly used

[1] Exhibit A, Deposition of Stan McClellan, at 83:5-84:22 (emphasis added).

the term "power purchase agreement" when referring to certain aspects of the "power option agreement," which I later acknowledged:

Q So just to be clear so our -- **Your use of the word consume here means -- it doesn't mean physically the data center consumes the power by using it. It also could mean that the power is sold back**.
A **Consume is a transactional thing. Right. The consumption is a transaction where I'm consuming it. I have to dispatch that power some way**.
Q What do you understand the term performance strategy to mean in the context of the claims of the '433 patent?
A A performance strategy is deciding -- is a decision based on incoming data and conditions and monitored conditions as to how to dispatch the -- **how to dispatch the power that's been consumed through the PPA against bitcoin miners or not**.
Q So in your understanding of performance strategy could performance strategy be to not consume power?
A It could be --
Q I'm sorry. Let me -- I asked a bad question because I used the word consume in a different context. So in your understanding of the term performance -- the meaning of the term performance strategy, could a performance strategy be a decision for the load to not utilize power?
A As long as it complies with the minimums, yeah.
Q What minimums must it comply with?
A **The minimum thresholds in the PPA**.
Q If I understood -- if I understood -- You said PPA. I think the term from the patent is power option agreement.
A Yeah. That's -- that's –
Q Are you using the two -- Do you think there's a difference between -- Well, between a PPA which – What do you understand PPA to be?
A **I may have just used the wrong term**. I meant the contracted purchase of power at a certain rate.
Q Do you understand that the term -- do you understand there's such a thing called a power purchase agreement?
A Yeah. I've heard of that.
Q Do you understand –

20 A I think they're essentially the same thing, but
21 I'm not exactly sure of the difference.
22 Q That was my next question. Is there a
23 difference or not that you are aware of?
24 A **I tend to use them interchangeably, and that**
1 may not be exactly right.[2]

[10] I note that the Court adopted my broader understanding of the term "consume" for both the terms "consume" and "use," which the Court found to be interchangeable. D.I. 218 at 9. I also note that the Court found that some, but not all, minimum power thresholds may be zero. *Id.* at 13, FN5.

[11] The Court's Markman Order also does not change my opinion on Mr. Storms significant contributions to the conception of the subject matter claimed in the '433 Patent. Mr. Storms made significant contributions to claim limitations other than, and in addition to "power option agreement" and "minimum power threshold"

III. CLARIFICATIONS OF MY OPINIONS CONCERNING PLAINTIFFS' CONCEPTION/POSSESSION OF AND COMMUNICATION OF THE INVENTIONS DESCRIBED IN THE '433 PATENT

[12] My opinions have not changed regarding BearBox's possession of the inventions recited in claims 1-20 of the '433 Patent prior to meeting and communicating with Mr. McNamara and Lancium. The Court's constructions of the terms "power option agreement" and "minimum power threshold" do not change my opinions, and my opinion still stands for at least the reasons set forth in my Original Report and Reply Report.

[13] In addition, I provide the following clarifications concerning the interaction between the power entity associated with the delivery of power to a load and the load in the system Mr. Storms conceived.

[14] The term "power option agreement" appears in claims 1, 6, 12, 17 and 19-20 and "minimum power threshold" appears in claims 1, 5-6, 13-14, 17 and 19-20.

[2] Exhibit A at 85-87.

[15] Because each claim uses the terms consistently, the following analysis applies to each of the claims reciting the associated term.

[16] BearBox conceived of and/or developed technology that could receive and process "power option data based, at least in part, on a power option agreement, wherein the power option data specify: (i) a set of minimum power thresholds, and (ii) a set of time intervals, wherein each minimum power threshold in the set of minimum power thresholds is associated with a time interval in the set of time intervals" as recited in the claims above.

[17] As I noted in my earlier reports, the systems conceived of and/or developed by BearBox satisfy these aspects of claim 1 at least because the BearBox systems calculated profitability at distinct time intervals, each with an associated power threshold, such as comparing mining profitability based on, inter alia, current power usage and energy price conditions on the one hand with profitability based, inter alia, on expected future power usage and energy price conditions. To be clear, my opinion is not, and never was, that calculating profitability is necessary to meet these claim limitations. Rather, calculating profitability the way the BearBox system did is one way to implement the features recited in those limitations. For example, the BearBox system used multiple time intervals, including the day-ahead hourly intervals and real-time 5-minute intervals, each of which included an associated minimum power threshold used in periodically determining performance strategies (i.e. every five minutes). The BearBox system also included custom PDU software capable of providing fine grain load control (i.e. the ability to turn on some but not all of the miners) and also was configured to work modularly with a variety of different miners that had different power requirements.[3]

[18] I also explained in my earlier reports that, to the extent this feature is found not to be explicitly described in the BearBox disclosure, it is my opinion that merely ordinary skill would have been required to incorporate this feature. For example, the involvement of and communication with a power entity through a QSE in connection with power option agreements

[3] Ex. 5, Deposition of Austin Storms, dated February 23, 2022, pp. 99-100, 290. The numbered exhibits cited herein are to the exhibits to my Original Report.

(and the data associated with power option agreements) was well-known, conventional feature in the art at the time of the invention.[4]

[19] I listed in my Original Report and again below certain exemplary modules and files that I considered pertinent to my analysis and opinions. The noted modules perform functions related to receiving power option data in which minimum power thresholds at various time intervals are used to determine a performance strategy for the system. Non-exhaustive examples are listed below with reference to the current claim language. A detailed analysis of each module is provided in the Appendix.

1. arb_main_AEC.py - Processes marginal power price data to determine profitability of Bitcoin mining based on several parameters, and controls power to mining systems based on outcomes.
2. cgminer_sqlite_test.py - Remotely communicates with miners to retrieve status information
3. DA_LMP_import.py - Imports marketplace data and returns the day-ahead marginal power price (LMP)
4. DA_LMP_import_AEC.py - Imports marketplace data and returns the day-ahead marginal power price (LMP)
5. email_alert.py - Provides email alerts for mining machine states (on, off, restart, shutdown, etc)
6. EXELON4.py - Computes “break even” point for mining Bitcoin in dollars per kilowatt-hour.
7. get_current_RT_LMP.py - Fetches marketplace data and returns the real-time local market price (LMP)
8. miner_amort_breakeven_.py - Performs profitability determinations for dynamic power thresholds and manages mining system based on resulting performance strategy.
9. LMP_csv_import.py - Retrieves the marginal power pricing data from Southwest Power Pool marketplace
10. test_profit.py - Simulates a mining operation’s profitability

[4] I discussed these issues and facts with Frank McCamant by telephone on April 1, 2022, and I understand that his report explains these concepts in additional detail. I reserve the right to supplement my report based on any additional information that may be included in his report.

11. test_test_test.py - Simulates a mining operation's profitability.

[20] In my previous reports, I also explained how the information communicated by Bearbox described these aspects of the claims at least because the system contemplated distinct time intervals, each with an associated power threshold, and in the example provided comparing mining profitability based on, inter alia, current power usage and energy price conditions on the one hand with profitability based, inter alia, on expected future power usage and energy price conditions. For example, the annotated system diagram (reproduced below) shows the use of multiple time intervals, including the day-ahead hourly intervals and real-time 5-minute intervals, each of which included an associated minimum power threshold used in periodically determining performance strategies (i.e. every five minutes) to determine, for example, whether to mine Bitcoin.[5] The Bearbox system also included custom PDU software capable of providing fine grain load control (i.e. the ability to turn on some but not all of the miners) and also was configured to work modularly with a variety of different miners that had different power requirements. [6]

[21] The annotated system diagram is reproduced below:[7]

[5] Ex. 4, BB00000091-92.
[6] Ex. 5, Deposition of Austin Storms, pp. 99:13-100:16, 290:7-14.
[7] Ex. 4, BB00000092.

[23] I also stated in my Original Report that BearBox provided a comma-separated value (.CSV) file[8] that described various monitored conditions, including Bitcoin price, Bitcoin block height, real time LMP day ahead LMP, an estimated network hash rate and a network difficulty. This proprietary .CSV file also described and/or explained how to determine a generated mining revenue figure to be expect from using power to mine Bitcoin, a real time LMP revenue figure based on selling energy to the grid at the current real time energy price, a day ahead LMP revenue figure based on selling energy to the grid in the future at the day ahead energy price, and a realized revenue figure that represented the most profitable of the three other revenue figures. In some instances, the most profitable option was to mine Bitcoin (*see, e.g.,* row 2 and cells H2 and L2), while in other instances, the most profitable option was to sell energy to the grid (*see, e.g.,* row 7 and cells K7 and L7).

[24] In light of the Court's Markman Order, I clarify that the "minimum power threshold" limitation is met, for example, by the current and future expected energy usage values I noted above, which, in conjunction with the time interval data (e.g. five minutes) I referenced above, comprise the "power option data, based at least in part, on a power option agreement." The amount of power for exemplary "minimum power thresholds" is reflected in data of the .CSV file, for example, which shows revenues generated by selling fixed amounts of energy at various real-time and day-ahead energy prices (approximately 31kW in one simulation), or the revenue to be earned by using that same amount of energy to mine Bitcoin.

[25] In light of the Court's Markman Order, I also clarify that the "power entity associated with the delivery of power to a load" is depicted as "generation assets" in the annotated diagram shown above. The "generation assets" are depicted delivering power to the Bearbox/load by a lightning bolt in the diagram above. That this "power entity" has an "option to reduce the amount of power delivered to the load up to an agreed amount of power during an agreed upon time interval such that the load must use at least the amount of power subject to the option during

[8] Ex. 4, BB00000097.

[27] Mr. Storms confirmed these roles for the windfarm "generation asset" and BearBox load, as well as related capabilities of his system, at his deposition:

5 Q. In the context you're talking about, who
6 sells the power back to the grid?
7 A. Variety of different options there. **It could**
8 be the generator sells the power back. It could be the
9 mining facility sells the power back. It could be a
10 different market participant depending on the ISO.
11 Q. And what we've just been discussing, **is that**
12 part of what you maintain you talked to Mr. McNamara
13 about regarding how load can be controlled to maximize
14 profitability?
15 A. **Yes**[9]

. . .

6 Q. Could that system as it -- you know, model as
7 it existed, if it got a -- **if it got an instruction or a**
8 signal from a wind farm, for example, to go from 10
9 megawatts of power to 5 megawatts of power, could it do
10 that?
11 A. It could.
12 Q. How -- how would that happen? How would the
13 system accomplish that?
14 A. The system would turn off miners to
15 accommodate the decreased load.
16 Q. You only had one miner?
17 A. Oh, yeah. I'm sorry. So that system was
18 meant to simulate a larger build, and so the relay
19 controller used in the system within my apartment is the
20 relay controller that's used in each PDU, and it's the
21 same command to all of them to decrease the load to that
22 level.[10]

[28] These clarifying reasons further support my opinion that BearBox was in possession of each claim element of claims 1-20 of the of the '433 patent and communicated that information to Lancium by May 9, 2019.

[9] Ex. 5, Deposition of Austin Storms, p. 105 (emphasis added)
[10] Ex. 5, Deposition of Austin Storms, p. 226 (emphasis added)

IV. CONCLUSION

[29] As a result, it is still my opinion that BearBox and Mr. Storms conceived, devised, and implemented the technology which enables a computing system to adjust power consumption based on a power option agreement, and using some combinations of power thresholds, time intervals, and monitored conditions, which is disclosed in claims 1-20 of the '433 patent, and communicated that information to Lancium.

Dated: November 11, 2022

Dr. Stan McClellan

EXHIBIT A

UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

BEARBOX, LLC, and AUSTIN STORMS,	)	
Plaintiffs,	)	
-vs-	)	No. C.A. 21-534-MN-CJB
LANCIUM, LLC, MICHAEL T. McNAMARA, and RAYMOND E. CLINE, JR.,	)	
Defendants.	)	

Deposition of STANLEY A. MCCLELLAN, Ph.D. taken before CAROL CONNOLLY, CSR, CRR, and Notary Public, pursuant to the Federal Rules of Civil Procedure for the United States District Courts pertaining to the taking of depositions, at 233 South Wacker Drive, Suite 6300, Chicago, Illinois, commencing at 9:08 a.m. on the 3rd day of June, A.D., 2022.

There were present at the taking of this deposition the following counsel:

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appeared on behalf of the Defendants.

ALSO PRESENT:
Mr. Milo Savage, Videographer
Mr. Joseph Previti, Summer Associate
Marshall, Gerstein & Borun

I N D E X

DEPOSITION OF STANLEY A. McCLELLAN, Ph.D.
TAKEN June 3, 2022

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PREVIOUSLY MARKED EXHIBITS

Exhibit 55	Short Message Report, Date Range 5/4/2019 - 5/9/2019	189

THE VIDEOGRAPHER: Good morning. We are going on the record at 9:08 a.m. on June 3rd, 2022. Please note that the microphones are sensitive and may pick up whispering, private conversations and cellular interference. Please turn off all cellphones or place them away from the microphones as they may interfere with the deposition audio. Audio and video recording will continue to take place unless all parties agree to go off the record.

This is media unit 1 of the video-recorded deposition of Dr. Stan McClellan taken by counsel for defendant in the matter of Bearbox LLC et al. versus Lancium, LLC, et al. This case is filed in the United States District Court for the District of Delaware.

This deposition is being held at Marshall Gerstein, Borun, LLP located at 233 South Wacker Drive, Suite 6300, Chicago, Illinois.

My name is Milo Savage from the firm Veritext, and I'm the videographer. The court reporter is Carol Connolly from the firm Veritext. I'm not authorized to administer an oath, I'm not related to any party in this action, nor am I financially interested in the outcome.

Counsel and all present in the room, and everyone attending remotely, will please now state their

appearances and affiliations for the record. If there are any objections to the proceeding, please state them at the time of your appearance beginning with the noticing attorney.

MR. NELSON: This is Mark Nelson of Barnes & Thornburg, representing defendants.

MR. KAUFMANN: Adam Kaufmann with Barnes & Thornburg also representing defendants.

MR. RICORDATI: Ray Ricordati of Marshall, Gerstein and Borun representing plaintiffs.

THE VIDEOGRAPHER: Will the court reporter please swear in the witness, and we may then proceed.

STANLEY McCLELLAN, Ph.D.,

called as a witness herein, having been first duly sworn, was examined upon oral interrogatories and testified as follows:

EXAMINATION

By Mr. Nelson:

Q Good morning.

A Good morning.

Q Could you please tell the jury your name?

A My name is Stan McClellan.

Q And are you a Ph.D?

A Yes.

Q Do you prefer to be addressed by Dr. McClellan or Mr. McClellan?

A It doesn't matter to me. Most people use doctor.

Q So I noticed you have some materials in front of you. Can you identify what those materials are?

A Yeah. These are printouts of the initial report and the reply report, as well as exhibit material.

Q What exhibit material?

A I don't remember exactly which exhibits these were, but they're Bates labeled.

Q Are they exhibits to the reports?

A Yes, I believe so.

Q Do you have anything in front of you that is not an exhibit to the report?

A I think these are all exhibits.

Q Okay. Do you know that or you just think that?

A I'm pretty sure that's the truth, but I didn't print them out.

Are they all exhibits?

MR. RICORDATI: Yes. That's Exhibit 4 to the report.

MR. NELSON: Q Okay. You can just put those aside for now. We'll probably get to them shortly I'm sure

but --

A Okay.

Q Have you been deposed before?

A Yes.

Q How many times?

A Two or three.

Q Which one? Two or three?

A Three. Three.

Q Can you tell me the matters that you were deposed in?

A One was an intellectual property case that was fairly recent, another one was a -- wrongful injury case, and third one was a breach of contract case.

Q Okay. What was the -- Do you recall the name of the intellectual property case?

A It was WSOU versus Microsoft.

Q What was the technology involved?

A Cloud computing technology.

Q Source code level or --

A Source code review, expert reports, invalidity, rebuttals, stuff like that.

Q And you represented plaintiffs in that case?

A Yes.

Q What about the other two, what was the general

subject matter of those depositions?

A Well, the one was a wrongful injury case where -- it was Debra Nelson versus Sunbeam where a lady had been burned by a space heater, and the third one was F5 versus Newstar where there was a breach of contract issue.

Q And in those other two cases, which side were you representing? I'm sorry. Which side were you carrying as part -- on which side were you acting as an expert?

A In the space heater case, it was the plaintiff. In the breach of contract case, I don't recall. I believe it was the defendant.

Q Do you know that or you just believe that?

A That's best of my recollection right now.

Q Have you given -- So in those three cases did any of them go to trial?

A Yeah. The Sunbeam case went to trial about a year ago.

Q Do you know -- what was the result?

A Ms. Nelson was awarded damages.

Q Do you recall the amount?

A I don't know. I think it was a million and a half, something like that.

Q Have you ever had your opinions -- Have you given opinions in cases other than where you've been deposed?
A Yes.
Q And what happened in those cases to your knowledge?
A Typically they were resolved before they -- before the deposition happened. Oftentimes the legal team goes on to something else and doesn't notify me and that's how I find out that things have finished.
Q So as far as the opinions that you have given, whether they have been in deposition or otherwise, have you ever had them challenged?
A Yeah. In the -- there was a Daubert motion in the Sunbeam case.
Q Any others?
A No.
Q Have you ever had any opinions struck?
A No.
Q So I know you have been deposed before, but let's just go over just a couple of quick housekeeping rules. So I'm going to be asking questions today. There's a court reporter here, a videographer. You understand you're under oath, correct?

A Right.
Q You understand the court reporter is taking down your answers?
A Yes.
Q Is there any reason you can't testify truthfully today?
A No.
Q When were you -- Well, who retained you in this case?
A The defendant. Not the defendant. The plaintiff.
Q Do you recall the specific person that retained you?
A Austin Storms is the name of the plaintiff, and Bearbox, LLC.
Q Is he the one who called you and hired you, or did somebody else do that?
A No, I was hired through an aggregator.
Q Which one?
A Bar Group.
Q And did you -- did you talk to Mr. Storms -- Who made the decision to hire you is my question. Was it a lawyer or was it Mr. Storms personally?
A I spoke with Mr. Storms as well as his legal team before -- to make the hiring decision.

Q When was that?
A I don't recall specifically.
Q What did you and Mr. Storms talk about?
A We talked about some of the issues in the case, we talked about some of his background, some of my background, you know, basically run through my CV and just essentially an interview, I guess.
Q How long ago was that?
A I don't recall specifically. It was whenever I got first involved with this case.
Q When did you first get involved in this case?
A I don't recall the specific dates. I'd have to look at my -- I'd have to look at my notes. I think it was -- I think it was late last year, like November, December of last year.
Q Of 2021?
A Yes. I think that's -- sometime in that timeframe. I'm not exactly sure of the specific dates.
Q On that interview, did you and Mr. Storms talk about anything in particular? This is before you were retained.
A Before I was retained, yeah. The way those interviews go is, you know, I introduced myself and I go through different elements of my background and my CV and different types of projects that I've worked on and technologies. And then we go through a similar process as this right now, what cases have I been involved with, what positions was I dealing with and those kind of things, and then they introduce their issue, their case. Quite often, if there's a patent involved, they'll provide the patent or some documents for review beforehand. That's -- that's -- that's what happened in this particular case as well. I mean, they all kind of follow the same format.

Q Did you review the patent in this case before you were retained?
A I don't believe so. I don't believe so. That usually happens with specific types of cases. This is a -- this case has kind of an interesting twist. I may have looked at the abstract of the patent, of the '433 patent, but the majority of the discussion was, you know, basically going through my resume.
Q So can you summarize for me your technical experience? What's your area of expertise?
A Well, I have a background in -- I have a pretty broad -- pretty broad technology background in things related to signals and systems, largely signals and

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systems, and a lot of computer systems, computer networks, telecommunication systems, system integration, things like that. It kind of encompasses an enormous amount -- an enormous range of things so it's hard to summarize other than signals and systems and system integration.

Q What do you mean by signals and systems?

A Signals and systems is a fundamental part of electrical engineering that deals with the propagation of electromagnetic radiation, deals with characteristics of signals whether they're electrical or some other kind. It deals with how systems -- how systems process signals, how signals are turned into information, how information is changed or manipulated by a system. It's kind of a black box approach with things that gozintas and gozoutas out of and how things fit together.

Q Did you consider yourself an expert in bitcoin mining?

A I'm familiar -- I'm a little bit familiar with bitcoin mining. I wouldn't consider myself a great expert in bitcoin mining, but familiar with it.

Q When did you become familiar with it in the context of this case or otherwise?

A It's just general technical knowledge. I mean,

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it's a very popular area, so --

Q When did you -- when do you believe you became somewhat familiar with it?

A Several years ago. Couple years ago. We have -- we do senior design projects all the time. We've had some senior design projects that were related to understanding how bitcoin works, and so, you know, just dribs and drabs here and there with students and projects and so on.

Q Do you know what the block height is?

A I don't know what the -- the block height has to do with the size of the block in the chain, I believe, is what I recall.

Q Can you -- can you specifically tell me what that relationship is?

A Well, block chain is a kind of a weird perturbation -- perturbation is not the right word. A weird configuration of a linked list, and so hashes of previous blocks are inserted in the future blocks, and information can be inserted in the future blocks, blocks get larger, right. The individual blocks get larger and the chain grows so there's a difficulty metric that's associated with that.

Q And do you think that difficulty metric is the

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block height?

A The block height is -- My understanding of block height -- I'm not a bitcoin expert, but my understanding of block height is the size of the block, the complexity of the block itself.

Q What's the network hash rate?

A The network hash rate is how fast the network can turn around the validation of chains of blocks.

Q Is your understanding of the network hash rate is global or local?

MR. RICORDATI: Object to form.

You can answer. Object to form. You can answer.

THE WITNESS: I thought you said my name. Sorry.

I don't know. It's -- it's a metric that's associated with difficulty. I don't know if it's global or local.

MR. NELSON: Q Do you understand how bitcoin price is calculated in the market, not -- in the market?

A I have a basic understanding.

Q What's your understanding?

A The -- the bitcoin targets are released on something like ten-minute intervals and then -- then the miners try to validate the hashes, and then it becomes a

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bidding kind of a -- typical market bidding.

Q Do you have experience in the -- well -- Do you understand the difference -- Do you have experience in the energy markets?

A Not directly in the energy market, no.

Q Do you know what ancillary services are?

A Ancillary services can mean a lot of different things. In the power distribution market, ancillary services typically means things that are brought online on demand. It often means things are brought online on demand.

Q Let me ask it more specifically. Do you have an understanding with respect to the Electric Reliability Council of Texas, also called ERCOT, all caps, what ancillary services mean?

A I'm not an ERCOT expert.

Q Do you know what a controllable load resource is?

A Yes.

Q What is it?

A It's a load that can be controlled locally or remotely by ERCOT. It's a -- sort of a -- sort of a contractual business arrangement where ERCOT can command the load to shed.

Q And in a controllable load resource in this context, ERCOT is the one doing the commanding, is that right?
A I think it can be local or remote.
Q But who is making the decision whether or not the load will curtail, meaning shed?
A Typically it's ERCOT that's doing that because ERCOT has a -- ERCOT wants load to reduce.
Q Are you aware of any other situations where the ultimate decision was not ERCOT's?
A Sure. Every local provider sheds loads separately from ERCOT.
Q Can you give me a specific example?
A Often various substations will shed load at the feeder level and they have prioritized feeders for when they have emergency issues and they need to shed load and turn feeders off.
Q Is that a controllable load resource situation though, or is that simply a load --
A That's load shedding. That's load shedding. That's load shedding. It's not end point based. It can total the load resources, end point based load shedding.
Q Yeah. I think we were talking past each other. So my question -- original question, are you aware of any

situations where in a controllable load resource situation an entity other than ERCOT or another ISO is making the decision whether or not the load should curtail?
A Typically the control of the load resource is done by the operator.
Q By the --
A Or in this case ERCOT would be asking the operator shed the load.
Q Do you know what reg up is?
MR. RICORDATI: Objection. Vague.
THE WITNESS: You'll have to define that more.
MR. NELSON: Q In the context of ancillary services.
A No.
Q Do you know what reg down is in the context of ancillary services?
A No.
Q Do you know what nonspin is in the context of ancillary services?
MR. RICORDATI: Objection. Vague.
THE WITNESS: No.
MR. NELSON: Q Do you know what ERS is in that context?

A No.
Q Are you familiar with the difference of zonal or nodal pricing in the energy market?
A Vaguely, vaguely.
Q What do you know about it?
A Well, I'm not an energy pricing expert, but I understand that energy prices can be manipulated at different scales and at different times. So the zonal and nodal would be different scales.
Q Can you explain what you mean by different scales?
A Like geographic scales.
Q Are you familiar with what grid connected means?
A Uh-huh.
Q What does grid connected mean?
A Grid connected is something that's authorized to connect directly to the electric -- the service operator's facility.
Q What do you mean by service operator's facility?
A The service provider owns all of the electrical infrastructure, and if you're grid connected, you're allowed to connect to that. The point at which your

house is grid connected is the meter, for example.
Q Are you familiar with what behind the meter is?
A Uh-huh.
Q And what is behind the meter?
A Well, it kind of depends on your perspective, right. Typically behind the meter is on the service provider's side of the meter. Sometimes people refer to behind the meter as the user's side of the meter, so it's kind of a dependent term.
Q So in the context as you were using it earlier, the house would be behind the meter, the meter would be the point where it's connected to the grid. Is that fair?
A The meter is the point where the load connects to the grid. Typically behind the meter means inside the service -- My familiarity of the term behind the meter means inside the service provider's network. It can also mean outside the service provider's network on the load side of the meter. People use that term differently.
Q Okay. And on the load side of the meter, behind the meter would be sort of downstream from meter if you're thinking of electric -- if electricity flows from the generator ultimately to the grid to a meter and then to an end point, behind the meter would be after --

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on the downstream side of the meter in that context, is that right?
A Depending on how you're using the term behind the meter. If it's on the -- if it's on the load side of the meter, then it would be beyond the meter. If it's on the service provider side of the meter, then it would be closer to the generator than the meter.
Q So if I understand your definition of behind the meter, it could be on the same side of the meter as the generator if it's on the service provider side?
MR. RICORDATI: Objection. Mischaracterizes the evidence.
THE WITNESS: It's not my definition of behind the meter. I'm telling you that I have heard the term used in a lot of different ways, and it's kind of a positional term.
MR. NELSON: Q Well, I'm asking your understanding of it. I think you use it somewhere in your expert report, and I want to know what your understanding of behind the meter is.
A It depends on the context. Behind the meter in a forward flow case often means downstream of the meter. Behind the meter in a backward flow case typically is used to mean on the generator side of the meter.

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Q What's your understanding of behind the meter in this case?
A I'd have to look specifically at what the context it was used in. I don't recall. I don't recall the entirety of the report. I'd have to look at the context it was used in.
Q Okay. You can't -- you can't give me that understanding without looking at the report?
A You're asking specifically for the context of how the behind meter term was used in the report, so -- and I don't recall the entirety of the report, so I'd have to look at the context it was used in.
Q So your answer is no, you can't tell me your understanding of behind meter in this case without looking at the report, is that right?
MR. RICORDATI: Objection. Asked and answered.
THE WITNESS: If you want me to get more specific about what the specifics of behind the meter mean in this case, I'd have to look at the context in the report.
MR. NELSON: Q Do you know what transmission and distribution costs are for energy, electricity?
A Uh-huh.
Q What are they?
A They're the costs associated with transmitting

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the energy from the generator to the distribution grid, and that's the T. And the D is the cost of the moving the energy through the distribution grid to the load.
Q Do you know how they're calculated?
A No, that's based on a lot of different factors.
Q What factors are you aware of go into the calculation?
A Well, there's the cost of the wires, there's cost of maintaining the wires, there's the people costs that are associated with the wires, there's the cost of the transformers, there's the cost of the energy, there's the cost of the ground, the facilities. I mean, it's a --
Q Do those costs --
A Those are all costs that are associated with the transmission and distribution infrastructure.
Q Okay. Do those costs vary depending on whether the generator is a renewable or whether the generator is a nonrenewable?
A I'm not familiar with the calculation of those specific costs. I would assume that they change based on that.
Q Do you consider yourself an expert in source code?

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A Uh-huh.
Q Do you know what the term open source means?
A Uh-huh.
Q What's it mean?
A Typically it means source that's been community developed or initially developed by one or small group of people that have been provided on one of several different sites for the community to participate in the development of.
Q Have you ever written source code yourself?
A Yes.
Q What languages do you write in?
A Depends on the needs of the project. A lot of different languages.
Q Well, tell me the languages -- tell me the languages of source code that you know how to write in.
A We'd be here all day.
Q Well, give me a high level summary. Give me an approximation of how many languages.
A 50. I don't know. There's some that are nonstandard. One called Staple, for example, that's specific to a particular system. CEC plus plus, Python, Java, Java Script -- I mean, Rust. It goes down the line.

Q Okay. That's fair.
When is the last time you wrote something -- you wrote code in Python?
A Yesterday.
Q For what project?
A For -- for a communications analysis project that I'm working on.
Q In the bitcoin space or in another space?
A Has nothing to do with bitcoin.
Q Is there anything specific about bitcoin that makes Python sort of the code of choice for bitcoin or not?
A Python is the code of choice for a lot of different things because it's pretty easy to use and it has a lot of tools and a lot of -- a lot of community support. There are a lot of packages that can be easily included that can provide really specialized facilities that you don't have to deal -- It's very easy to include capabilities in Python that extend its functionality rapidly. So it's a good language for a lot of different things.
Q Have you ever used -- have you ever used open source software in the context of your writing code?
A Oh, yeah. All the time.

Q You have to pay for that, or is it free?
A Typically depends on how it's licensed. There's a bunch of different open source licenses. It depends on how it's licensed and how you use it. Sometimes you don't pay exactly for the code, you pay for the service that surrounds the code, the service and support that surrounds the code.
Q Is it -- is it also free many times? Is open source code free many times?
A Often.
Q Do you think -- is it more common that open source software is made available to the public for free or is it more commonly licensed in some fashion?
A I haven't -- I don't know the statistics on that so I can't say what's common or not. There are a lot -- 15 or 20 different open source licenses that have different criteria and people choose -- the author of the code chooses which license to publish the code under and that creates constraints on how the code is consumed and used after that point. I'm most familiar with GPL variants of licensing because those are the ones that certain often used code packages that I deal with are licensed under.
Q Do you know if Python is licensed under a code package or not? Strike that. That's a bad question.
A I thought you meant to say if it has a license, an open source license. I'm sure it does. I don't know what it is.
Q So you provided -- you provided your CV in connection with this case, correct?
A Yes.
Q One of the exhibits to your report.
A Yes.
Q Is that your most current CV?
A It changes almost every day. I don't know what the date was that that CV was provided. I'd --
Q I'll hand it to you in a minute, but just let me --
A That's why there's a date in it.
Q Yeah.
A That was current as of the date that was stamped in it, but it changes every time a paper is published or every time a student graduates or whatever.
MR. NELSON: So, Counsel, to the extent we don't have the current CV, could you produce that to us?
MR. RICORDATI: Yeah, we can get that.
MR. NELSON: Q And let me hand you what we'll mark as Defendant's Exhibit 200, which was a copy of the CV

that was included in the case.
A The date in the top right-hand corner of this actually answers three separate questions that you've already asked.
MR. RICORDATI: Do you have a copy for me?
(Exhibit 200 marked as requested)
THE WITNESS: You asked earlier when I was first involved with this case. December the 8th. That would have been when I provided my CV for the --
MR. NELSON: Q Okay. Do you know why the decision was made to retain you in this case as opposed to somebody else?
A I'm not privy to that thought process.
Q What did you tell Mr. Storms and his counsel during your interview regarding your opinion on the case before you were retained?
A I didn't have an opinion on the case before I was retained. We just looked through some of the basics of it, and then, you know, as I mentioned before, the -- went through the CV during the interview.
Q So let me focus your attention on your list of cases. I think they're -- trying to find the right page here. If you turn -- You've got a recent consultancies page.

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A Uh-huh.
Q Let me ask you this. Go to your selected publications page, which should be on page 18.
A Yeah.
Q Is that -- is that a list on pages 18 going over to page 20 and ending on page 23, is that a list of all of your publications and presentations, or is that a subset?
A It's a subset.
Q So what criteria did you use to create the subset?
A These are typically the publications that academic institution care about. They're called peer-reviewed publications.
Q So the selection here on the CV, was it made for this case, or was it just otherwise what you did?
A No, no. This is the subset of quote, unquote, peer-reviewed publications. There's lots of other publications that are not on this because they were not peer reviewed so academic institution doesn't care about them.
Q So if you look at page 12, recent consultations.
A Uh-huh.

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Q Let me hand you a pink highlighter if I can and ask that you highlight in pink the cases where you were retained by the plaintiff's side.
A It already has that in here, doesn't it?
Q I was having a little trouble figuring out that's why I asked that you just highlight in pink just so it's real clear.
A This is a version that doesn't specifically say which one is which. Okay. Plaintiff would have been the Sunbeam case, the Microsoft case -- all three of the Microsoft cases. There's four. One of them was dropped. There's the other Microsoft cases and HP. So all the ones on page 12. I don't know about that one. I don't know about that one.
Yeah, it does, it says for plaintiff. If it says -- in the law firm line for all of them, in the fourth or fifth line after every bullet, it says law firm, blank, blank, blank law firm for plaintiff. So you can tell by looking at that line on those which one is the plaintiff. So --
Q Okay. Some of them don't have it --
A It's listed in there if I knew it. There's one I didn't know which was the inter partes review, that wouldn't have been plaintiff. That was for defendant,

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that one is for defendant. That one is for -- yeah, it says it in there, in that last line.
Q Okay. So the pink ones are the ones where you represented -- where you represent plaintiff, correct?
A Yeah. The ones where it says law firm and then the name of the law firm, for plaintiff.
Q Okay. So let's talk about the IPR one. It's the third bullet point down on page 13.
A Uh-huh.
Q Were you on the patentholder side on that --
A I was on the American Express side of that.
Q Was that the --
A I believe they were the defendant.
Q The challenger? The patent challenger?
A That one has been a while back so I'd have to look -- I'd have to look at the notes.
Q Okay. And then let me hand you a yellow one, and if you can highlight the ones where you know you represented -- you represent the defendant. I understand the law the firm is in there on some of them, but it's not in there on all of them.
A The only one that's not in there for is the IPR case with American Express.
Q And that one you were on the American Express

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side?
A Yeah.
Q If you hand me the highlighters back, I appreciate it. Thank you.
On your list of publications are there publications in the last ten years that are not on your CV?
A Yeah. I think I've already answered that. The ones that are -- the CV only contains the ones that are quote, unquote, peer reviewed. So there's publications that are not peer reviewed that are not contained in there. Examples of that would be reports that are internal to an organization or reports that are -- or papers or any other sort of output that was not submitted to a collection of referees for evaluation. So there's lots and lots of those.
Q Have you ever written source code for a load that connected it to the electrical grid?
MR. RICORDATI: Objection. Vague.
THE WITNESS: For a load connected to the electrical grid. Yes.
MR. NELSON: Q What? Give me an example.
A Well, in about 2018 timeframe I started a company -- we can look on -- where is it? At the bottom

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of page 7, it's about 2008 timeframe, Power Tagging Technologies. That company developed devices that were both -- that were loads for a grid that were inside the -- depending on -- where you talk about behind the meter, they were on the provider side of the meter, they were on the client -- they were on load side of the meter, they were on the service side of the meter, they were in the substation. All of those had software associated with them.

Q What were those products?

A Those were -- the products did slightly different things to form a sort of reconnaissance for the feeders. So the device would -- depending on where it was installed, it would listen -- essentially -- the best way to think about this is sonar. It was sonar for a -- for an electrical feeder. It would listen to what was going on on the electrical feeder, it would process the data, it would make some sense out of the data, and then the devices would communicate with themselves at ultra low frequency on the feeder wire itself.

Q And what was the purpose of these products?

A It was to create a control system that extended beyond the substation and directly into the individual load. So it made the individual load -- it integrated

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control and reconnaissance for individual load devices in with a larger control system that was situated at the substation. So it allowed the provider to control the characteristics of the load; turn it off and on, tell it to stop consuming power. It also allowed the load device to communicate its status with the provider side devices. It allowed the provider side devices to communicate between themselves with status, and so on. So it was a state management control and state management system.

Q What was -- Is this company still in existence?

A No.

Q Did you ever sell any products?

A The company I believe was consumed by a division of Dominion Power, and the technology is still used by the spinoff -- a spinoff that Dominion Power made to do distributed voltage optimization.

Q Was the products that you were involved in code for, were they ever -- were they ever sold?

A Yes.

Q What were their names?

A I don't -- intelligence module. Something like intelligence module. Like a feeder intelligence module, a transformer intelligence module. It was -- depending on where they were sitting, it was -- the first letter --

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the first word was whatever that thing was, and then intelligence module. So it was -- it was something intelligence module depending on where it was sitting in the grid.

Q What was the cost of the product? Do you remember?

A I don't remember.

Q $100? $10,000?

A It was different depending on where they sat. I mean, the ones that sat at the substation were tens of thousands of dollars.

Q What about if they sat in other places?

A I don't believe we ever successfully commercialized the ones on the load side -- directly on the load side because that was a partner play. That wasn't -- you had to have those embedded in the device. So it was a white goods partner play. You wanted them embedded in the water heater, you wanted them embedded in the washing machine, you wanted them embedded in the car, whatever. So not an aftermarket addon.

Q So on the load side, these were small chips, that kind of stuff that would control a washing machine or refrigerator, something like that?

A The downstream control part was -- when you use

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the term small chip, the downstream control part was small. The upstream part was large -- was physically pretty big. It was the size of a softball. Maybe a little bit bigger than a softball.

THE VIDEOGRAPHER: Excuse me. Mr. McClellan, can you kind of move to the center of the table?

THE WITNESS: I'm sorry.

THE VIDEOGRAPHER: That's fine. Thank you.

MR. NELSON: Q So you gave reports in this case, correct, you submitted reports, expert reports?

A In this present case, yeah.

Q Yeah.

A They're right here.

Q And did you -- let's talk about your initial report first. Did you write that?

A I created the initial draft, and then -- these things have a certain format to them, so the legal team fixed the format and I contributed content from that point on.

Q So did you physically write any of the report?

A Oh, yeah.

Q Do you know how much you have been paid in connection with the initial report and whatever went into that?

A You mean a cumulative total of what I've been paid?
Q Well, I was going to get to that. I was trying to figure out sort of for the first report do you know how much you were paid for that.
A It's on an hourly basis. It's not on -- it's not on a deliverable basis. I'd have to go back and look at -- So I don't know. I can't tell you how much for this piece of work or this piece of work. It's done on an hourly basis.
Q Can you estimate the amount of hours you've spent on this case so far?
A Not offhand. I'd have to look at the billing slips.
Q 50?
A Probably on the order of that, yeah.
Q Total?
A Yeah.
Q What's your billing rate? What's your hourly rate?
A $320 an hour.
Q Let me get this mark as Exhibit 2 -- 201. Sorry.
(Exhibit 201 marked as requested)

Q Can you identify Exhibit 201, Defendant's Exhibit 201?
A It looks like the list of files. It's a listing of files with Bates labels.
Q And this I believe should be Exhibit 2 to your report. Is this the list of materials you considered in connection with your first report?
A It looks like it.
Q Did you consider any other materials other than what's listed here in preparing your first report?
A I don't believe so. I mean, the purpose of this list is to be a comprehensive set of materials that were used in preparing the report.
Q Did you prepare that list or did counsel prepare it?
A Well, this -- The Bates-labeled items are provided on website type interface. And so the list is created based on what's provided through that website interface. And if I find other materials, then they get kind of incorporated into that.
Q So the materials you looked at, did -- how did you get those materials? Were they provided by counsel, or were they given to you in another way?
A I think -- the website interface that's made by

the legal team is provided to me, and it has all these things in there with their Bates labels. And then if I have to -- if I -- I'm speaking in general terms. If I look around and find something else, then it goes into that repository as well. I don't believe that I added anything to this repository. I don't recall adding anything to this repository, so they were provided by counsel.
Q And I guess my question is, how is it determined what you looked at? Did you get the materials from counsel, hey, you know, Dr. McClellan look at this and this and this, or was it done in some other way?
A Well, the -- counsel provides the web interface, and it has all the materials that are associated with the case, and a lot of those materials are background stuff. In this case it was source code, pictures of brochures, emails. This one actually had CSV files. The source code was Python. So the repository that was provided to me was pretty comprehensive, and it contained all the background information for this case. There was no need for me to go find something else.
Q Well, when you say background information for this case, what do you mean?
A The information associated with the case.

Q But is it-- Do you know if what you were provided was the entire information associated with the case or some subset of that information?
A I don't know. I looked at the materials that were provided to me. I can't -- I can't tell you if they were a subset or if they were -- is other stuff that was not provided to me.
Q Well, I guess when you say provided to you, was it provided to you in a way that, okay, Dr. McClellan, here is a set of materials for you to look at, or was it provided to you, here's a website, go find materials?
A Well, it's a secure website that has materials in clusters, and I was -- review of the material in the different clusters and decide which parts of that material was important to creating a report. One of those clusters, for example, was the source code. So review the source code. One of the clusters was the set of documents that were -- sort of communications documents. So the stuff was sort of pre-clustered, and it was presented to me through the secure website for me to review and create an opinion about based on those materials for the purpose of creating the report.
Q I notice that there's only a few Lancium documents here. Did you review any additional Lancium

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documents in preparing this report other than the ones listed?
A We're talking about the initial report?
Q The initial report.
A No, I don't believe so.
Q So was the source code provided to you electronically through a website or in some other way?
A Yeah. The secure web portal that's provided to me has clusters of information. One of those clusters was PDFs of the source code with Bates labels, and one of those clusters was PDFs of communications, and another cluster was PDFs of background documents and stuff like that. So the secure web portal has clusters of information that's not digested, it's just partitioned.
Q So your initial report has -- Let me go ahead and just mark that. We'll get this document marked as Exhibit 202.
(Exhibit 202 marked as requested)
THE WITNESS: What time was it when we started? You know, was it 9:00 o'clock?
THE VIDEOGRAPHER: 9:08.
MR. NELSON: Q So can you identify Exhibit 202 for me?
A It says Expert -- it looks like my expert

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report dated April the 5th. It's the same as this one.
Q Okay. Can you look at the last page? Is that your signature?
A Yes.
Q Does that --
A It's thinner than this one. Is that because it's printed double sided? Yeah.
Q Yeah. I'll represent that to the best of my knowledge it's a complete copy. I think it's just printed double sided.
A Okay.
Q It may not have the two Exhibit 1s and Exhibit 2 on there.
A Okay.
Q Does Exhibit 202 contain your opinion -- your initial set of opinions for this case?
A Yes.
Q Without looking at the report, can you summarize what those opinions are?
A Without looking at the report. Can I summarize what the opinions are? The opinions are that Austin Storms and Bearbox had some technology and -- that was in advance of the technology that Lancium possessed, they had a meeting, and some of that technology knowledge was

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transferred, and then Lancium began to use that technology in their products without attribution. That's a loose summary.
Q And when you say they had a meeting, you're talking about the group dinner that Mr. Storms, Mr. McNamara, and six other people attended?
A My understanding is that there were a time period where there was interaction. It wasn't just necessarily a face-to-face meeting. It was a face-to-face meeting -- at least one face-to-face meeting, as well as emails, as well as other types of interaction. I mean, I think Mr. Storms provided some critical information to Lancium via email, so that was part of that interaction period.
MR. NELSON: Objection to form. Nonresponsive.
Q My question simply was about you characterized it as a meeting, a face-to-face meeting.
MR. RICORDATI: Objection.
MR. NELSON: Q That face-to-face meeting was, in fact, a dinner with -- attended by 8 people at a restaurant after a happy hour, isn't that right?
MR. RICORDATI: Objection. Mischaracterizes the testimony.
THE WITNESS: I don't think I said face-to-face

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meeting. I think I said that there was a meeting and then there was a period of interaction. The meeting may have been the first part of the period of interaction. Typically meetings get set up with prior interaction. So there had to have been some period of interaction that set up the meeting which -- the dinner, let's say. So there had had to have been some sort of interaction that set up the dinner and then there was interaction that followed up the dinner. So there was a period of interaction that was at least one face-to-face meeting as well as electronic interactions.
MR. NELSON: Q And I want to focus -- I understand your opinion is that this is all sort of one event and that's --
A It's not one event. It's --
Q I want --
A A period of interactions.
Q I want to focus on the meeting first. You characterize it as a meeting. My question is, what you characterize as a meeting was a dinner at a steak place after a happy hour attended by 8 people, correct?
A That was -- that sounds like it was one of the period -- one of the interactions in that period, yes.
Q I'm asking you was that the meeting that -- You

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used the term meeting, and that meeting was in fact a dinner of 8 people -- a dinner attended by 8 people at a steak house after a happy hour, correct?
MR. RICORDATI: Objection. Mischaracterizes the testimony.
THE WITNESS: I believe there was a conference where they -- It's not clear to me if they had interacted before they met at the conference or if they met at the conference and then continued interacting, but there was at least one meeting that was associated with that conference. Whether it was a dinner, whether it was at the conference on the exhibit floor, whatever, there was at least one face-to-face meeting in there. I know that there was a dinner. I'm aware that there was a dinner.
MR. NELSON: Q Do you know whether Mr. Storms and Mr. McNamara met -- first met at a happy hour following the conference?
A I don't know when they first met.
Q Did you -- Let me ask you this. When you prepared your report, did you talk to Mr. Storms as part of the preparing your report?
A Yeah, a little bit.
Q When did you talk to him?
A Right at the beginning -- right at the

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beginning before we started -- we also talked to him a little bit about some clarifications of some of the source code. I mean, there was several different interactions over about a three-month period.
Q And in the context of your conversations with him, did you rely on anything from those conversations for preparing your expert report?
A Say that again.
Q In the -- You had several conversations with Mr. Storms in the context of preparing this report, correct?
A Yeah. They were mostly around clarification of what's in the source code or clarification of what's in one of the documents.
Q And my question is, is in preparing your report, did you rely on the information provided by Mr. Storms?
A No, I relied on the information that was in the documents.
Q So you did --
A I had to get some clarification from him regarding how these went together or what sequence they came in.
Q And -- I guess my question is -- I'm trying to

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be specific with it. Is -- in getting those clarifications, did you rely on those clarifications in preparing your report?
MR. RICORDATI: Objection. Asked and answered.
THE WITNESS: I rely on them in -- I would have relied on them only to clarify something that was a sequencing issue or, you know, what does this mean, you know, what is this term -- what is this variable describing.
MR. NELSON: Q So the answer is yes in the context of getting the clarification, you would you then use that clarification in preparing your report, is that fair?
MR. RICORDATI: Objection. Mischaracterizes the testimony.
THE WITNESS: I don't say it's used the clarification in preparing the report. It might have used the clarification in dismissing something that was not germane to the report or didn't have anything to do with the issue that I was looking at right at that time. So I'm not exactly sure how to answer that question because rely on -- did I use it? Yeah. I might have used it dismiss something. But did I rely on it to put something in the report as a result? Only to -- only to the extent it helped clarify -- helped validate what I

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was seeing.
MR. NELSON: Q What specific variables did you request clarification on?
A I don't recall.
Q Did you write the legal principles that are in this report?
A No, those were provided to me to understand.
Q Did you rely on any legal principles other than what's in the report in forming your opinion?
A I'm not a lawyer.
Q That wasn't my question. My question was, other than the legal principles set forth in this initial report, Exhibit 202, did you rely on any other legal principles?
A No. I mean --
Q They're in the report?
A Yeah.
Q Wasn't a trick. Just trying --
A I don't know any other legal principles. I'm not a lawyer.
Q Let me have you turn to your report real quick, Exhibit 202. Go to paragraph 6. Paragraph 6 says: Multiple methods were used to analyze the relevant technologies.

Do you see that?
A Uh-huh.
Q What multiple methods were used?
A Well, to analyze documents, you read the documents. To review source code, you read the source code, and then in some cases, you try to run it.
Q Did you try to run the source code here?
A There's a couple things that I took pieces of and tried to run them and make sure they made sense.
Q What were those?
A I don't -- It was -- I don't even recall offhand. I'd have to look -- I'd have to look back in my notes to see if I even recorded what was being looked at at the time, but analyze relevant technologies and items in development. I mean, it's a matter of reading a document or looking at a picture and reviewing source code. And reviewing source code is not reading a document. It's a different kind of analysis process.
Q What do you characterize reading or source code review to be that's different than reading a document?
A Well, when you're reading source code -- I'm talking about in general --
Q I'm talking about source code here.
A Okay. With this source code, sometimes, you

know -- you have a notebook and you're going through the source code and you kind of draw a picture or you make notes about well online something, something this did this, and then you go to some other part of the source code and, oh, that relates to that and you draw an arrow. It's just an analysis of -- Source code is not something that you read like you read a text. It's something you parse apart because it's functional. Right.
It's much closer to -- it's much closer to looking back and forth between footnotes and references in a document than it is just reading a document. So that's why it's source code review rather than reading source code. That's my point.
Q Other than -- Let's go back. You said you tried to run some of the source code. Why did you do that?
A Because I thought it was interesting.
Q What was the format it was provided to you in to try to run it?
A It was provided -- it was provided in -- I think it was provided in native Python format as well as PDF with Bates labels. There was two separate categories. Remember, I talked about the web thing with the category. There's one category with -- there was

source code not Bates labeled and there was source code Bates labeled.
Q And do you recall the modules you tried to run?
A No. I didn't try to run modules.
Q Well, what would you characterize -- What's the correct word for what you tried to run?
A Pieces. Pieces.
Q So -- You don't recall the -- What was -- Do you recall the functionality of the pieces you tried to run?
A No.
Q Did it work?
A No because I wasn't trying to do it in the context of -- Well, I mean, it worked in my context. It wasn't -- didn't work in this context. I didn't try to execute this source code for the function for which it was made.
Q When you said it executed in your context, what do you mean?
A Well, you look at the source code and go, that's an interesting way to try to do that, let's see if it works a different way. If I can make it more efficient or if I can apply it in a different context. Right. Sometimes the source code that he had was not

real well formed, so it would -- just kind of like a mental exercise, that's an interesting -- that's kind of an interesting way to do that, let's see if there's a better way.
Q So other than document review and source code review, did you use any other methods in analyzing the materials from this case?
A Not that I recall. I don't believe so.
Q Looking at paragraph 7, it says your source code review involved analyzing the structure and design of the Bearbox technologies, including identifying architectural and functional elements of the Bearbox product suite which contains technologies, protocols, and architectures or which exhibits functions, behaviors, or structures that may infringe on corresponding aspects of the subject patents.
Do you see that?
A Yes.
Q So what are the architectural things you're identifying there?
A Well, architectures means what are the large scale functional chunks. Right. So there's a database, oh, we're going to interface with the database. That's an architectural chunk. We're going to interface with

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something that's across the network. That's a different architectural chunk. We're going to loop through these things. Oh, okay. That's a different -- just like what are the different zones or levels of functionality.

Q How does that compare to the functional elements?

A Architecture is a collection of functional elements typically. So an architecture is an area of source code or a relationship between functional elements that may be doing something similar or doing something that's somehow interrelated.

Q So you say the Bearbox product suite. What is that?

A That's the collection of the code.

Q Anything else or just the code?

A Well, it's the code -- it's the code and the functionality of the code, right. Bearbox also -- part of their product was -- part of their product suite was the cage and the PDUs that were being controlled by the code.

Q When you say cage, what do you mean?

A It was a box.

Q You're talking about a mining container?

A A rack, yeah.

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Q Mining container with the racks in it --

A The PDUs and wiring and stuff.

Q And when you say rack, you mean just like almost like a shelf that miners fit into?

A A place to put a computer.

Q When you say PDUs, what do you mean?

A Power distribution unit.

Q And what are those?

A Power distribution unit is something that's used in a -- in a IT context where bulk power comes in. It typically at that point is converted to DC, sometimes it's just split, and then there's controls on every outgoing link to different devices.

Q And --

A It monitors itself.

Q Is a power distribution unit -- is that something specific to this case, or is that something --

A No, that's common.

Q That's a common thing.

You said the PDUs modify -- monitor themselves. How do they do that?

A PDUs is a -- The concept of a PDU is a very broad area of technology. So PDU in general is a device that accepts bulk power and then splits it out typically

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to save cabling. Some PDUs monitor themselves. They have temperature sensors, they typically have fans, they see if they get too hot and they turn their own fan on. They monitor the incoming power and can shut things off if the power fluctuates in certain ways. So it depends on the intelligence built in the PDU. A PDU is a bulk -- accept bulk power, split it out. You can create some intelligence in that process depending on characteristics.

Q And how is that intelligence created?

A It depends on the -- depends on the vendor of the PDU or the functionality of the PDU.

Q And the -- We call those intelligent PDUs. Has that been around for a long time?

A In different markets. Right. Like in the telecom market, there's very sophisticated power distribution devices. For example, in events telecom compute -- ADC, it's a standard architecture for bladed systems to fit in. It has a very complicated power distribution setup that has onboard and offboard intelligence to control the power that's distributed to monitor the power that's distributed, to make sure if this device needs 12 volts that it's always getting 12 volts to make sure the voltage doesn't fluctuate. I

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mean, the intelligence of the PDU is typically application dependent.

I mean, there are also PDUs. I mean, A power strip is a -- a conventional power strip that you plug into the wall that -- you plug it into one plug and it has six plugs, that's a PDU, a type of stupid PDU.

Q If you turn to paragraph 9 of your report. You have a -- you start that with, I understand that Bearbox and Austin Storms developed a system, and then you go on to explain some of the pieces of that. Do you see that?

A Uh-huh.

Q What -- what -- So is your description there in that first sentence, is that your understanding of what Mr. Storms' system was?

A The first sentence of paragraph 9?

Q Of paragraph 9.

A I understand that Bearbox and Austin Storms developed a system that utilizes a set of bitcoin miners under the direction of a control system that uses these various things. Yes, it's a vertically integrated system.

Q And your view of his system, could a system be just one minor or did it have to be more than one miner?

A I think his thing was -- was set up to have

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multiple miners, but it could scale down or up.
Q Is it your understanding he physically built this system with multiple miners?
A I don't know. I don't know if he physically built and deployed the system. I know that he simulated it, and I think he had -- I know that he had -- based on the documents that were provided, it seems like he had prototyped a custom PDU device for a chassis and was able to control it.
Q When you say a chassis, what do you mean --
A Chassis, cage, rack, collection -- a thing that contains a whole bunch of computers.
Q So let me ask it then because I'm not sure I understood your answer. So my question was whether a system that utilized -- you say that Mr. Storms developed a system that utilizes a set of bitcoin miners under the direction of a control -- of a control system then, and you go on. My question is, in your use of the term system there that you utilizes a set of bitcoin miners, would you consider it a system if it utilized only a single miner?
A Yeah. It would be a system that had an arbitrary number of miners as well as API calls, custom PDU logic, fan control, logic to process the information,

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yeah. Doesn't matter how many miners are in there, it's still a system.
Q So you say that part of that is the custom PDU logic and fan control to provide fine grain load control for the miners. Do you see that?
A Uh-huh.
Q What do you understand fine grain load control to mean?
A Well, it's the ability to control a load with high resolution in a combination of resolution and time and in output; input, output.
Q And what -- what code do you believe that Mr. Storms -- Do you believe Mr. Storms had any code that actually accomplished that?
A Yeah, I think that's contained in the source code.
Q Which pieces?
A Well, we'd have to look specifically through the ones. There's a lot of -- Maybe I can find the names. I don't recall offhand, but I think all the ones that are arb_main -- arb_main something kind of have the entirety of it in there. I'd have to look. I don't remember the exact names of the modules, but there's -- there's test things. There's -- I think arb_mains are

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the one primary ones that have the whole thing in there, but I'd have to look at the source code to be absolutely sure. I can probably look at the summary of the source code in the appendix.
Q So in your view fine grain load control then is more than simply turning miners on and off?
MR. RICORDATI: Object to the form.
THE WITNESS: Well, fine grain load control is control of the load at something more than just a gross level.
MR. NELSON: Q Let's suppose that the load is a group of bitcoin miners. If you had a control system that turned those bitcoin miners on or off in response to some variable, is that fine grain load control?
MR. RICORDATI: Object to form.
THE WITNESS: I think that would have to be defined more specifically because you could have fine grain in terms of time, right. So you can turn something on and off, and that's gross load control in terms of throughput maybe, but if you do it really rapidly, it's fine in terms of time. So fine grain has two dimensions, more than two dimensions probably, but two really obvious dimensions.
MR. NELSON: Q So one is time. What's the other

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one?
A Outcome or power. You've not power in, you've got outcome out.
Q Okay. So if you had a system that could turn a group of bitcoin miners off within 5 minutes of the power -- well, if you had a system that could turn a group of miners off and on within 5 minutes of the power reaching a certain price point, is that fine grain load control?
MR. RICORDATI: Object to form.
THE WITNESS: Within -- turn the group of miners as in total on and off?
MR. NELSON: Q Yes.
A Within 5 minutes?
Q Of a price reaching a certain point -- power price reaching a certain point.
A That would be stretching it. That's not fine -- In my mind that's kind of gross control.
Q Okay. Well, then what would you need to add to that hypothetical to make it fine grain load control?
MR. RICORDATI: Object to form.
THE WITNESS: Well, the within 5 minutes problem -- the within 5 minutes is a problem because that's really bad lag. Being able to address the miners in groups would create a form of finer grain control rather than

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all of them at once. One at a time or two at a time or just the top ones or just the bottom, that would be a fine grain control. Being able to do it -- in different groups and at different times would be a different resolution of the finer grain.

You have a collection of things, and those things are individually using power and producing output. So if you control those things individually or in groups, that's a form of -- that's one dimension of finer grain. Right. If you can control -- on and off, control, that's one form of finer grain. If you can reduce their consumption of power, that's a different form of finer grain. If you can turn them off in different sequence at different times, that's a different dimension of finer grain. We're talking about a multi-dimensional partitioning here, and being able to partition in smaller pieces is the essence of finer grain.

MR. NELSON: Q So going back to paragraph 9, number 3 says the system include custom logic to process the information and periodically term mining profitability.

Do you see that?

A Uh-huh.

Q What do you mean by us custom logic there?

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A Well, custom logic is logic that's specific to the application. So it's application specific logic or logic that's been developed for a particular purpose. And in this case the logic that's developed for a particular purpose processes information that's coming in and on some schedule makes a determination.

Q What is that logic? I mean, specifically in this case, what is that logic that Mr. Storms -- that you allege Mr. Storms has?

A That's the logic that's embodied in the Python code.

Q All of the Python code or particular modules of it?

A It would be particular places and particular modules.

Q Is that logic anything else or is it the logic that's embodied in the code?

MR. RICORDATI: Object to form.

THE WITNESS: Well, the code -- the code is an implementation of the application purpose. So the code -- the application purpose gets translated into the code. So the code is an embodiment of the application purpose. There may be other things that are outside the code that also participate in the application. So it's -- it's not

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that all of the custom logic exists inside the code, but there is custom logic inside the code that performs this application.

MR. NELSON: Q Well, if there's custom logic that exists outside the code in this case, what is it? Where does it exist?

A Well, it would be the way that the system was put together, the way the wires are run. That's -- not really logic, but it's system construct.

Q So I'm asking specifically about what you mean by custom logic. You said that there's custom logic embedded in the code or as part of the code, and then you seem to say that there was custom logic outside of the code.

A Well, I was saying there's custom application specific construction, let's say.

Q That's not my question.

A Logic --

Q My question is, custom logic, does that exist outside the code?

A Custom PDU logic and fan control -- if you constrain this to custom PDU logic and fan control, it would exist in the code that controls and manages the PDUs and the fans.

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Q So you've got custom logic in the Python code in number 3, and then you've got custom PDU logic and fan control. Is there any other custom logic that exists in this system in your view?

A I have to think about that. There's logic involved in the construct of the container --

Q Not asking about logic. I'm asking about custom logic as you used those words.

A Well, if we -- if we phrase custom logic as having to do with the Python code, then the custom logic and the Python code is the only thing that processes the information and determines mining profitability. The custom PDU logic and fan control, I know that the Python code interfaces with the PDUs and can turn them on and off and change the fan speed, but there may -- seems like -- I'd have to review that. I think -- I think the -- without -- without further diving into the details of the system implementation, I think it's fair to say that this is focused on the logic that's within the Python code that controls the PDUs and fans to control the load for the miners, as well as the logic that processes the option information and determines mining profitability.

Q So the last sentence says: Based on conditions, the system may either instruct some or all of

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the miners to mine bitcoin or sell power to the grid, parentheses, power arbitrage, closed parentheses.
Do you see that?
A Yes.
Q Did Mr. Storms' system actually do that?
A Mr. Storms' system was a prototype. I don't know if it was ever grid tied. I don't believe it was. I believe it was all prototype, but it had all the logic in there to instruct miners to mine bitcoin or to sell power back.
Q So when you say prototype, I think the word you use in the reply report is simulation. Are you using prototype and simulation same --
A Same thing.
Q Okay. So can you explain how the simulation allegedly performed power arbitrage or simulated power arbitrage?
A Sure. There was an incoming power price. If the bitcoin -- there's incoming power price, and there was incoming bitcoin information -- power information and bitcoin information, and then based on the projected output of the bitcoin miners, you can figure out how much money you're going to make by mining bitcoin, or you can figure out how much money you're going to make by not

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mining bitcoin and selling the power back.
Q And so from -- from the perspective -- the perspective of this arbitration, was it being done from the perspective of the load or from the perspective of the generator, or something else?
A I'm not sure I understand the question. Was it -- it was being done from the perspective of controlling the load?
Q Well, if you're the load, how do you sell power back?
A You have an arrangement with the power market to not use the power that you have contracted for and they buy it back.
Q And did Mr. Storms' system have such an arrangement with the power -- his simulation have such an arrangement?
A The simulation doesn't need that kind of arrangement. That's a business arrangement that's outside of the computer simulation.
Q So the answer is no, the simulation didn't have that arrangement, right?
A It had the ability to designate -- to designate times at which power would have been sold back through a business arrangement if that existed.

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Q And my question was, the code did not have the ability to sell power back, correct, because it never had such a business relation arrangement?
A I don't believe it was ever grid tied, and I don't believe it was ever tied to a scheduling entity. So I don't think the business arrangement ever existed because it was a simulation or a prototype.
Q Did -- So your viewpoint is that Mr. Storms' collection of code could work either from the grid -- from the generator side or from the load side?
MR. RICORDATI: Objection. Mischaracterizes the evidence.
THE WITNESS: I don't think -- I think his system could have worked in a variety of orchestrations.
MR. NELSON: Q So the answer is yes, you think it could have worked -- Well, let me ask you -- the system that -- Well, first of all, let's get our terminology straight.
If we're talking about Mr. Storms' system, what do you understand that to be?
A Mr. Storms' system was the enclosure, the power distribution units, and the logic to control the power that that system would consume and make a tradeoff between how much bitcoin that thing could mine versus

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selling the power back that it would have consumed.
Q So physically what did Mr. Storms' system consist of?
A Physically -- the cage, the construction -- the structure, the power distribution units, the wiring. It would have been the place to put the miners, as well as the logic -- the control system and the logic that control the miners and control the distribution of power.
Q Did the system also include miners?
A I think the way he was planning to sell it, it was just the control system, not the miners. I remember -- I remember one of the -- one of the disclosed documents has a pricing thing that's everything except the miners, so it's just the control system and the framework.
Q So the simulation ran on a miner, did it -- The simulation used a miner, didn't it?
A The simulation was for the control system.
Q Did it not use a miner?
A It interfaced with miners.
Q Was -- Did it turn a miner on and off?
A Uh-huh.
Q Did it turn multiple miners on and off?
A Yeah, it was to address --

Q I didn't ask was it able to. I'm asking if did it. Did it turn more than one miner on or off?
A I'd have to look specifically at the code. I believe it was capable of doing that.
Q My question is, do you know whether the system did in fact turn more than one miner on and off?
MR. RICORDATI: Asked and answered.
THE WITNESS: If it had been deployed, would it have turned miner on or off, is that what you're asking?
MR. NELSON: Q I'm asking as, you know -- the system ran on a simulation is my understanding. And --
A Okay.
Q As it was running did it turn a miner on or after?
A I don't know if he ran it with a miner attached to it. You're asking me if something happened at a particular point in time that had a miner attached to it. I can't speak to that. I have reviewed the code and I think it has the capability of doing that. I don't know if it was actually done because I wasn't there, and I didn't review that part of the thing. I reviewed the code, and the code certainly has that capability.
Q All right. So you don't know whether the system actually turned a miner on or off?

A That's not part of my role in this analysis is to determine what happened at a particular time. Actually turning a miner on and off is something that happens at a particular point in time.
Q My question is simply --
A He may have not.
Q So you don't know?
A I don't know if he ever connected a miner to it or not. I assume that he did, but I don't know. The code certainly has that capability.
Q I assume your answer is the same to whether or not he ever connected multiple miners to his system, you don't know one way or the other?
A It doesn't really matter to me because the code certainly has that capability.
Q So the answer is you don't know?
A I don't know what he did at any point in time before I was attached to the case, correct.
We've been going for an hour and a half. Can we take a break?
MR. NELSON: We can take a break.
THE WITNESS: My 60-year-old bladder can only go so far.
MR. NELSON: No problem.

THE VIDEOGRAPHER: The time is 10:38 p.m. This is the end of media unit 1. We're going off the video record.
(Off the record)
THE VIDEOGRAPHER: The time is 10:47 a.m. This is the beginning of media unit 2, and we're back on the video record.
MR. NELSON: Q So, Mr. McClellan, can you turn to paragraph 14 of your report. The first sentence says: Based on my review and analysis as summarized above, my opinion is that Bearbox was in possession of the technologies recited in the asserted claims either literally or under the doctrine of equivalents and other trade secrets relating to power arbitrage prior to meetings with Lancium. And then it goes on.
Do you see that?
A Uh-huh.
Q So what aspect of the claims was Bearbox allegedly in possession of under the doctrine of equivalents in your use of the words there?
A Are you specifically asking about doctrine of equivalents?
Q Yes.
A I have to go back and review exactly what

doctrine of equivalents means. These legal terms --
Q I think you can -- You can look at paragraph 39 perhaps for that if you need to.
A So under the doctrine of equivalents if a limitation of an asserted claim is not literally present in an accused instrumentality, an equivalent component or step may be identified instead. A component or step is equivalent when there's an insubstantial difference between the component and the claim limitation. So the test is substantially the same function and substantially the same way to achieve substantially the same result.
Q Right. And my question is, what aspects of the asserted claims do you believe Bearbox was in possession of under the doctrine of equivalents as opposed to literally?
A I would have to go through the claim elements item by item. And you want to know which ones were literal and which ones were equivalent? We have to go through the claim elements item by item.
Q Okay. Is that done in your report or not?
A I don't know if it's done in the report, if it identifies whether it's doctrine of equivalents specifically or not. I don't recall the specifics.
Q When you say the -- various parts of your

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report you say the system was capable of something. Do you remember that?
A Uh-huh.
Q Is that doctrine of equivalents or is that something else?
MR. RICORDATI: Object to form.
THE WITNESS: Well, like we were talking a minute ago, I don't believe that the Bearbox system was ever connected to -- was ever grid connected. So it was capable of being grid connected, but it was not.
MR. NELSON: Q Yeah. But my question is -- Thank you for that. But my question is more broad because I'm trying to figure out what aspects of the Bearbox technology you believe are in the asserted claims under the doctrine of equivalents, and I don't see in your report where you specifically call that out. What I do see in your report is various places where you say the system was capable of meeting a particular claim limitation. And my question was, when you say it's capable of meeting a claim limitation, is that your analysis under the doctrine of equivalents or is it something else?
MR. RICORDATI: Object to form.
THE WITNESS: Well, capable of meeting a claim

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limitation means that it was capable of meeting that claim limitation whether it specifically was tested under those circumstances or not, like, for example, with the -- with being grid tied.
MR. NELSON: Q So am I understanding your answer correctly then is that just because you use the word capable of it does not mean it was doctrine of equivalents analysis or it does?
A I'm not exactly sure how to answer that. If it was capable of doing something, then it had the ability to do that, if it was deployed in that fashion. I'm not exactly sure how that relates to doctrine of equivalents. I'd have to look at that and noodle on that for a while.
Q What's your understanding of the role of doctrine of equivalents in establishing inventorship?
MR. RICORDATI: Objection. Calls for a legal conclusion.
THE WITNESS: I'm not a lawyer.
MR. NELSON: Q I'm asking you if you have an understanding. What is your understanding as somebody who put in an expert in this case -- or expert report in this case that uses doctrine of equivalents what your understanding is of that in the context of your inventorship opinions?

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A If we look back at the definition of doctrine of equivalents it does substantially the same thing in substantially the same way, then it's equivalent.
Q So that in your view then if something in Mr. Storms' system didn't meet the claim limitation exactly, but it did something similar in the same way, it would be sufficient for the inventorship analysis?
MR. RICORDATI: Objection. Calls for a legal conclusion.
THE WITNESS: I don't know if I'm capable of -- like the objection says, providing a legal conclusion on that. If the claim limitation says -- gives a certain type of functionality, and the functionality of the system is substantially the same or has the same form or produces the same outputs, then there's an equivalency there.
MR. NELSON: Q Okay. And my understanding is -- I'm trying to understand your opinions. In that scenario would you say then -- So suppose that Mr. Storms -- you maintain Mr. Storms communicated on a claim element to Mr. McNamara and that Mr. Storms' system was equi -- for that claim element Mr. Storms' system was equivalent to the claim -- the claim element in the '433 patent. Under that scenario, would you maintain then that Mr. Storms had met that claim element for the purposes of

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inventorship? Is that your opinion is what I'm trying get at?
A That sounds reasonable.
Q What do you understand -- So going back to paragraph 39. What do you understand insubstantial difference to be?
A I've got to find 39. What do I understand what -- a substantial difference or insubstantial difference?
Q 39 is more -- is the legal doctrine of equivalents section, correct?
A Right.
Q And one of the -- one of the terms there that is used is insubstantial difference. Do you see that?
A Right.
Q What do you understand an insubstantial difference to be?
A Well, literally that's a difference that's not substantial. It's not a -- not a meaningful difference.
Q An is that the criteria you used in your analysis whether the difference was meaningful or not?
MR. RICORDATI: Objection. Calls for a legal conclusion.
THE WITNESS: Well, in -- from my perspective, meaningful has to do with what the function is or what

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the outcome is or how the process works. But if they're very close, then there's an insubstantial difference.

MR. NELSON: Q And did you use that understanding in forming your opinions in the case?

A Yes. If the component or step and the claim limitation performs substantially the same function in substantially the same way to achieve substantially the same result, then there is an insubstantial difference. I mean, that's --

Q Would adding a new feature to the code to meet a claim criteria -- would that be an insubstantial difference?

MR. RICORDATI: Object to the form.

THE WITNESS: Depends on what the feature is, right. If you add a GUI to the code, it's an insubstantial difference for this particular case.

MR. NELSON: Q So if I understand your opinion correctly, you used what you define -- what you called the plain and ordinary meaning to a person of ordinary skill in the art when understanding the claim terms. Is that right?

A Yeah.

Q And is that plain and ordinary meaning at any time or is it at a particular time?

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A I'm not sure I understand the question. It's plain and ordinary meaning.

Q Well, my question is so -- You can turn to paragraph 49 to give you the context.

So you say: I understand that claim terms by default are construed by their plain and ordinary meaning to a person of ordinary skill in the art. For the purposes of my analysis, I have applied the plain and ordinary meaning of the claim terms.

Do you see that?

A Right.

Q And my question is, the plain and ordinary meaning that you have applied, is that in any particular timeframe, or is it just in general?

A That seems -- that -- the question makes me uncomfortable because it seems to call for some sort of legal conclusion about what the term plain and ordinary meaning means. Plain and ordinary meaning is just the plain and ordinary meaning to somebody who has ordinary skill in the art. The plain and ordinary meaning of things can change over time as technology changes.

Q That's my question. Did you -- did you utilize the plain and ordinary meaning in your view of these terms at any particular time period? Was it plain and

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ordinary meaning you used your understanding of the terms as of the date of this report, or was it the plain and ordinary meaning at the time Mr. Storms and Mr. McNamara went to dinner, or was it the plain and ordinary meaning prior to that? What time period does your plain and ordinary meaning analysis encompass?

A Well, the concept of plain and ordinary meaning has to do with the terminology around the application area, and if the plain and ordinary meaning of the terminology around that application area changes, then you have to adapt to that. I don't notice any changing during this -- during the timeframe of the last 2, 3 years that this thing has been in contention. I don't think the plain and ordinary meaning has undergone any large -- of any of the terms in here have undergone any large changes during that timeframe.

Q So prior to me asking this question, had you considered the timeframe of the plain and ordinary meaning?

A Well, typically plain and ordinary meaning is at the time of analysis. That's the way I typically use it. At the time of the -- Well, if it was a patent that was filed, you know, ten years ago, then you have to think about what the plain and ordinary meaning was at

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the time that the patent was filed and contrast that with what's going on now.

Q What timeframe of plain and ordinary meaning did you use in your analysis in this case?

A I think I already answered that. It's the plain and ordinary meaning that's -- this is very localized in time. So the plain and ordinary meaning of the terms that are associated with this case are localized in time. There hasn't been a large timeframe change where technology can migrate between them.

Q Well, there's been several years. What time -- My question is simple. What time period did you utilize to determine your plain and ordinary meaning, or did you utilize any?

MR. RICORDATI: Objection. Asked and answered.

THE WITNESS: There's no -- In my opinion for this case, there's no real change in plain and ordinary meaning for the terms that are involved in this patent in this technology. There hasn't been a large time scale where things can evolve and terminology changes.

MR. NELSON: Q Did you utilize a particular time period for your plain and ordinary meaning analysis in this case?

MR. RICORDATI: Objection. Asked and answered.

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THE WITNESS: It's the time period around this case which, in my opinion, is relatively compact.
MR. NELSON: Q So the time period from when to when then? Give me years.
A I think the patent was filed in 2019, right? The date of the patent filing -- If you look at the timeline there's the date when they started -- when Storms started to develop stuff, and there's a date when Lancium had product, and there's a date where they overlapped, then there's a date when the patent was filed. All of that timeframe was fairly compact between like 2018 and 2020. It's about a two-year period -- two- or three-year period in there.
Q So is that the time period you used, or did you use your understanding as you were doing your -- plain and ordinary meaning as you were doing your analysis -- When you were writing your report, what time period did you use?
MR. RICORDATI: Objection. Asked and answered.
THE WITNESS: The time period of the report is early 2022 which abuts the time period of the activity of the patent and stuff. So it's basically all the same time period. I don't know that there's any substantial migration or substantial changes in any of the terms that

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are associated with this patent or with this case. If there have been -- if there have been, then we need to isolate those and make sure that there wasn't any misinterpretation of anything.
MR. NELSON: Q What's your understanding of the plain and ordinary meaning of power option agreement?
A My understanding of power option agreement is it's essentially a contract to buy power at a certain price. It's like a wholesale purchase. I'm going to buy X number of units at X price.
Q What's your understanding of power option data?
A Power option data is the data that's associated with the power option agreement.
Q What -- is there any specific data that's required to be power option data, or can it be anything?
A I think at least it has intervals and minimum thresholds. There may be other data that's associated with that, but I think there's thresholds over intervals.
Q And intervals are intervals of time?
A Time intervals, yeah.
Q And what are thresholds?
A You agree to buy power at that -- you agree to consume that much power at a certain price at that time.
Q You agree to buy that much power or consume

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that much power?
A Typically it's consume because you're a load that's not controllable. If you're a controllable load, then you're buying that power with the assumption that you're going to consume it. If you have ability to sell it back, then you can sell it back. But you don't sell it back to whoever you bought it from, you sell it into a market at that time. It's an agreement with the seller to consume, right?
And consume doesn't mean use. Consume means purchase. Whether I use that power to do something with or whether I sell that power to somebody else, that's separate from the power option agreement.
Q What's your understanding of a minimum power threshold in this case as used in the '433 patent?
A That's the data that's associated with the option agreement.
Q What specifically is a minimum power threshold?
A That's the amount of power that you're contracted to consume.
Q And by consume you don't mean use, correct?
A I may not use it, but I'm going to consume it. I'm purchasing it. Whether I use it or whether I sell it, that's a completely separate issue. I'm agreeing to

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purchase it at that threshold.
Q So just to be clear so our -- Your use of the word consume here means -- it doesn't mean physically the data center consumes the power by using it. It also could mean that the power is sold back.
A Consume is a transactional thing. Right. The consumption is a transaction where I'm consuming it. I have to dispatch that power some way.
Q What do you understand the term performance strategy to mean in the context of the claims of the '433 patent?
A A performance strategy is deciding -- is a decision based on incoming data and conditions and monitored conditions as to how to dispatch the -- how to dispatch the power that's been consumed through the PPA against bitcoin miners or not.
Q So in your understanding of performance strategy could performance strategy be to not consume power?
A It could be --
Q I'm sorry. Let me -- I asked a bad question because I used the word consume in a different context.
So in your understanding of the term performance -- the meaning of the term performance

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strategy, could a performance strategy be a decision for the load to not utilize power?
A As long as it complies with the minimums, yeah.
Q What minimums must it comply with?
A The minimum thresholds in the PPA.
Q If I understood -- if I understood -- You said PPA. I think the term from the patent is power option agreement.
A Yeah. That's -- that's --
Q Are you using the two -- Do you think there's a difference between -- Well, between a PPA which -- What do you understand PPA to be?
A I may have just used the wrong term. I meant the contracted purchase of power at a certain rate.
Q Do you understand that the term -- do you understand there's such a thing called a power purchase agreement?
A Yeah. I've heard of that.
Q Do you understand --
A I think they're essentially the same thing, but I'm not exactly sure of the difference.
Q That was my next question. Is there a difference or not that you are aware of?
A I tend to use them interchangeably, and that

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may not be exactly right.
Q So going back to minimum power threshold again. Is that -- Do you understand that to be a power threshold to be power that must be utilized in the form of the data center actually operating and physically using the power, or do you understand minimum power threshold to be something else?
A I'm not -- I'm not sure of all the specifics of the contractual arrangement. I think that you're going to pay for the power at a minimum power threshold whether you use it or not.
Q So in your view --
A I don't know if you have to use it or if you have to pass it through. You may just not use it, but you're going to pay for it no matter what.
Q So in your view point then the term minimum power threshold as used in the '633 patent can be a price for power?
MR. RICORDATI: Objection. Vague.
THE WITNESS: It's the -- it's the threshold at which you're going to pay for power that you've purchased in advance.
MR. NELSON: Q What do you mean by threshold in that context?

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A Well, if I purchase one kilowatt at $1, I'm going to pay that $1 whether I use that kilowatt or not.
Q So the minimum power threshold in that example is the $1 or the one kilowatt?
A The power threshold is the kilowatt.
Q The minimum power threshold is the kilowatt?
A Uh-huh.
Q Then what is the dollar?
A That's the price I paid for the kilowatt.
Q I'm sorry. I have been misspeaking. Just for the record, I may have said '633 patent a few times. Do we have an understanding that when we've been testifying, I'm using -- the patent in question is the '433 patent.
A Right.
Q Your testimony was relating to the '433?
A Yes, '433 -- the report is relative to the '43 patent.
Q And my questions -- You understood my questions to be as well?
A Yes.
Q Thank you.
The patent talks about the performance strategy may specify a power consumption target for the load. Do you have an understanding what the power consumption

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target for the load is?
A That's the amount of power that you want the load to consume.
Q Going back -- I want to go back to minimum power threshold one more time. So what do you understand the word threshold to mean in minimum power threshold?
A In general a threshold is an amount or a value that's called out specifically, and you observe whether you're crossing it, whether you're under it, over it, or crossing it in northbound or a southbound direction. So threshold is a value that's a form of target, but it's not necessarily a form of target that you want to meet. It may be a target that you want to avoid.
Q In the context of the '433 patent, is it a target that you want to meet or avoid or both?
A It's a minimum threshold, so it's a target that you have to be above.
Q If I understand your -- rest of your testimony, it's a target that you have to be above, and you can -- according to your understanding of the plain and ordinary meaning, you can be above that target by either using the power -- physically consuming the power or consuming the power by selling it back, is that correct?
MR. RICORDATI: Objection. Mischaracterizes the

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testimony.
MR. NELSON: Q Do I understand your testimony correctly?
A Well, I think this is actually a better question for Mr. McCamant. The power option agreement is an agreement to purchase a certain amount of power at a certain time at a certain price. I don't know if you're required to dispatch that power or if you can just not use it. But I know that you're going to pay that price no matter what, because you have got the contract. You're contractually obligated to pay for the power at that price at that time. I don't know if you have to dispatch it.
Q Well, you are the person who is providing opinions in this case whether Mr. Storms conceived the inventions of the '433 patent, and you are the person who is applying the claim language in the plain and ordinary meaning as you understand that claim language to the claims of the patent. So my question to you is -- going back again, is the minimum power threshold, is that something that must be utilized by the data center in the form of it's actually physically being consumed by the data center, or may it -- may a minimum power threshold also be something that is utilized in the context of

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selling -- is consumed by selling it back?
A The minimum power threshold -- this is a business question really. The minimum power threshold --
Q This is a claim -- This is a claim construction question relating to your understanding of the plain and ordinary meaning of the claim terms as you have applied them. So please answer the question in that context.
MR. RICORDATI: Objection. Asked and answered and argumentative.
THE WITNESS: Yeah. I think I was talking and he talked over me.
Fundamentally it's a business question because you've purchased that power sometime in advance and you purchased it to use it at a certain time, and you're going pay for it. So it's a business liability. Whether you use the -- whether you have to use the power or not, I'm not sure exactly what the requirements are in the contract, but you're going to pay for it. So you can use it or you can just do nothing and still pay for it. Right. That's -- that's -- that's the structure of the '433 patent.
MR. NELSON: Q Right. So -- so let me make sure I understand. So to meet the -- the meaning of the claim element minimum power threshold, in your understanding as

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it's used in the '433 patent, you can either consume the power, meaning physically use it to run bitcoin miners, for example, or consume the power to -- in the form of selling it back, and minimum power threshold encompasses both of those scenarios in its plain and ordinary meaning, is that correct?
A The minimum power threshold is the contracted amount that you're going to pay for regardless of -- I don't think you have to use it, but regardless of whether you use it or not. For example, I could contract -- and I believe this is correct -- but, again, this is a question for McCamant. We'd have to look at the specifics of the purchase agreement.
If I have one light bulb, I could buy one kilowatt hour for today at noon and I could use that kilowatt hour to run that light bulb. Or -- and I'm going to pay for that kilowatt hour no matter what. Or I can turn that light bulb off, and I'm still going to pay for that kilowatt hour. Or I could screw in five light bulbs and I could use more than that one kilowatt hour, and I'm still in compliance with that contract. But I've got to pay for that one kilowatt hour, one kilowatt hour that I contracted for. But I don't know the specifics of the contract to get in anymore detail than that.

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Q So the claims also use the term set of computing systems, correct?
A Uh-huh.
Q What's the meaning of set of computing systems?
A That's computing systems, more than one because it's a set. Devices that do some sort of computational something, and there's more than one of them.
Q The claim uses the term monitor a set of conditions. What does monitor mean?
A Monitor means observe.
Q At any particular time? Always? Once?
A I think the implicit meaning there is that you monitor over time, because if you only monitor something once, you're really not monitoring it. You made one observation. Monitor means multiple observations.
Q So the claim -- I'll refer to Claim 4 -- If you need to look at the patent, I can give you the patent too to answer this question because --
A I can find it in here, I guess.
Q You may be able to, but you may not for a couple of these.
A Okay. It would be helpful to have a copy of it.
Q Let me give a copy U.S. Patent No. 10,608,433

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marked as Defendant's Exhibit 203. And just for the record, when I have been using the term '433 patent, I have been using the term relating to this patent.

(Exhibit 203 marked as requested)

Q If you turn to the last -- second to last page where the claims start. Go to Claim 4. And Claim 4 states: The systems of Claim 3 wherein the performance strategy further comprises an order for the set of computing systems to follow when performing the one or more computational operations, wherein the order is based on respective priorities associated with the one or more computational operations.

Do you see that?

A Uh-huh.

Q So do you understand what's meant by an order for the set of computing systems to follow?

A Uh-huh.

Q What is meant by that?

A The order for the computing system to follow could mean a lot of different things. And in interpretation, it could mean for them to turn on. In another interpretation it could mean for them to turn off. It could mean for them to go to a quiescent state. It could mean for them to start processing a certain

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thing at a certain -- work on a certain workload at a certain rate.

Q So let's use the example where you said they were going to turn off as one -- as one of your things. So in that example, the rest of the claim element reads: Wherein the order is based on respective priorities associated with the one or more computational operations.

Do you see that?

A Uh-huh.

Q What is the -- In the case where it's turning off, how would that be based on the respective priorities associated with the one or more computational operations?

A Well, the performance strategy is assigning priorities to the operations, and it may be feeding those operations to the set of computers, and the set gets maybe one or maybe more computers, and it's feeding those in some sort of priority order, and it may be feeding those with the priorities to the computing systems, and the computing systems are examining the priorities and following those instructions based on that.

Q In that example how are the priorities associated with the computational operations?

A Well, the performance strategy is determining the priorities that are associated with each

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computational operation, whatever that operation happens to be. And it's feeding those -- the control system is either holding onto the priorities and using those to feed the orders to the computer systems, or it's feeding the orders and the priorities to computer systems who are then using the priorities to do things in a certain order or deprioritize.

Q If you go to the next page, Claim 18.

A Uh-huh.

Q And the second element of that claim says: Determining the performance strategy to further comprise instruction for at least a subset of the set of computing systems to operate at an increased frequency based on a combination of at least a portion of the power option data and the information about the set of computing systems.

Do you see that?

A Yes.

Q What do you understand the set of computing systems to operate at an increased frequency to mean?

A That can mean a lot of different things, that can --

Q What do you understand -- What do you understand it to mean, not what it could mean. I'm

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interested in your opinion what it does means.

A Well, it means a lot of different things all at once because it's fairly vague. Increased frequency could mean the frequency of the CPU. Right. Could mean jack up the frequency of the CPU or drop the CPU down. So -- Because when a CPU operates faster, it consumes more power. When it operates slower, it consumes less power in general.

It could mean to -- in a pulse width modulation kind of an idea, it could mean to operate at a certain level for this period of time, then stop, then operate at that same level for a longer period of time, then stop. And in between there you can change those levels. So it's a -- it's a collection of instructions to say the frequency can be the time of operation or the frequency can be the control of the operation itself through something like a CPU frequency.

Q So would increasing the clock speed, would that be one thing that met this claim?

A Yeah. It could also mean spin down the disks. Right. Increased frequency could mean go ahead and use your disk a lot. It couldn't mean don't use your disk. It could mean -- increased frequency means a rapidity of some kind in time, and different parts of computers

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consume power in different ways.
Q So the patent also talks about monitoring a set of conditions, and earlier I asked you about monitor, right?
A Uh-huh.
Q What do you understand the set of conditions to be, the plain meaning of set of conditions?
A Well, it's a collection of inputs.
Q Any inputs --
A Collection of things that you observe. It's whatever the conditions the patent claim language talks about. In this case going back to Claim 18, for example, it talks about information about the set of computing systems. That could be some of the conditions.
Q So if you go to paragraph 46 of your report --
A Oh, wow. Turned right to it. Okay.
Q So there you give the definition -- your view of the definition of a person of ordinary skill in the art?
A Right.
Q And you have a degree in electrical engineering. Is that a bachelor's degree or is it something else?
A Refers to bachelor's degree.

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Q Computer science, also refers to a bachelor's degree?
A Uh-huh.
Q Or a similar field. What do you mean by similar field?
A For example, physics, computer information systems. There's a bunch of different degree types that have this same sort of content in there.
Q Well, you say or similar fields. So I'm interested in what fields you would consider to be similar. So you said physics, you said --
A There's a bunch -- there's a lot of different ones.
Q Tell me what they are.
A Easiest way to be to go back to the Abet definition of credited bachelor's degrees. It could be some form of engineering technology, engineering -- electrical engineering technology, computer engineering technology, electrical engineering, computer engineering, computer science, software engineering, physics, computer information systems. I mean, we'll be here all day because different places define bachelor's degrees in different ways. And there's probably 10 or 15 on the Abet list that would be similar.

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Q Do you consider the level of skill in this -- Well, level of skill in the art here, what do you consider this art to be?
A The art of the '433 patent?
Q Yes.
A Well, you have to have a little bit of software knowledge, a little of power system knowledge, and a little bit of business knowledge.
Q Do you -- do you consider the field of art -- a person of ordinary skill in the art here to be relatively a low-skilled individual, high-skilled individual? Where does the person of ordinary skill in this art, in your view, fit in?
A I don't think this is particularly complicated. I mean, there are aspects of it that are a little more detailed, but I don't think it's particularly complicated.
Q Do you think Dr. Ehsani meets the level of skill in the art in this case?
A In some ways.
Q In your view?
A Yeah.
Q Do you know Dr. Ehsani?
A I was a student at Texas A & M when he first

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joined Texas A & M as a faculty member. I don't believe I ever had classes with him, but I have seen him. I think I've probably met him a few times long time ago.
Q Do you have an opinion regarding his reputation?
A Uhn-uhn.
Q Do you think he's -- has integrity, for example?
A I suppose so. I mean, I haven't had any contact with him in more than 20 years.
Q You've read the '433 patent, correct?
A Yes.
Q How many times?
A I have no idea, many.
Q Many like 3? Many like 20?
A You mean from beginning to end? Probably once from beginning to end. Back and forth little pieces here and there, hundreds.
Q When did you read it last?
A Read it -- By read it do you mean from beginning to end?
Q Yes.
A That would have been four months ago.
Q When did you look at it last?

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A Two or three minutes ago.
Q Well, prior to this deposition when did you look at it last?
A Well, there's snippets of it in the report so I've seen snippets of it in going through the report. Does that qualify as looking at it or are you talking --
Q Sure.
A Yesterday, the day before.
Q But you didn't -- These reports were done before yesterday or the day before. So did you look at it in the context of preparing for your deposition?
A Yeah.
Q How long did you spend preparing for your deposition?
A A few hours yesterday, and a couple hours a couple more days earlier in the week.
Q Did you meet with anybody?
A Sure. Met with the legal team.
Q Did you meet with Mr. Storms?
A No, not during the deposition -- not during the prep for the deposition, no.
Q Did you talk to Mr. Storms?
A Not during that time, no.
Q Did you meet in person or virtually with the

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legal team?
A In person here, yesterday. Virtually before that.
Q Who did you meet with?
A Yesterday?
Q Yes.
A Ray and Ben.
Q Who did you meet with before that?
A Ray and Ben.
Q Did you look at any documents in the context of preparing for the deposition?
A Just the reports and the documents that are associated with the reports.
Q Anything else?
A Well, my own notes, but that's the same as the documents in the reports.
Q Did your notes refresh your recollection?
A The notes weren't particularly helpful actually. The reading through the documents was more helpful.
Q Did your notes refresh your recollection, yes or no?
A The notes that I was referring to were taken at the very beginning when I was -- basically during the

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interview when they were telling me about the case, and they were actually relatively inaccurate.
Q Did your notes refresh your recollection, yes or no?
A No. I said the notes that I took were relatively inaccurate, so they didn't refresh my recollection. They confirmed that I had gotten it wrong the first time. The things that refreshed my recollection would be the reports and the documents cited in the reports.
Q So take a look at the patent again and look at Claim 1 real quick. Just read it to yourself, and let me know when you're done.
A Okay.
Q So what is your understanding of the plain and ordinary meaning of Claim 1?
A Claim 1 is very broad. There's plain and ordinary meaning of a bunch of different terms.
Q We talked about the terms. Maybe it was a poor question. I'm just trying -- I'm trying to get your understanding of the scope of Claim 1 as somebody who is opining on the plain and ordinary meaning of terms and comparing Mr. Storms' system as we defined it to the claim.

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A Well, it's a system of computing systems, a collection of computing systems, one or more, I guess, that can be instructed to do computational operations based on a business arrangement that has to do with power options.
Q Anything else?
A Well, and instructing to do the computational operations it's based on a performance strategy that it figures out, and the performance strategy is based on a set of conditions as well as information that's associated with the power option data.
Q Anything else?
A We can go on for days. This claim is broad.
Q I understand that's your opinion, yes.
A There's always going to be something else. I mean, you're asking for me to summarize something that's really complex. My summary will, by definition, be a little bit -- have holes in it or have gaps in it. So if you ask me if there's anything else, I'll say yes every time until we go exactly through the language of the claim.
Q Yeah. I'm just trying to get your understanding generally of what the scope of the claim is. So is there anything else with your general

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understanding about the scope of the claim?
A That's -- I think that's a reasonable summary. But if you ask me if there's anything else, I'll say yes because that claim is pretty broad.
MR. NELSON: Why don't we take a five-minute break.
THE VIDEOGRAPHER: The time is 11:36 a.m. and we're going off the video record.
(Off the record)
THE VIDEOGRAPHER: The time is 12:34 p.m. And we're back on the video record.
MR. NELSON: Q Good afternoon, Dr. McClellan.
A Afternoon.
Q During the break or at any point today have you discussed the subject matter of your testimony with counsel?
A No.
Q So before the lunch break we were talking about the plain and ordinary meaning of certain terms of the '433 patent. Do you remember that?
A Yes.
Q What did you do to form your opinions as to what the plain and ordinary meaning of these terms were?
A Well, just interpreted the terminology in the patent in the context of my industry knowledge and

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technology knowledge.
Q Did you look at the -- did you consider the patent in forming your opinion as to the plain and ordinary meaning of the terms?
A I guess that's fair, yeah.
Q Did you consider -- Do you know what the prosecution history of a patent is?
A Uh-huh.
Q Did you consider the prosecution history of the '433 patent in forming your opinions as to the plain and ordinary meaning of the terms?
A I didn't look at it in detail.
Q So the answer is no?
A Right.
Q Did you consider anything else in the context of forming your opinion as to the plain and ordinary meaning of the terms of the '433 patent?
A My interpretation of creating a plain and ordinary meaning interpretation is to somebody who is skilled in the art. So if you have domain knowledge, you use your domain knowledge to interpret the terms in the context of that domain knowledge. So that's basically what I did.
Q So you used your personal knowledge -- when you

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say domain knowledge, do you mean your personal knowledge as --
A It's my understanding of the technologies that are at play, my understanding of the markets, you know, yeah, and other materials that are associated with the case like the other background materials.
Q Okay. In looking at the terms of the '433 patent, did you find any of them to be ambiguous?
A All patents have terms that are ambiguous, so, yes.
Q Which ones did you find to be ambiguous?
A Do you want to go through the claims and have me point them out? I mean, we have talked about several of them already.
Q Let me make sure. Let me give you a definition of what I mean by ambiguous because I'm not sure you're clear. So what I mean by ambiguous in -- that you can't figure out the meaning from the specification of the patent itself or the prosecution history of the patent if you looked at it.
MR. RICORDATI: Objection. Calls for a legal conclusion.
THE WITNESS: I still think there's some ambiguities in the terminology.

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MR. NELSON: Q I understand, but I want to make sure when the term ambiguous is used that we're using it in the same context here.
So, when I asked you if there were any terms in the '433 patent that you found ambiguous in formulating the plain and ordinary meaning, what I meant by the term ambiguous was that you as a -- as a purported expert here could not determine the meaning of the claim term absent looking outside of the specification or the prosecution history of the patent had you looked at that.
A I think -- I think the plain and ordinary meaning of the terms that are in here are less ambiguous under those constraints.
Q But my question is very specific. In the context of forming your plain and ordinary meaning, are there any terms in the patent -- Let me start over.
You told me what you did to determine the plain and ordinary meaning, and so my follow-up question is, are there any terms in the patent claims that you as a purported expert could not determine the plain and ordinary meaning of based on solely looking at the specification and/or the prosecution history had you looked at it?
A Well, you can determine the general plain and

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ordinary meaning of it, but you can't determine the specific meaning of it. For example, things like computer system, that can mean a whole lot of different things. Right. I think I understand in the context of this what they mean by computer system, so it becomes less ambiguous. But the term computer system can mean a whole lot of different things. So you have to use the domain and the terminology that's in the patent to kind of disregard that type of computer system because we're talking about one that's like this, for example.

Q So use that as an example. So what do you believe the term computer system -- the plain and ordinary meaning of the term computer system is in the context of the '433 patent?

A Well, because of the -- because of the -- because of the application space and because of the domain space, I think they're talking about things that are like essentially hardened or not hardened pizza box servers that have particular specifications. They're not talking, for example, about a raspberry pi, they're not talking about an Arduino, they're not talking about a micro controller which could be construed as a computer system. They're talking about enterprise class, data center class computer system. Computer system spans the

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gamut.

Q And so using that again as an example, do you believe as an expert that you could not determine the meaning of computer system in this -- as used in the '433 patent based on reading the '433 patent, its specification, and the prosecution history, that you would need other information other than what's in the patent and the prosecution history to determine the plain and ordinary meaning of computer system as used in the patent?

A I would need -- that would depend on the -- it would depend on the specification application and those associated with the patent, but I think the general term of computer system that's used in the patent has a meaning that tends towards an enterprise class server system, rather than some other type of system.

Q Yeah. I understand that. So my question is really specific. So you're a purported expert in this case. You formed opinions as to what the plain and ordinary meaning of certain terms are. You told me what you did to reach those opinions of what the plain and ordinary meanings are, you told me what you looked at.

So my question to you -- and this is very specific -- is looking at the claims of the patent, are

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there any terms that you as an expert could not derive, understand the plain and ordinary meaning of based solely on looking at the specification of the patent and the prosecution history and the claims themselves as part of the specification?

A I think -- I think using that constrained context you can come up with interpretations of these claims, their plain and ordinary interpretations, that get you a pretty accurate perspective on what those terms mean but -- for example, back to computer systems example. There's nothing in here that talks about the operating system that's functioning on the computer for example.

So there's completely different classes of operating systems that might be functional for some things rather than other things. So it's a computer system that incorporates a large swath of potential interpretations, but the general concept of computer system I think is pretty clear from this. It's an enterprise class computer system, maybe a pizza box, maybe a one U rack mountable server, but it has certain types of characteristics that would enable it -- that would better enable it to do things like bitcoin mining, as opposed to a different kind of computer system that

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wouldn't be configured that way.

Q And so using that as an example, just to be clear, so to understand the plain and ordinary meaning of computer system, would you as an expert have to rely on anything else other than the patent and its prosecution history?

A Well, that's where a person I think of skill in the art comes into it. Right. You read between the lines.

Q You're not answering my question. My question is would you as an expert to determine the plain and ordinary meaning of a computer system, would you have -- to reach that meaning, would you have to look -- could you reach that meaning looking solely at the patent and the prosecution history --

MR. RICORDATI: Objection.

MR. NELSON: Q -- or would you need to go outside of the patent and the prosecution history to get some other information, whatever that is, to reach the plain and ordinary meaning of computer system?

MR. RICORDATI: Objection. Asked and answered.

THE WITNESS: I can describe to you what my process would be for interpreting computer system in the context of this patent.

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MR. NELSON: Q Well, You already did. You already did that.
A I wouldn't go consult some other thing. I would look at the computer system, and I would think about this is where the skill in the art -- I would think about what it is they're trying to do with a computer system and how you would optimize the structure of that computer system to function in this application space, and that's what I would interpret computer system to mean as a result.
Q I understand.
A I wouldn't rely on anything outside for that.
Q Well, but what you're talking about there is you're relying on your own personal knowledge as an expert.
A Yeah. That's the person of ordinary skill in the art.
Q Well, that's not the question I'm asking. I'm asking as an expert, looking only at the patent specification claims and the prosecution history, could you divine the plain and ordinary meaning of computing system looking only at that information and nothing else?
MR. RICORDATI: Objection. Asked and answered.
THE WITNESS: I mean, that's what we've done.

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MR. NELSON: Q Well, That's not what you said you did. You said you looked at -- you used your own personal knowledge as an expert and the domain. My --
A That's what I just said. That's what the report is. It's an interpretation of the patent claims taking into account my knowledge in the domain and trying to interpret those in a plain and ordinary fashion.
Q I understand that. And I understand that in doing that you took into account your knowledge of the domain based on your experience and the patent, right?
A Yeah.
Q And my question to you is -- I understand what you did. My question to you now -- It's really a yes-or-no question. Is in your opinion could you have arrived at a plain and ordinary meaning -- I don't care what that meaning of it is -- could you arrived at the plain and ordinary meaning based solely on looking at the patent and the prosecution history, or did you need to go outside of the patent and the prosecution history in terms of your own personal knowledge and the domain to arrive at the meaning?
MR. RICORDATI: Objection. Asked and answered.
THE WITNESS: So when you're saying outside of the patent and the prosecution history, you're talking about

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my personal experience.
MR. NELSON: Q Your personal experience --
A If I had zero experience, I would have a potentially different interpretation of the term computer system, for example. My experience has informed me that the interpretation of computer system in this context is very much, much more likely to be that rather than this. Right. If I had -- if I didn't have that experience I might lump all those together as computer system. For example, this is a computer system. This is not applicable in this case.
Q Just for the record, this, he's holding up his cell phone.
A My cell phone.
Q Okay. I think I understand.
A You understand what I'm saying?
Q Yes.
A I can't divorce my own personal experience from my interpretation here.
Q Okay.
A It's very difficult for me to do that.
Q And if you had divorced your own experience from it, if I understand correctly, your plain and ordinary meanings might be different?

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A It's possible. But it's the plain and ordinary meaning in the interpretation of a person who is skilled in the art. So the skilled in the art part kind of automatically focuses.
Q All right. Let's look at different pieces of your report here.
A Which report? The first one?
Q The first one. Why don't you go to paragraph 57.
A Okay.
Q All right. So 57 is connection with claim element 1, which you label as 1(a) for Claim 1, correct?
A Yes.
Q And this is your opinion as to where that element is met in Mr. Storms' system, is that fair?
A Yeah. It's the noted modules perform functions related to the elements of that claim.
Q And then you list 11 modules here, right?
A Yes.
Q And these modules 1 through 11, are those Mr. Storms' Python source code?
A Yeah. Those are the names of the modules of the Python. I think it's all Python. Yeah. Names of the modules of the Python code as provided to me.

Q Did you look -- in the code that you looked at in this case, did you look at any code that wasn't Python?
A I don't think so. I think it was all Python.
Q So if I say Python code, do we have a common understanding that we're talking about the Mr. Storms code in this case?
A Yeah. I believe they were -- I believe everything was Python.
Q Okay. And the Python code that's listed here -- I know there's others -- other modules that are listed here, but the collectively Mr. Storms' Python code, that's the source code in this case that we've been talking about, right?
A Yes.
Q Now, to your knowledge did Mr. Storms ever make the source code available to Mr. McNamara?
A I don't believe so. I think the only things that were provided were the data sheet and the diagram and the Excel spreadsheet, but I don't know if the source code was provided or not.
Q Okay.
A I don't recall.
Q You have not seen any evidence that it was,

have you?
A No. I don't recall seeing any evidence like that.
Q If you turn to page 17 of your report, we're still in paragraph 57, just on next page you say: A non -- nonexhaustive example -- nonexhaustive examples are listed below with reference to the current claim language. A detailed analysis of each module is provided in the appendix.
A Uh-huh.
Q So are there other -- Is it your opinion there are other code modules that also demonstrate possession of the element of Claim 1 or is this all of them? Because you say it's nonexhaustive samples. So I'm trying to figure out if there's others that aren't listed here that you believe demonstrate that Mr. Storms was in possession of Claim 1 element A.
A It's possible. These are the ones that seem to jump out as being the most relevant.
Q Okay. So it's -- I guess I'm trying to figure out why if it's possible there were others why didn't you list them all.
A Because there was no need. There's already 10 or 11 listed here.

Q What if it turned out that the court finds none of these 11 actually taught that element? Would there -- would there be others --
A I don't think that's possible.
Q I understand that's your opinion. I'm saying what it if turned out that the court ruled that way. I'm trying to figure out what else would be your opinion as to whether there's any other code that would meet it that's not listed here.
A Well, if these particular modules were stricken as being not applicable to this claim element, we'd have to go back into the other ones and see if there was other pieces of that claim element in those modules. It's possible that there is because there were so many different modules and a lot of them overlapped a lot.
Q So what was your criteria for deciding to list these 11?
A These ones were the ones that seemed to have the most applicability to that claim language.
Q Do you ever explain specifically where each of these modules meet the claim language?
A If you look in the appendix, you'll find a summary of each module that talks about the different functions, the different data structures, the different

elements, as well as specific Bates numbers and line numbers.
Q So it's -- I'm trying to understand the structure of your report. So if we want to see the specific reason why each of these modules allegedly meets -- why it's your opinion that this -- that the module meets the claim element, we'd look at the appendix description for each module?
A Yes.
Q Okay. And is that true -- Because your report -- for each claim element it lists a group of modules. Some of them are the same as these, some are different than these.
A Correct.
Q So for each of these modules, your opinion as to specifically why the module meets the claim element is contained in the appendix?
A Well, and in general -- in general there's a little summary at the -- In the body of the report, there's a summary around the module that customizes why -- that kind of explains why that module is applicable to that piece of the claim language. If you want more detail than that, then you go to the appendix. And if you want more detail than that, then you use the appendix

as an index into the actual source code.
Q I'm trying -- I can look at the actual source code. I'm trying to understand all the different places where your opinions are provided. So it would -- it sounds like they're provided in the paragraphs themselves associated with the particular claim element, and then to the extent those paragraphs call out source code modules the appendix where you give your opinion as to what that source code module does, is that fair?
A Yeah. I mean, the best way to think about it is the source code is laying on the table. Think of it as little dots, little elements of the source code laying on the table. And the appendix takes a subset of that source code, a module, and creates a summary of it with specific indexes into it. And then in the claims, there's a second layer abstraction that kind of explains why that first layer of abstraction is applicable.
So there's kind of a three layer thing there that keeps from having to paste pieces of source code into the module, which gets really cumbersome, but it's the equivalent of pasting pieces of source code into the report because you can index directly from the body of the report to the module, to the element, to the code.
Q So let's turn to paragraph 61 and 62.

A Uh-huh.
Q And that refers to claim element 1 -- what you label as 1(c), correct?
A Yes.
Q And so if you look at 62, does that explain where in Bearbox's system you believe that claim element is satisfied?
A Paragraph 62 explains, in general, that the Bearbox system used those elements of the claim or had reference to those elements of the claim, and then the source code that's listed in 64 calls out specific modules that would provide a more specific perspective on that.
Q So in paragraph 62 you state: The systems conceived and/or developed by Bearbox satisfy this aspect of Claim 1 at least because the Bearbox systems calculated profitability at distinct time intervals, each with an associated power threshold, such as comparing mining profitability based on, inter alia, current power usage and energy price conditions on the one hand with profitability based, inter alia, on expected future power usage and energy price conditions.
Do you see that?
A Uh-huh.

Q So what do you -- what do you understand or what do you mean by associated power threshold?
A Well, the term intervals, each had an associated power threshold.
Q So is that the same as a minimum power threshold, or is that something different?
A It's essentially the same idea. It's the same concept, right. You have a time interval with a target. Target is the threshold.
Q So -- but the claim says minimum threshold, and you use the same statement associated power threshold. And my question is, do you mean something different or do you mean minimum power threshold?
A It means -- it essentially means the same thing.
Q You say essentially. Does it mean the same thing or not?
A If the power threshold is a minimum, then it's the minimum power threshold.
Q Okay. And what if it's not?
A The power threshold not necessarily have to be the minimum threshold in some cases. Right. So you could have -- the minimum power threshold is associated with the power option agreement.

Q Correct.
A Right. So it would be straightforward to change the code to where it wasn't relative to a minimum power threshold. It would be relative to some different power threshold, but it's the same thing. Threshold is a threshold.
Q But you can make it -- So is the code as currently written associated -- is it -- is it looking at a minimum power threshold, or is it looking at an associated threshold?
A They would be the same thing in this case.
Q What condition would it not be the same thing?
A If the code were adjusted a little bit, it could be a different kind of threshold. So it's a threshold that's associated with the time interval. If you're doing a power option agreement, then you can call it the minimum power threshold. You can do different kinds of -- I mean, the code is flexible enough to where you can fiddle with it and it can be the maximum power threshold. It's a threshold.
Q What do you mean by threshold?
A I think we've already defined threshold.
Q What do you mean by it again for my edification?

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MR. RICORDATI: Objection. Asked and answered.
THE WITNESS: It's a value that you want to be aware of to either cross or not cross or to be above or below. It's a -- it's not a target value because you're not trying to achieve it. Right. It's a boundary value in some respects.
MR. NELSON: Q So does the code receive data that is the minimum -- In your view does the code receive data that is the minimum power threshold?
A Yeah. The code simulates the receiving of time intervals with power thresholds and computes target values.
Q And what variable in the code holds the minimum power threshold data?
A We'd have to look specifically at the code. We may be able to find it in the appendix. Let me look.
In arb_main -- in paragraph 64, it refers to arb_main_AEC. If you look at arb_main_AEC on paragraph A.1, page 94 talks about the way the module processes the data. It talks about pricing values and break even point and the provided parameters which include market parameters, load parameters and so on. And if you look down one, two, three -- fourth or fifth, good example the fourth bullet says: Good break even --

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Q Fourth bullet point I think you meant.
A The fifth bullet point talks about a function called, it's get break even USD per kilowatt hour which determines the break even power price. So there's a -- for the configured miner hash rate and kilowatt load and for insertion in the database, blah, blah, blah, that there would be a minimum power threshold in there. I don't know -- we'd have to look specifically at the code to see what the value of the variable -- what the name of the variable was.
Q That variable in Mr. Storms' simulation was hard coded, right, it was a fixed -- that placeholder for -- in Mr. Storms' simulation for a power amount there, that was fixed, right, hard coded into the code?
A I don't know. We'd have to look specifically at the code to see where the value of the variable was -- what the name of the variable was and where the value of the variable would have been defined. But it wouldn't hard code it because it was assigned to a variable.
Q When you say assigned to a variable, what do you mean?
A Well, there's a difference between hard coding and initializing a variable.
Q Explain.

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A Hard coding it has to do with at runtime when the computer is loading those values. Right. A hard coded variable is a loaded media. Right. A variable -- a hard coded value is low to medium. A variable value is de-reference into a memory location. Those are different things. There's very few instances where Mr. Storms used hard coded values.
Q So going back to paragraph 62 for a minute. The word again associated power threshold which I understand you're also maintaining maintains is the same as a minimum power threshold here. How is that -- how is that arrived at in Mr. Storms' simulation?
A The associated power threshold -- the power threshold associated with distinct time intervals?
Q Yes.
A We'd have to look specifically at the code to see where those values were -- were read or derived, but they're written out into a table. And I believe the table uses a constant value or very slowly changing value.
Q Does the Bearbox system that you've described -- does it have the ability to determine the amount of power that it is -- that it is using at any given point in time?

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A It appears so, yes.
Q Where do you describe that it can do that?
A It knows how many miners are in play, it knows the power consumption of the simulated miners, it knows how many of them there are. That's how much the load would be. It's also described in -- it's also described in the data sheet for the rack system or the container system.
Q And, so, in that context, the assumption you're make something is that all miners are running at 100 percent for the system to know how much load it's consuming?
A That's the maximum load.
Q Yeah. My question to you was, does Mr. Storms' system, as you've described it, have the ability to determine in realtime the actual amount of power that it is using?
A To determine in realtime the actual amount of power that each individual miner is using, to determine the amount of power that's being spent -- that's being burned in the PDU, to determine which actual amount of power?
Q To determine the total amount of power that his system is consuming.

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A I don't know if he's got a gross power monitor on there. I don't know if he meters the consumption -- the instantaneous consumption. I don't know. I'd have to look at the code.

Q Does Mr. Storms' system to your understanding have the ability to determine how much power the miners within his system are using as a group, as opposed to an individual miner?

A It makes assumptions about different types of miners and how much power they would consume. So it can be reconfigured for different miners of different characteristics. It can be reconfigured for different groups of miners that have different characteristics and different power or gross power targets, and so on.

Q But all of that would be projected power consumption based on the characteristics of the different miners. I'm talking about an actual operation if his system had been used to mine bitcoins. Does it have the ability to determine the amount of power the miners are using at a given point in time?

A I don't know if he has the ability to sub meter the miners. You'd have to have a -- you'd have to have a device that measured amount of current that was being consumed and the voltage that was being provided to the

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inlet power system of each miner. I don't know if his system has that.

Q Do you know if you identified anywhere in the source code where his system had the ability to report the amount of power actually being consumed by the system?

A Well, since his was a simulation, it couldn't determine the actual amount of power being consumed. It would be an estimate. I don't know if he envisioned in his system the ability to get feedback from those devices, but that would drive the overall system cost up because you'd have to have a sensor on the power inlet or -- you have sensor on the outlet of the PDU. If the PDU is smart and it can report that, then he can get that off the PDU -- off the PDU interface. So from that perspective, yes. If the PDU was not smart, then he'd have to meter the device where the power is being consumed, and I don't know if his system thought about that.

I think he may have been considering an intelligent PDU where he could monitor characteristics off the PDU and get the PDU to tell him how much it's putting out on each port.

Q Do you know whether he was considering an

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intelligent PDU or whether his PDUs were off the shelf?

A It looked to me like he was building custom PDUs in some respect.

Q And that's -- Was he building it or was Mr. Hustler building it?

A Who?

Q Mr. Jason Hustler. You don't know who that is?

A I don't know.

Q Do you know who Mr. Jason Hustler is?

A It sounds familiar, but I'm not recalling what part he played in this right now.

Q Do you know if Mr. Storms or Mr. Hustler were building PDUs in the same physical location as his simulation was running?

MR. RICORDATI: Objection. Assumes facts not in evidence.

THE WITNESS: I can't speak to that.

MR. NELSON: Q So you don't know?

A I don't know anything about their physical construction.

Q Do you know if under Mr. Storms' system the system -- do you know whether it was impossible under Mr. Storms' system for the -- to tell the miners to maintain a certain amount of load?

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MR. RICORDATI: Objection. Vague.

THE WITNESS: Can you restate that?

MR. NELSON: Q Yeah. Do you know whether it would be possible -- whether it was impossible under Mr. Storms' system to instruct the miners to maintain a certain amount of load?

MR. RICORDATI: Objection. Vague.

THE WITNESS: You mean to consume a certain amount of power?

MR. NELSON: Q I mean -- When we've discussed the word consume, that has multiple meanings here. So to constantly -- Well, let me ask a different way.

Do you know whether Mr. Storms' systems could instruct the miners to maintain a certain load, whether that was -- whether that was impossible for his system to do?

A No, his system could do that.

Q Do you know whether he said his system could do that or not?

A I think it's pretty clear from the code.

Q Would you be surprised if he said it was impossible for his system to do that?

A I'd have to know what the context was.

Q So you won't know one way or the other?

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A Well, it seems to me based on looking at the code that it would have been possible for his system to instruct the miner to maintain a certain load. Now, depending on what maintain a certain load means, right, it's highly dependent on the structure of the computer system. It's really difficult to say to an arbitrary computer system, consume this much power, and only this much power. That's really tough.

Q What about his total build? So let's say he had -- let's say hypothetically he had a -- his system was 50 miners. Do you know whether his system -- under that system it would be possible to maintain a constant load?

A What do you mean by constant load? Constant power usage?

Q Power usage, yes.

A Well, if the things are on, their power supply is going to burn a certain amount of power, their operating system function is going to burn a certain amount of power, even if they're quiescent. If they use -- I mean, there's so many variables in this, it's really, really difficult without specific monitoring on the internals of a computer system to tell it to consume a certain amount of power. It's really difficult.

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Q And sort of by extension then it's really difficult to tell it to maintain a certain amount of power, to maintain the same -- using the same amount of power?

A You can -- Well, there are certain power amounts that you can tell it to go to, right. You can tell it -- depending on the structure of the computer system, right, you can always tell it to turn off, and that's specific amount of power, zero. So it could do that.

Q That's no load. I'm talking.

A It's consuming a certain amount of power. Right. You can tell it to be quiescent, and that will give you a better -- that will give you a better -- you can tell it to stop performing anything except its operating system activity, that will give you a pretty good idea about how much power it consumes. But, again, it wouldn't be constant. You'd have to average it over a certain period of time because it's never constant. So the question really -- There's no possible way to answer the question. There's too many other considerations.

Q So turning to paragraph 63. You state: To the extent this feature is not found to be explicitly described in Bearbox disclosure, it's my opinion that

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merely one of ordinary skill in the art would have been required to modify the existing system -- I think I read that wrong. Hold on. Let me start over.

In paragraph 63 you state: To the extent this feature, meaning claim element C -- 1(c) is found not to be explicitly described in the Bearbox disclosure, it is my opinion that merely ordinary skill would have been required to modify the existing system to explicitly incorporate this feature.

Do you see that?

A Uh-huh.

Q So is it your opinion that this feature is found in Mr. Storms' system based on paragraph 62 or that it's not found but would be easy to do as stated in paragraph 63? Because it seems like paragraph 62 and 63 contradict each other.

A Contradict each other.

MR. RICORDATI: Objection. Mischaracterizes the report.

THE WITNESS: I don't think those two paragraphs contradict each other.

MR. NELSON: Q Well, is it your opinion that claim element 1(c) is or is not found in Mr. Storms' system?

A Okay. Claim 1(c) -- element 1(c) says:

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Receive power option data based at least in part on a power option agreement. His system was a simulation, so it didn't actually have a power option agreement, but it was able to receive power option data on simulated power agreement. Wherein, the power option data specifies, 1, a set of minimum power thresholds -- he had has minimum power thresholds -- 2, a set of time intervals -- he clearly had time intervals -- where each minimum power threshold in the set of minimum thresholds is associated with a time interval and set of time intervals. Yes, his system did that.

Q So his system did all those things except for it couldn't receive power option data based on at least, in part, on a power option agreement because it was a simulation, is that fair?

A It was a simulation, and to receive power option data based on a power option agreement, you have to stroke the power option agreement. And to my knowledge he never had a stroked power option agreement, but his system would have been capable of receiving that data if he had.

Q In your view would a POSITA -- you used the word POSA, P-O-S-A, all caps -- would a POSITA have had knowledge of power option agreements?

A I think -- yeah.
Q Why do you say that based on your level of skill?
A Somebody who's -- somebody's who familiar with the way that power markets work would understand that you could have a power option agreement.
Q And in your view does a -- because I don't recall in your definition of a person of ordinary skill a requirement that they be familiar with power option -- with power markets.
A Well, a power market is just another type of market. We're buying future -- you're paying a price today for something that's going to happen tomorrow. This is a common business construct. So anybody who was familiar with that business construct and knew how to apply it into the power space would understand that. This is not -- this option agreement stuff is a business construct.
Q So in Footnote 4 you say you discussed these issues and facts with Frank McCamant on April 1st. Do you see that?
A Yes.
Q How long did you talk to Mr. McCamant?
A I don't -- I don't recall. Maybe -- 30 minutes

maybe, an hour.
Q Did you only talk to him once?
A I've talked to him a couple times. I mean -- I'm aware of him. I have talked to him previously. I think I've only talked to him one time with respect to this case, but I'm not exactly sure. I know I talked to him on this date because we specifically talked about some of these concepts.
Q Is it your understanding for, example, of QSEs -- Q-S-E, qualified scheduling entities, does that come from Mr. McCamant?
A Does the concept of QSE come from McCamant? No, that's a concept that comes from ERCOT.
Q I'll ask a different question. Were you aware of quality scheduling entities before this case and before talking to Mr. McCamant?
A I was aware that this capability -- I was aware that this market existed and that these capabilities existed, but I wasn't aware of the specific terminology.
Q Prior to this case how were you aware that -- of -- that this market existed and the capabilities existed?
A I work with people who are in the electric power space some of whom are very familiar with ERCOT.

And so, you know, it's general domain familiarity and conversations with colleagues.
Q So going to paragraph 62 again, the last portion of it. The last sentence says: The Bearbox system also included custom PDU software capable of providing quote -- capable of providing fine grain load control, parentheses i.e., the ability to turn on some but not all of the miners, closed parentheses.
A This is paragraph 62?
Q The last sentence of 62.
And was configured to work modularly with a variety of different miners that had different power requirements.
Do you see that?
A Yes.
Q So the fine grain load control there, are you -- the definition of it are you talking about what's in the i.e., paragraph, the ability to turn on some but not all of the miners? Is that how -- what you're defining fine grain load control to be in the context of your opinion here?
A I may -- I believe i.e. means such as or for example. So the ability to turn on some but not all the miners is a for example that helps to define fine grain

load control. It's the complete -- it may not be the complete extent, but it's an example of that.
Q Okay. So you're using -- where you use the term i.e. in this report, you're using it as for example?
A I -- hopefully I used it right.
Q That's e.g.
A Okay. I get those backwards all the time.
Q So in the context of this report, where I see the terms i.e., I should read it as for example?
A The i.e. means as an example or -- I can't think of a better way to explain that.
Q It sounds like the answer is yes. I just want to make sure I'm understanding --
A Well, I don't -- well, I get them confused all the time. They may go different directions, but I kind of use them interchangeably as a for example because I get confused as to exactly what their precise meaning is. They're very closely related to me. I'm not a Latin expert.
Q Let's turn to claim element 1(d) beginning paragraph 65. So the first sentence -- beginning of paragraph --
A Beginning paragraph -- do you want 1(d) or paragraph 65?

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Q Well, you have 1(d) as a heading, and then paragraph 65 is your opinion about it, right?
A Yeah.
Q You talk about the systems conceived of and/or developed by Bearbox satisfy this aspect of Claim 1 at least because the Bearbox system calculated profitability at distinct time intervals, each with an associated power threshold, such as comparing mining profitability based on, inter alia, current power usage and energy price conditions on the one hand with profitability based, inter alia, on expected future power usage and energy price conditions.
Do you see that?
A This is paragraph 66?
Q Yes.
A Yeah.
Q So where does the system calculate expected future power usage?
A If you look at the outputs of the system, it calculates power that would have been -- that would be used for bitcoin mining or that could be used for bitcoin mining versus -- it calculates power that could be used for bitcoin mining and the resulting profit versus not using the power for bitcoin mining and selling it back --

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selling it on the market. So the power that could be used for bitcoin mining.
Q That's the expected future power usage?
A Yeah.
Q And how is that calculation done?
A We'd have to look specifically at the code to see the equation, but it's amount of power used by a certain miner for a certain time. How much power does this miner use over what time period.
Q An individual miner?
A For each miner. That's a unit ladder thing, right. Power, time, dollars.
Q Right after that, there -- you see the term energy price condition. What is the energy price condition that you're talking about?
A That's the real time power price.
Q At a particular node?
MR. RICORDATI: Object to form.
MR. NELSON: Q Is that at a particular node?
A That's the realtime power price that's received from the marketplace.
Q But my question for you is, that's a realtime power price received from the marketplace at a particular node or something else?

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A Yes. Wherever the power price is being fished from.
Q I've asked a compound question so let me ask a better question.
Is the energy price condition you're talking about there being the realtime market price the realtime market price for a particular node?
MR. RICORDATI: Object to form.
THE WITNESS: If I'm understanding your question correctly, I believe that's right.
MR. NELSON: Q And where is that price coming from in his simulation?
A It's -- there's a vector of values that are -- that are retrieved either statically or dynamically that change over time that are used to create that calculation in the trade off.
Q What is the current power usage in your sentence in that paragraph 66?
A That would be the amount of power essentially used by the bitcoin mining devices.
Q And how is Mr. Storms obtaining that number, the amount of power actually being used by the bitcoin mining device?
A He can't obtain the power actually used because

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there weren't any actual miners because it was a simulation. So there's an estimate of what the power would be used by the miners. And he's using corner case or best case/worst case analysis where he's using maximum -- looks like to me he's using maximum values, worst case, maximum value -- maximum power used by the miners.
Q And so he's basically making an assumption that the miners would be running flat out, and if they're running flat out, they use so much power?
A Yes. That's the envelope -- that's the envelope calculation.
Q And if that assumption were not true, for example, if his system were operating in the real world and a -- some group of miners had overheated or weren't running, how could -- how would he know that?
A How would he know what?
Q How would he -- how would he -- how would his system have calculated the actual current power usage if it was running in the real world? How would it have calculated the actual amount of power the system is using?
A I think we already addressed this. There's several different ways of doing that. One -- probably the most efficient way is to have a smart PDU that can

monitor its output ports and you query the PDU to find out how much power is being consumed. That's the easiest way.

Harder way is you got a dumb PDU, you got to go put a sensor on a device. Hard way is you got to crack the computer open and put a bunch sensors inside of it.

Q And do you -- Are you aware of any evidence in this case that Mr. Storms had done any of those things such that his system could, if implemented, actually figure out the amount of power it was consuming -- it was using at a specific point in time?

A I believe he was anticipating using smart PDUs that he could query their output ports. I think that's the simplest, most straightforward way to do it.

Q And your belief that he was doing that is based on what?

A It's based on my recollection right now of what I remember in the code. I believe that's what was going on. To make it make more sense we'd probably have to look at the appendix and see which modules were related and see if there's specific reference to -- I think the PDU interface modules are using a mod bus protocol which can talk -- which with very little modification could talk to a mod bus device to determine how much power is

being flushed out through its output port.

Q What portion of the appendix are you looking at?

A I'm looking -- looking right off the back just trying to finds thing on page 94, paragraph A.1, looking in some of the helper functions. I believe those helper functions that are in the bullets down at the bottom of page 94 are actually not part of arb_main. I think they're part of a package that arb_main includes. Again, we have to look specifically at the code to see exactly what the details are.

Q All right. So if I'm understanding you correctly, to really understand these details, you and I would need to spend time going through the code?

A I think the best way to do that would be to come up with really specific questions and then look at the code and find out specifically in the code where exactly your questions were resolved. But I think for this particular question, it's talking to a mod bus enabled device over an IP network. That means it's assuming some level of intelligence. So that's where I get my interpretation that he's assuming that there's an intelligent PDU that he could talk to and get information from.

Q Okay. And to verify that assumption I would need to -- you and I would need to look at the code and go through the specifics?

A It would get more detailed than that. We'd have to look at the PDUs that he envisioned looking at. I remember on a spec sheet there's a description of something that appears to be a PDU. We'd have to look at that specific PDU, see what the characteristics of that PDU had. We'd have to look at the code and see exactly what kind of queries the code did for that PDU. But based on what I'm seeing there, it would be extremely easy to -- He's using an intelligent PDU, it's mod bus capable. You can query those PDUs all day long. They got all kinds of data in them so it would be no big deal to get that data out of there. That's why I say I think he's assuming an intelligent PDU.

Q Did you do any analysis to confirm that he is using or assumed an intelligent PDU?

A I think the fact that it's a mod bus capable PDU on an IP network pretty well establishes that.

Q Is a mod bus PDU -- is that an off the shelf component you can buy?

A Mud bus is a communication standard. You can buy all kinds of things that speak mod bus.

Q Including PDUs, correct?

A Or an adapter that goes onto the PDU.

Q So both?

A Yeah. Or a relay that controls a PDU.

Q So going back to paragraph 66 for a minute. What's being compared there is the current power usage and energy price condition with an expected future power usage and an energy price condition, is that right?

A Yeah.

Q Is the current power usage -- is that a threshold?

A No. That's the power usage that would be of the -- my interpretation of that is the current power usage of the mining device. The current or expected power usage of the mining device.

Q My question to you, is that a threshold?

A To could considered a threshold.

Q Do you consider it a threshold?

A It's the power usage. It's the actual power usage of the device. Typically a threshold is something you compare against. So measuring the power usage, not really a threshold. It may be something you compare with a threshold. Does that make sense?

Q Yes. In your analysis did you consider how

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long it would take Mr. Storms' miners to turn off from -- if they were instructed to turn off from an on state, how long it would take them to turn off?
A You mean -- you mean for the PDU to turn them off?
Q Yeah.
A That would be instantaneous.
Q So from --
A The PDU -- if the power is taken away, the computer shuts down almost immediately unless it has a battery backup.
Q Did you consider how long it would take the miners to come back up if they were -- if they were in an off state and turned -- and put into an on state?
A That gets into the situation that we were talking about before with computer systems. Right. Depends on this, depends on that, depends on the other thing. And if you -- if you -- if you turn a computer system off in a nongraceful fashion, then how long it takes for it to come back up is an it-depends question, and we have doing down the rat hole of what a computer system is.
Q And did you -- in the context of your analysis of Mr. Storms' system turning bitcoin miners off and on,

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did you consider how long it would take his system to turn bitcoin miners on if they were in an off state?
A Well, to turn them on would be instantaneous. To make them operational would depend on all of these other conditions.
Q By turn them on, I mean make them operational.
A Get them where they can mine bitcoin? Depends, depends, depends what operating system -- you out of juice?
THE VIDEOGRAPHER: I have five minutes left.
THE WITNESS: So it depends what's the operating system, what's the disk structure, what kind of activities is it contained in, what's the cache structure, depends, depends, depends, depends.
MR. NELSON: Q I understand that.
A I can't answer that question.
Q My question is, did you consider that in your analysis? I don't see that in your report. Did you consider how long it would take them from being -- from an off state to being turned on to actually becoming operational? Did you consider that in your analysis of his system?
A No, I don't think -- it doesn't have a bearing on the approach here. The objective is to have -- I

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think his simulation had 272 miners or something like that. You know, if a few of them -- they're not all -- even if they're all turned off gracefully, they're not all going to come up in the same way at the same time. So there's just -- there's no good answer to that question.
Q Well, my question was did you consider it in your analysis.
A I considered it, and I thought well, you know, there's too many outstanding variables on that.
MR. NELSON: Why don't we take a break. You can change tapes?
THE VIDEOGRAPHER: The time is 1:39 p.m. This is the end of media unit 2 and we're going off the video record.
(Off the record)
THE VIDEOGRAPHER: The time is 1:52 p.m. This is the beginning of media unit 3, and we're back on the video record.
MR. NELSON: Q So going back to page 66 of your report.
A Okay. Page 66 or paragraph --
Q Paragraph 66.
A Yes. Got it.

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Q So what portion of paragraph 66 addresses the claim language wherein the performance strategy comprises a power consumption target for the set of computing systems?
A Power consumption target. I think it's -- it's associated with current power usage and expected future power usage.
Q So is -- so is one of those the power consumption target?
A Yeah, I think so. There's the -- there's the -- there's the power threshold for the time intervals and current power usage and energy price conditions. So the current power usage would essentially be the target, and expected future power usage would be the estimated future target.
Q And how is the associated power threshold utilized, if at all, to determine the expected future power usage?
A Well, the power threshold -- if you're assuming that the data is coming from a market system, then the power threshold is the minimum amount of power that you're bound to pay for or consume.
Q By consume you mean use or sell back, right?
A Well, again, it depends on -- There's several

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different things going on here, right. There's the patent language and there's the business of making the contract with the service provider, and I think those two things are separated somehow. For example, if you have a wind turbine, you have a contract with the service provider, and if they're not going to take the power, you shunt it to ground. But -- so they don't have to take the power, but --

Q Well, we're focused on the patent.

A You understand what I'm saying? So the patent language -- If you go back to the patent language, it says receive power option data based on an option agreement. So there's a contract that's giving you the data, and the power option data specifies time intervals with thresholds, and the power -- the minimum power threshold is associated with each time interval. So there's time intervals that have thresholds that are associated with them, and the thresholds are minimum power that you're bound to consume. You have paid for, you're going to pay for.

Q And -- So we talked about this earlier, bound to consume means you can either use it by running miners or not use it by selling it back, is that right?

A Well -- Let's look. Claim 1 says wherein --

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power consumption target -- you're talking about targets -- for the set of computing systems for each time interval in the set of time intervals wherein each power consumption target is equal to or greater than the minimum power threshold. So the patent doesn't contemplate selling back at all. It talks about consuming that minimum power threshold by those computing devices. I mean, it's -- I just read the claim language there. It says: Minimum power consumption target wherein each target is equal to or greater than the minimum power threshold associated with the time interval.

Q So earlier on I had asked you a question what about the plain and ordinary meaning of minimum power threshold was, and you said it was the power that could either be consumed -- that could be consumed either by using it or by selling it back. So -- Are you changing the definition?

A No. I'm saying in the power option agreement, I believe I said it's not clear to me whether the power option agreement mandates that you use the power. That's a question for McCamant. I believe I said that several times. I don't know about the contract -- there's a contract, and then there's this language in the patent,

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and I'm trying to draw the distinction between the two. The contract language may not make you use the power.

Q Well, the term power option agreement is in the claim, so it has a legal meaning per the claim. What do you understand the legal meaning of power option agreement to be?

A I don't know if power option agreement means that you must consume -- you must expend the power that you're contracted to buy. I can't answer that. That's again -- that's a question for McCamant because that's a business -- that's ERCOT marketplace business thing.

Q So when you did your analysis of the claim language, did you apply a plain and ordinary meaning of power option agreement as it's used in the patent in the context of your analysis?

A It says receive power option database at least in part on a power option agreement where the power data specify a set of minimum power thresholds. Right. So the minimum power thresholds means you must be capable of consuming that. I don't -- What I'm saying is I don't know if it means that you must consume that. You must be capable of consuming that.

Q I understand that. But --

A Those are two different things.

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Q Do you know -- did you in your analysis determine a plain and ordinary meaning of the word power option agreement -- the phrase power option agreement as used in the patent?

A The phrase power option agreement to me in my interpretation means options for buying power ahead of time. To me means that's the plain and ordinary meaning of it, opting to purchase power ahead of time at a certain rate and then I'm going pay for that power, and then when it comes for that time I'm going to pay for that power whether I use it or not. There's a secondary condition which says -- where I'm drawing a distinction, I don't know if you're bound to use that power. Do you understand what I'm saying? I'm going to pay for that power, that's the option. When it comes time, I'm going to pay for that whether I use it or not. I don't have to use it. I can screw in that light bulb and turn off the switch, and I'm still paying for that minimum power.

Q So let's go back -- I think in connection with paragraph 62 I had asked you some questions about where -- where the code received the minimum power threshold data. Do you remember that?

A Yes.

Q And I think you pointed to go -- go to the

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appendix on page 94.
A Yes.
Q I think you pointed to bullet point 5 as providing more information on that.
A I believe that's where it is, yeah.
Q So where in bullet point 5 does it identify what -- where specifically the power option -- the minimum power threshold data is in the code?
A Well, it talks about the load and the break even power price.
Q But neither one of those is minimum power option data? I'm sorry. Neither one of those is a minimum power threshold, is it?
MR. RICORDATI: Objection. Mischaracterizes the testimony.
THE WITNESS: Well -- I believe that the break even power price includes the minimum power threshold.
MR. NELSON: Q The break even power price is a price, it's not a minimum power threshold, is it?
A I'm opting to buy the power ahead of time for a certain amount of money and it's a certain amount of power. Comes time for that power to be used and paid for, I can stick it in my light bulb, I can stick it in my bitcoin miners. If I stick if in my bitcoin miner, it

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might make me some money. The bitcoin miner has to make enough money to get me past the cost of that power and maybe a couple of other things to make a break even. So the minimum power threshold is built into that break even.
Q I understand your belief that it's built into the calculation. My question is, where in this bullet point does it actually tell me what the minimum power threshold is?
A It doesn't tell you specifically in the bullet point. I believe what I said before was we'd have to go back -- if you want to find the name of the variable or whatever, we're going to have to go directly into the code and find that. This kind of gives us a hint as to where it would be.
Q So your report doesn't identify specifically where the minimum power threshold is in Mr. Storms' system, I have to go to the code to actually find that?
A Yeah. I mean, my approach to doing these reports like this, like I explained before, is the code is down here and it's got all the detail. There's a first level which is the module descriptions that have a little more detail, then there's the second level which is the stuff that's inserted in the body, which is even

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less detailed. So if you want ultimate detail, you have to keep going down.
Q So -- But the report is your opinions, and if I want to find out what the actual minimum power threshold that Mr. Storms' system allegedly uses, if I want to find out what that is, I can't find that out from your report, I've got to actually look at the code?
A Right. Because the report summarizes the code. The report doesn't include the code. The report includes the code by reference with these summaries. Right. So it gives you a hunt as to where you'd have to look. It looks like you'd look at arb_main_AEC, which is BBSC 016, and then you go to 016, line 63 through 69, and then you go to 016, lines 15 and 16. And that's probably where that would be if you were looking for it. So it gives you a really efficient cross-reference to go quickly into where the thing is that you're looking for in the code. I mean, it's not possible to list every variable name and every function call and every bit of code.
Q So if -- Let me ask you this. If prior to Mr. Storms' system, if a company developed a system that was capable of turning individual miners on and off within a group of miners, taking into account multiple variables to determine what strategy should be based on

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what the strategy should be, i.e., to turn the miners off and on, based on a company's business strategy, would such a system be the same as the Bearbox system?
MR. RICORDATI: Objection. Vague.
MR. RICORDATI: Q I can ask that slower if it was too quick.
A Yeah, please.
Q So, hypothetically, if prior to Mr. Storms' system a company developed a system that was capable of turning individual cryptocurrency miners on and off within a group of miners, and in doing so took into account multiple variables to determine the strategy should be based on whatever the company's business strategy was, so it could be to turn the miners on and off, to arb power, to do whatever, would that be Mr. Storms' system?
MR. RICORDATI: Objection. Vague.
THE WITNESS: I believe Mr. Storms' system to be capable of doing that. And additional things.
MR. NELSON: Q Well, my question -- well, my hypothetical -- would that be Mr. Storms' system?
MR. RICORDATI: Same objection.
THE WITNESS: No. Mr. Storms' system would be capable of doing that, but it would do more.

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MR. NELSON: Q What additional things would it need do to be -- to encompass Mr. Storms' system?
A You mean a system that complies with the terms of the patent?
Q No. I mean, that complies with Mr. Storms' system as you understand his system.
A I thought you were talking about a system that implemented what the patent said.
Q I'm talking about implements -- If there was a system in existence prior to Mr. Storms' system that was capable of turning individual miners on and off within a group of miners, and in making that decision it took into account multiple variables to determine whether or not to do so, would that be Mr. Storms' system?
MR. RICORDATI: Objection. Vague.
THE WITNESS: Well, this is a hypothetical system that had the ability to turn miners on and off based on a set of conditions.
MR. NELSON: Q Correct.
A Mr. Storms' system does that and more.
Q And what is the and more?
A Well, the main thing it does -- one -- some of the primary things it does is optimize the way that the systems are turned on and off or the target power that

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they consume for the purpose of maximizing total profit, maximizes total profit, not just bitcoin profit.
Q And when you say it maximizes profit, it's maximizing total profit for the bitcoin miner?
A It's maximizing total system profit, not just bitcoin mining profit.
Q No. I understand. But I'm trying to get -- in your understanding what perspective his system operates under. Is it operating from trying to maximize the profit of a bitcoin miner so that if I'm a bitcoin miner, if that's the load, and I'm trying to optimize my profit, I could either do it by mining bitcoin or I can do it by selling back power? Understand?
A Mr. Storms' system does that.
Q Right. And is that --
A This system does not.
Q Is that the perspective that his system is operating from, the perspective of the load in trying to maximize profit for the load?
A It's trying to maximize profit for the system, and one element of maximizing the profit is making the most efficient possible bitcoin mining activity. So if you have a lot of computer systems, and some are more efficient at mining bitcoin, then you want to use them

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more often. But if they consume a lot of power, and your power price is high, then maybe you don't want to use them as often. Right. So there's tradeoffs in the bitcoin mining thing that optimizes your bitcoin revenue. There's also tradeoffs that optimize other types of revenue and other types of expenditures. Right. So Mr. Storms' system optimizes a different set of overall things than the system that's described in the patent, which seems to only optimize bitcoin mining. It doesn't even optimize bitcoin mining.
Q But my question for you is Mr. Storms' system, is it designed to be implemented at the load side or at the generator side?
A I don't -- I don't think it matters. I think it just consumes some amount of electricity and optimizes the cost, optimizes the profit versus the cost. It doesn't matter where in the system it's actually implemented.
Q Well, A generator doesn't consume electricity, it provides electricity, fair?
A Right. So the system that Storms created is consuming the electricity that's coming from the generator, or it's passing it through and selling it.
Q Right. But my point of view is what entity is

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implementing Mr. Storms' system in your opinion, the generator or the bitcoin mining?
MR. RICORDATI: Objection. Vague.
THE WITNESS: That question -- I can't -- I can't answer that question because it doesn't make sense to me.
MR. NELSON: Q Why not?
A The generator is a generator. It doesn't implement bitcoin mining. A bitcoin miner doesn't implement -- a pure bitcoin miner doesn't implement any sort of optimization. Storms' system is different than a generator and different than a bitcoin miner in that it takes into account all of these conditions and optimizes the amount of revenue.
Q I understand your position, but who is going to use Mr. Storms' system, a generator or a bitcoin miner?
MR. RICORDATI: Object to form.
THE WITNESS: Could be a lot of people use Mr. Storm' system.
MR. NELSON: Q Could a generator use it?
A I guess.
Q How could a generator use it when a generator doesn't mine bitcoin?
A A generator could use it as a local load. The generator is selling -- a generating device -- a

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distributed generating facility is selling power into the power pool. If the price he is getting for selling power into the power pool is lower than the money he can make by bitcoin mining, he is going to shunt his power into the bitcoin miner and mine some bitcoin. But if the power price goes up, he's going to shut his bitcoin miners down and shunt it back into the power pool. A great example of this is a solar panel -- I mean a wind turbine. When wind belows at night, power company doesn't want it. What are you going do with it? You're going to stick in your bitcoin miner at night. So a generator can use that.

Q Turn to paragraph 97 of your report. That's Claim 7. Do you see that?

A Yeah.

Q So if you turn to paragraph 100, you give -- you give your explanation as to where that claim element is met, and said: For example, the Bearbox system was capable of working with a variety of different miners with different power requirements could dynamically determine profitability at various power thresholds, parentheses, usage, closed parentheses, level and can instruct the miners based on this determination as explained above.

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Do you see that?

A Uh-huh.

Q So how does that meet the claim language of claim -- of Claim 7?

A Claim 7 says it's a system according to Claim 6. Let me look at Claim 6. Claim 6 says it's a system according to Claim 1. So Claim 6 modifies Claim 1 into receiving subsequent power option data to increase or decrease the thresholds. And Claim 7 says -- Claim 7 says, 6, which modifies to change the performance strategy in response to changing conditions in the power option data. So the power option data is not fixed. The power option data is now changing over time for subsequent time intervals. Storms' system was capable of doing that. And in cases where it wasn't directly capable of doing that, it would have been very obvious to make small adaptations.

Q You say it was capable of doing that because it was capable of working with different miners with different power requirements could dynamically determine profitability at various power threshold usage levels.

A Uh-huh.

Q So how is -- how is that relating to subsequent power option data?

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A Well, if you think about two power option intervals, for example -- let's just look at two subsequent intervals. Let's say that the power option data is feeding in fast. So during this interval got a minimum threshold of one level, and you've got miners that can mine effectively according to that threshold. Subsequent power interval, the threshold is different. Right. So I've got a collection of miners that I can bring to bear in a different way against that different threshold to optimize my revenue in a different way. I may turn some other ones off that used to be on, I may turn some on that used to be off, I may instruct them to mine in a different way perhaps.

Q What portion of Mr. -- You identify seven modules here that allegedly have -- have that capability. So the subsequent power option -- the subsequent power option data, that's being received by the system, right?

A The modules that have the term -- that have the word import in them are consuming marketplace data. The couple of other modules compute the break even point, which is based on the threshold that's in the marketplace data, and the one that has current realtime fetches marketplace data and returns the realtime market price, and then the one that has the break even term in the name

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of it performs profitability determinations. I mean, that's exactly the scenario that I just described.

Q We're -- For the record he's talking about page 33 of his report. Is DA_LMP, day-ahead local market price -- location margin price, is that power -- is that subsequent power option data?

A Day-ahead seems to be marketplace option data.

Q Is that the same as subsequent power option data?

A Yeah. It works every day. Every day it consumes the day-ahead data.

Q So get current RT_LMP, is RT_LMP also subsequent power option data?

A Realtime market price.

Q So that's not subsequent power option data?

A That's not power option data. That's sell data.

Q So what do you understand subsequent power option data to be in this claim?

A That means consuming power option data at a subsequent time.

Q Well, the claim says receiving the subsequent power option data. So how can that be consuming power option data at a subsequent time?

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A We're using overloaded terms like consume. So the system ingests power option data. It receives. So some power option data comes to it at multiple times. Maybe this day it's this day-ahead, the next day it's that day-ahead.
Q So what data is that though that's coming? What is the subsequent power option data that's coming to the system at multiple times?
A That would be the power price.
THE VIDEOGRAPHER: Excuse me. Mr. McClellan, could you move your mic up a couple inches. Perfect. Thank you.
MR. NELSON: Q Go to paragraph 109.
A Page 35?
Q Yeah. So that's talking about Claim 9. Claim 9 is on page 34. It says: Wherein the control system is a remote master control system positioned remotely from the set of computing systems.
Do you see that?
A Right.
Q And you say that using IP-based protocols for communication between control systems physically remote from the resources under their control is a conventional feature of computing systems for decade, right?

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A Yes.
Q So a person of ordinary skill in the art in your view would have known the details of Claim 9 prior to Mr. Storms' system, is that fair?
A Yes.
Q Okay. Do you know if Mr. Storms was ever registered with Southwestern Power Pool as a market participant?
A I don't know.
Q Do you know have an opinion whether that mattered or not for practicing the claims of the '433 patent?
A I don't think it makes that much difference. His system was a simulation. It wasn't actually retrieving and implementing stuff. It was simulating a concept.
Q Do you know if Mr. Storms' system retrieved information regarding the status of individual miners? The simulation --
A Are you talking about operational status? I know that it was configurable to adapt to different miners, yes.
Q What software retriev -- I'm talking about retrieving information. Let's say, you know, whether a miner was overheating or something, was it able to retrieve that information?
A I don't know. I know it was able to retrieve information from the PDUs. I don't know if it was able to retrieve information from the miners. Again, that would be a -- that would be a computer system specificity that would have to be nailed down. Right. If it was used in this operating system or that operating system, the retrieval process could be different.
Q What information was it capable of retrieving from the PDUs?
A It looks to me like it was interfacing with mod bus capable PDUs. So it would be capable of retrieving anything from a PDU that would be available over mod bus. So that would be a characteristic of the PDU that was selected.
Q Do you know what PDUs Mr. Storms was considering?
A I know that there's -- there's a product detail sheet or something like that that may detail certain kinds of PDUs that he was thinking about, and I know that he also prototyped some custom PDUs. So it seems to me like he was considering building his own PDUs, but it looked like he spec' out a particular one for -- to get

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to market faster maybe.
Q Do you know if he ever sold his system at all, ever commercialized it?
A I don't know.
Q So turn to paragraph 170.
A Uh-huh.
Q So in 170 you say: In my opinion, Bearbox communicated information about its proprietary technology and know-how to Lancium that enabled one of ordinary skill in the art to derive the inventions recited in the '433 patent or such inventions would have been obvious variations in light of the information communicated from Bearbox to Lancium.
Do you see that?
A Uh-huh.
Q So is it your opinion that the information that Bearbox communicated to Mr. McNamara and Lancium did enable or -- did enable one to derive the patents or that such inventions simply would have been obvious in light of what Storms communicated?
A Well, in the second sentence, Bearbox communicated information about its technology to Lancium that enabled one of ordinary skill in the art to derive the inventions recited in the claims of the patent.

Q Then you have an or, or such inventions would have been obvious variations in light of the information communicated. So which one is it? Did they communicate -- did Mr. Storms communicate the information that enabled one of ordinary skill in the art to derive the inventions, or did Mr. Storms communicate information in your opinion that would have rendered them obvious?

A I think that some of the -- some of the information that was communicated was enabling for them to recite in the claims and some information that was communicated was -- was also enabling, but was not necessarily contained in the patent or would not have -- or would have just been obvious variations.

Q I'm not sure I'm following your statement there. So the first part of that opinion is Bearbox communicated information about its proprietary technology and know-how to Lancium that enabled one of ordinary skill in the art to derive the inventions recited in the patent. Do you see that?

A Uh-huh.

Q Then you have an or statement.

A Uh-huh.

Q Or such inventions would have been obvious -- So we're still talking about the inventions of the '433,

correct?

A Yes.

Q Would have been obvious in light of information communicated from Bearbox to Lancium.

A Right. So the information that Bearbox communicated to Lancium made the -- made the inventions obvious to Lancium, and they used some of that information to claim in the '433 patent.

Q That's not -- Okay. Is that how you're reading that? So let me ask you this. So do you believe or is it your opinion that Bearbox communicated information about its proprietary technology and know-how to Lancium that enabled one of ordinary skill in the art to derive the inventions of the '433 patent, not rendering them obvious or anything else, but that the information Bearbox communicated enabled a person of ordinary skill to make the inventions of the '433?

A Yes, the information that Bearbox communicated was enabling.

Q So Bearbox communicated information in your belief that enabled every single claim element of every single claim of the '433?

A Well, there are three independent claims. I think there's some dependent claims that are not

necessarily associated with stuff that Bearbox may have communicated, but the independent claims and some of the dependent claims, Bearbox communicated information that would be enabling for Lancium to recite those claims.

Q Okay. And then certain dependent claims, they weren't -- Bearbox didn't communicate that information, but in your view, those would have been obvious in light of what Bearbox did communicate, is that right?

A Yeah.

Q So which -- which dependent claims would have been obvious in view of the information Bearbox did communicate?

A Let's look at Claim 12, for example. Claim 12 is dependent on Claim 1, where the control system gets information from a QSE. I think that was obvious to everybody at that point. I mean, that's a business relationship that has existed for years with ERCOT. That claim -- that dependent claim would have been obvious.

Q Any others?

A I'm sure there are others. We'd have to go through them all and -- Some of the dependent claims are really redundant. I think Claim 9, which is dependent on Claim 1 is pretty obvious to anybody skilled in the art. Put the control system remotely, that's no big deal.

Claim 13 is dependent on Claim 1 where the power option data specifies subsequent thresholds. I mean, that's kind of obvious in the data that's received. That would have been obvious. Plus it's obvious from Bearbox code that it can be iterated. I mean, 15, this is Claim 1 duration of the time intervals corresponds to a -- Claim 15 -- I'm just reading Claim 15 -- is dependent on Claim 1 where a total duration of the time intervals corresponds to a 24-hour period. I mean, that's --

Q Any others?

A I'm sure there are. You want me to just keep going through them?

Q Yeah.

A Claim 3 depends on Claim 2, and it's a pretty obvious variation from Claim 2.

Claim 4 depends on Claim 3, and it's a pretty obvious variation where you do priorities.

Claim 5 depends on 4, and it just talks about different -- different price thresholds or different minimum price thresholds. That's a pretty obvious variation.

Claim 6, again pretty obvious because the subsequent thresholds change.

Claim 7 depends on 6 where when the thresholds change you follow -- you change your performance strategy, also pretty obvious.

Eight depends on seven. Eight says the control system changes the instructions to the computers when the obvious performance strategy changed because the obvious data was different.

I mean, a lot of the dependent claims are just minor variations on a theme. But I mean that's how patents have to be written, so -- but I think a lot of these things were pretty obvious. Once you understand the concept, then you start to see the minor variations, and that's the enabling part.

Q So let's talk about the communications between Mr. Storms and Mr. McNamara. We talked a little bit before about they met at or around a conference on May 3rd, correct?

A They met -- there was a period of interaction. I don't know when they actually first met and if it was virtual meeting or if they met in person. I know that they met at this conference and that there were -- there was at least one discussion at that conference. There had to have been more than one discussion because they all ended up at dinner. The dinner discussion had to

have been subsequent to another discussion where they set the dinner up, and there may have been more.

So I don't know all the specifics of the verbal conversations that they had, but I know that there were several interactions during that time, including emails and so on.

Q So what did you rely on -- Well, you formed your opinions regarding what Bearbox -- what Mr. Storms communicated to Mr. McNamara, right?

A I formed my --

Q You formed opinions -- You can look at your report if you want. It's big Roman Numeral VII on page 53. You form an opinion that Bearbox communicated information to Lancium and that such information enabled -- would have enabled one of ordinary skill in the art to derive the inventions of the '433 patent, or such inventions would have been obvious variations in light of the information. We just talked about all that.

A Uh-huh.

Q So you relied on something to form those opinions, right?

A Well, there was information that was communicated by Storms to Lancium in an email or more than one email, may have been more than one email. I

don't recall exactly. And that information described the Bearbox system, it described the concept behind the Bearbox system, and it -- and it described outputs, the optimization outputs of the Bearbox system.

Q What my question is, I'm trying to figure out what you relied on to form your opinions. So you relied on an email with some attachments, right? I'll show you these two in a while.

A Yeah.

Q The email -- But there were text messages between Mr. McNamara and Mr. Storms, correct?

A Uh-huh.

Q Did you rely on those?

A There were communications between that period of interaction that appeared to communicate information back and forth. I think the primary interaction that communicated the most dense information was the spec sheet, the diagram, and the optimization outputs. That was a lot of really dense information in that that would have communicated an enormous amount of information towards the claims in the patent.

Q Yeah. I understand you want to advocate for Mr. Storms here with the voluntary thing, but my question simply was what information you relied on in forming your

opinions. You relied on an email with attachments, right?

A Yeah. It's the background data that's contained in the exhibits of the report.

Q You relied on -- Did you rely on text messages between McNamara and Mr. Storms?

A Well, there were some messages back and forth between them. I don't remember exactly if they were particularly valuable, but there were interactions.

Q You know that there was a dinner that Mr. Storms, Mr. McNamara, and I believe six other people attended, right?

A So there was at least one meeting that had -- before that to set up the dinner. So they had several interactions during that period, and I don't know the details of all those interactions.

Q What I'm trying to figure out is what details you do know. So you know that there were eight people that went to dinner, and two of them were McNamara and Storms, right?

A Yeah, that sounds right.

Q And you say that there -- somebody set up the dinner, so they must have met at some point prior to --

A They communicated somehow prior to that. Maybe

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they met in person, maybe they met over email, maybe -- I don't -- they got each other's contact information somehow. I don't know the details of that. And then they continued to carry out interactions.

Q So since -- Stop. Since you don't know the details, you didn't rely on that former communication for anything, right?

A I relied on the fact that they had multiple interactions over a period.

Q I'm trying to break those interactions up to figure out what they all are. Okay. So they met at some point to get together for a later dinner, correct?

A They would have had to.

Q Yeah. But you don't know anything about that prior meeting, do you?

A I don't know --

Q You don't know if it was a meeting?

A There had to have been because you can't set up a dinner unless you know somebody.

Q Do you --

A Whether it's email or whatever.

Q Let me finish. You know they talked at some point to set up the dinner?

A Yeah.

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Q Or maybe it was set up through a third party, right? You don't know that, right?

A Could have been.

Q Could have been. So you don't know anything about -- Whatever the prior meeting is, you're speculating about, is that fair?

MR. RICORDATI: Objection. Mischaracterizes the testimony.

THE WITNESS: There had to have been some prior something that would have set up the dinner.

MR. NELSON: Q Right. You know nothing about that, correct?

A I know that there was a conference that they all attended.

Q Talking about a meeting, not -- I'm talking about how Mr. Storms and Mr. McNamara met. Do you know anything about that whatsoever?

A No.

Q Okay. You know they had a dinner at some point after that with other people, correct?

A Right.

Q What do you know about that dinner?

A I just know that they had the dinner.

Q Okay. Did you rely at all on Mr. McNamara --

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on Mr. Storms' description of that dinner?

A Well, there's the depositions that they both gave.

Q So you looked at Mr. McNamara's deposition and Mr. Storms' deposition of that dinner?

A Uh-huh.

Q And did that -- Other than those descriptions of that dinner, did you rely on anything else regard -- to corroborate their respective testimonies as to what happened at that dinner?

A Well, there's -- if we look through the set of exhibits for the report, there's the emails from Storms to the other guy, Hakes.

Q Did you rely on those?

A There's --

Q My question is, did you rely on them, the Storms to Hakes messages? Did you rely on those in forming your analysis?

A No, it's background information that was helpful in understanding the whole scenario.

Q So no, you didn't rely on Mr. Storms' and Mr. Hakes' communications in forming your opinions, is that right?

A Well, these -- this is in the list of materials

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considered for the report.

Q I'm asking you what you relied on in forming your opinions. Did you or did you not rely on the text messages back and forth between Mr. Hakes and Mr. Storms?

A Well, they were information that was considered in writing the report and in understanding the entire background. I don't -- We're going to have to define what rely on means because -- Did I look at them? Yeah, I looked at them. Were they really important? Depends. Some of them were more important than others. I think the email -- the email attachment with the system specification and the diagram and the simulation outputs I think was a very important interaction.

Q I understand that. Again, I know you're trying to advocate for that e-mail. I get that. But I'm trying to understand all of the things that went into you forming your opinion.

A Well, they're all listed here in materials considered. You're asking me to prioritize these, tell me which ones are more important, right.

Q Let me finish my question, Doctor. I'm asking you what you actually relied on as opposed to, okay, I looked at a bunch of stuff. That's considered. What it is you relied on.

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A Well, the email information was heavily relied on.
Q Okay.
A The Python code was heavily relied on.
Q That wasn't communicated by --
A Communicated -- communicated. The structure of the patent itself.
Q That wasn't communicated.
A No, but we're talking about things that inform the structure.
Q I'm not -- I'm asking what you relied on to conclude that Mr. Storms communicated information sufficient to enable one of ordinary skill in the art to create the patent.
MR. RICORDATI: Objection. Asked and answered and argumentative.
THE WITNESS: So all of this data. There's all kinds of information in here that's -- that was communicated that was important in forming those opinions. You're trying to draw a distinction between relied on and considered, and I don't know exactly how to draw that distinction.
MR. NELSON: Q Let me ask you a different way.
So other than Mr. Storms' testimony --

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deposition testimony and Mr. McNamara's deposition testimony about what happened at the dinner, did you consider anything else in corroborating whose version of what happened at the dinner is more likely correct?
MR. RICORDATI: Objection. Asked and answered.
THE WITNESS: Did I consider whose version of the dinner -- I think it's unlikely that an enormous amount of pertinent information was communicated at the dinner. The enormous amount of information that gets communicated is done by email. That's why -- So if we're talking about -- if we're going to do a binary rely on, then the binary rely is on the email and nothing else. If we're going to gradate it further than that, then I have to know what your definition of rely on is so that I can establish how deep in that set we need to go, because there's clearly some things in here -- you know, the dinner -- I know that the dinner happened, but dinners like that there's not normally an enormous amount of information that's passed back and forth. The email was -- was really important.
MR. NELSON: Q All right. All right. Fair enough. Go to paragraph 175 of your declaration. You see this is now picking up after the dinner has happened. And it says: It's my understanding that following this

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conference, Mr. McNamara continued to press Mr. Storms for additional details about Bearbox's technology.
Do you see that?
A Uh-huh.
Q So what led you to use the word press Mr. Storms for additional details?
A Well, in response Storms provided all of these specifications in a proprietary data set. There were requests for information and he provided the data. I mean, he doesn't just provide the data without some sort of request.
Q But you didn't use the word request. You used the word press which has -- What did you mean by the word press there?
A Asking questions. Trying to find out more information.
Q So -- so it would be equally as correct in your opinion to have said that Mr. McNamara continued to ask Mr. Storms for additional details or requested additional details?
A Well, I think if you -- I think this is from the deposition. If you back up to page 173, it talks about his discussions being extremely specific, and he talked -- he basically shared with him the general

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architecture of the system and how the system worked and what outputs it could produce, so --
Q That's not my question.
A -- they asked for more information.
Q That's not my question. My question was relating to it's my understanding -- You used the word press for additional details. Let me ask it a different way here. Let me find the text chain here.
Let me -- let me hand you what's been previously marked as Defendant's Exhibit 55.
(Exhibit 55 tendered to the witness)
Q That's a text chain between Mr. Storms and Mr. McNamara. Do you see that?
A Uh-huh.
Q And so I'll represent to you that the dinner happened -- March -- I'm sorry -- on May 3rd of 2019.
A Uh-huh.
Q So the next day, picking up on the top of Bates No. BB 10004960, Mr. Storms sends a text to Mr. McNamara that says Storms.
Do you see that?
A Uh-huh.
Q And so a day later McNamara says: Great to meet you at the conference. This is me.

Do you see that?
A Uh-huh.
Q So McNamara sends his LinkedIn information. Do you see that?
A Uh-huh.
Q So later the same day Storms comes back: I'm not on LinkedIn, but you've got my personal number. I'll put some feelers out to summon my PM friends this week about what we talked about Friday night. TTY soon.
Do you see that?
A Yes.
Q Do you know what PM friends he's talking about there?
A No.
Q Do you know what PM stands for?
A Can mean a lot of different things.
Q So the answer is no, you don't?
A I can't -- I can't speculate what it's for from this. There's not enough context.
Q Okay. So later on same day, McNamara responds back: That's great. I think your boxes might have some benefits versus the ones we are doing with JB driver.
Do you see that?
A Uh-huh.

Q So do you know what Mr. McNamara means by boxes there?
A He's talking about Storms' Bearbox systems, I believe.
Q He's talking about the whole system or he's talking about something else, or do you know?
A It seems -- He says boxes so I assume it's the container thing, and the response that Storms has says I can send you specs on the boxes PDU's logic and design and all that kind of stuff, which is the thing that got sent, which is the specification of the container.
Q Right. But Storms in the next sentence back says boxes, and then PDUs are separate, and then logic designs are separate? Right? They're separated by back slashes?
A Uh-huh.
Q So do you understand then what McNamara is asking for boxes is different in Storms' mind than PDUs and logic design because Storms is listing those separate from boxes?
A I don't know what McNamara was meaning by boxes. It sounds like he meant systems that they talked about. I mean, it could have -- could have meant a lot of different things.

Q Right. But I'm talking about Storms here. Because Storms send back: I can send you the specs on the boxes/PDUs/logic design, right?
A Uh-huh.
Q So based on Storms' language, Storms is separating PDUs and logic design from boxes, is that not fair?
A I think that's a -- I think that's a semantic hair splitting. I think the boxes had to do with the -- to me, my interpretation, which everybody can have a different interpretation, but my interpretation is when McNamara says I think your boxes may have some benefits versus the ones we are doing with JB driver, what we have to do is look at what they were doing with JB driver and see if we could get some context out of that, then we would understand what McNamara was saying because that's the extra context he sent there.
To me when I read that, without knowing that extra context, boxes seems to mean the things that were -- the specifications -- the things that were sent in specification in response.
Q Okay. I'm not asking you about McNamara's interpretation right now because earlier you said you don't know what that is, and, you know, fair point that

you have to -- if you looked at what they were doing with JB driver, you know, maybe it's relevant, maybe it's not.
A I don't know.
Q But what I'm asking you is based on Storms' language, Storms doesn't use the word boxes to encompass PDUs and logic design, he lists PDUs and logic design separately, doesn't he?
A Yeah, but down -- he doesn't send it and McNamara says, can you send me those box design specs.
Q I'm not asking what's going later. I'm asking you right now --
A You're asking me to interpret what box means.
Q I can -- I'm asking you about the line 5-5-2019, at 7:43 p.m. Storms says: I can send you specs on the boxes/PDUs/logic design. And do you have an understanding whether Storms is meaning the PDUs and logic design are separate from boxes or not?
MR. RICORDATI: Objection. Calls for speculation. Asked and answered.
THE WITNESS: I can't interpret that. The only thing I can interpret is that it didn't get sent and a couple days later McNamara requests it again.
MR. NELSON: Q Right. McNamara requests it again two days later, and five days at this point after talking

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to Storms at dinner, is that right?
A Whatever the number is.
Q Well, from May 3rd to May 8th. So do you -- Based on this text chain do you think he is pressing Mr. Storms for details here?
A Absolutely. The Storms, can you send me those box design specs please is a follow up to get information that wasn't produced with the first request. It's two requests for the same information.
Q In your view that's pressing?
A That's pressing.
Q That's pressing in your view?
A It's a follow up, and it's got an exclamation mark. It's got an intensity to it.
Q So in your -- Okay. So is your -- that's your basis for your using the word that he's pressing Mr. Storms for additional details?
A That's kind of what it looks like from that sequence of text messages.
Q And you have an opinion in here that McNamara continued to press Mr. Storms for additional details, and so I'm trying to figure out what that opinion is based on. And is it based on this text chain is my question?
A Certainly based in part on this text chain

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because he asked for the information twice, and when he doesn't get it, he increases the intensity of the ask.
Q Okay. So you're reading -- Okay. So if you go back to paragraph 175, you say: In response, Mr. Storms providing -- I think it probably should be provides -- component specifications, an annotated system diagram, and a proprietary model data set based on real world bitcoin variables such as bitcoin price and network hash rate, energy price, time intervals, power thresholds, and computed profitability figures.
Do you see that?
A Uh-huh.
Q And is that the email that you're talking about?
A That seems to be the email that's talked about in this text chain. He talks about specs on the boxes -- he talks -- in the text message chain he talks about specs of boxes, PDU, logic design, and then he talks about redoing a spec sheet and then emailing it, and so on. And I think the email happened in between those times, or right after the last one.
Q So looking back at your paragraph 175, what are the component specifications that you're talking about?
A That's the spec sheets.

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Q Okay. What's the annotated system diagram?
A That's the second page of the spec sheets.
Q Okay. So do you think the annotated system diagram is part of the spec sheets or something separate?
A It appears to be a two-page thing. It's contained in the report as figure whatever it is on page 56. Paragraph 176. That's the annotated system diagram. It looks to me like it's part of a two-page thing that contains system specs. It looks to me like it's an initial version of what you would create as a data sheet for a system to go to market with.
Q I'll mark this as Exhibit 204.
(Exhibit 204 marked as requested)
Q So let's talk about Exhibit 204. It's Bearbox 90 through Bearbox 97 with 97 being produced in native format. Just confirm that that's the email that you have been discussing.
A That seems like the email that they talked about, the spec sheet and the details and the modeling data.
Q Do you know if -- So the -- page 92 is the Storms drawing. In various places you cite -- Let's see if I can find an example here. So go to paragraph 186 real quick.

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A Okay.
Q And 186 you give your opinion regarding claim element 1(b), and you cite to footnote -- cite Footnote 27. Do you see that?
A Uh-huh.
Q And Footnote 27 cites to document number 91, see also 97, right?
A Yeah. It should be 91 through 97. I think that was the content of the email.
Q Okay. Well, it's not through. It's 91, and then it's see also. And in various other places you cite 91. Did you -- My question is did you cite 72?
A I think that's a typo. I think it meant to cite 91 through 97. But 91 -- In my mind 91 and 92 are two sides of one sheet of paper. So sometimes it gets referred to as 91 because it's essentially a data sheet mockup.
Q That's the front side of it. That's 91 in your view?
A I would say that 92 is the front side and 91 is the backside. If I were -- if I were making a data sheet, I would lead with the diagram and I would have the speeds and feeds on the back. So this looks like a data sheet because it has the common header on it. So that's

the way I interpret that.
Q Okay. What I'm trying to do is figure out what your report is actually citing to.
A It's trying to cite all of this stuff.
Q Now, stop. Let me finish my question. So go to paragraph 190 as an another example here. Let me know when you're at 190.
A 190, yeah.
Q So go ahead and read the first sentence to yourself that ends at Footnote 30, and then again you cite two pages in Footnote 30, 91 and 97. And my question is, did you mean to cite page 92 instead of 91?
A Let me see what actually 97 is. I think it meant --
Q 97 is the spreadsheet.
A I think it meant to include all of these things, but the stuff about the -- I mean, these are typos. This -- it probably should have been 91-97 or 91, 92. But 97 is pretty important here. Probably should have been 91-97 because the stuff that has to with fan and stuff is really not that important. So it's the stuff at the front, which is the two pages that looks like a spec sheet, and the spreadsheet that's at the end.
Q Right. The stuff in the middle is third-party

publicly-available documents, right?
A Yeah. It doesn't really pertain to anything valuable here. So typically -- that looks like it to me like it was a typo and it would have been 91 through 97 or 91 -- or 91 assuming that 92 is part of 91, because in my mind 91 and 92 are the same piece of paper. So that kind of complicates life.
Q Okay. So let's go to -- let's go 92 then, which is the drawing. Paragraph 177.
A Okay.
Q So the first sentence you talk about the diagram above illustrates a plurality of computing systems that include bitcoin miners having different power thresholds under the direction and control -- of control system composed of various API calls, and it goes on.
Do you see that?
A Uh-huh.
Q What are the different power thresholds you're referring to?
A Well, it's receiving day-ahead pricing and realtime pricing.
Q That's --
A So the thresholds are in the day-ahead pricing.

Q So your testimony is that the first two sentences -- two lines here: The above diagram illustrates a plurality of computing systems that include bitcoin miners such as Bitmain, S9 Dragon, T1 or the like having different power thresholds refers to day-ahead pricing?
A Sorry. Talking about the miners have different power thresholds. Sorry. The miners have different power consumption capability, and the Bitmain, S9 just to illustrate the fact that in my mind these two things are the same thing. The Bitmain, Dragonmint comes from the top of 91.
Q Okay. So the different power thresholds you're talking about there, for the miners what are those? I'm not asking if you know the specific number. I'm asking what you mean --
A That would be load characteristics.
Q That would be -- What do you mean by load characteristics?
A Well, different bitcoin miners or different computer systems so they have different load characteristics. They consume different amounts of power, different times and --
Q When they run?

A Yeah.
Q Okay. Under the direction and control of a control system composed of various API calls to retrieve relevant information such as realtime and day-ahead energy prices, custom PDU logic and -- custom PDU logic and fan control to provide fine grain load controls, and then it goes on. So let's talk about the -- Is there anything in this drawing -- Let me ask a different question.
You see the little lightning bolt arrow on the left side of the drawing?
A Right.
Q What does that mean? What's that represent in your mind?
A Looks like power being received by the bitcoin miners.
Q That power is then coming from what looks like wind mills?
A It's coming from some generation facility. It's illustrated here as generation -- it's called generation assets here. Looks like it's illustrated as wind mills, but it's a conceptual diagram.
Q Is there anything in the drawing that indicates this system of Mr. Storms -- this drawing could be

connected to the grid?
A Sure. Power could come from the grid.
Q What in the drawing indicates that?
A The fact that it's receiving power.
Q Anything else?
A Well, it's using day-ahead pricing data.
Q How does that indicate that it would be -- that it could be grid connected?
A Well, if you're -- if you're in a contract where you're consuming day ahead -- you're bidding day-ahead pricing data, you have to have the capability of consuming that. I think we already established that.
Q So does that mean that if -- that you must be grid connected? My -- first question was what indicates that this thing -- that this diagram depicts something that could be grid connected. And you gave me two things so far. You gave me the lightning bolt, that it got power from somewhere, and you indicated that it could get day-ahead information. Anything else?
A Well, it looks like some of the things up on left side appear to be -- it says physical infrastructure. I interpret that as physical infrastructure of the distribution grid. I don't exactly know what hardware layer means, but those things could be

construed to be transformers -- physical infrastructure could be construed to be transformers. The hardware layer, it's hot on one side and cold on the other side. So it's something that's cooling.
Q So all of those things in your mind indicate that this could be connected to the grid as opposed to connected to a generation asset?
A Yeah. It could be connected to a generation asset or it could be connected to a grid asset. It uses power. Again, when I got this, this was labeled 91, and I couldn't find 92. So I'm thinking of this as one page. So you have to look at this part up here. You have to look at 91 for this to make sense, and it talks about an electrical system that the box contains, three-phase four-wire, 415Y/240V, remote dual-outlet power control PDUs, all network infrastructure on UPS. So it consumes power three-phase, four-wire. Whether that comes from a stand alone generation asset, a distributed generation asset, a grid, whatever, it consumes 3-phase power.
Q Right. And the fact that it -- so other than the fact that it consumes -- that you understand it consumes three-way power, is there anything else that indicates this diagram represents something that could be directly connected to the grid?

MR. RICORDATI: Objection. Mischaracterizes the testimony.
THE WITNESS: It consumes three-phase, four-wire power which is conventional way for service providers to distribute power. That's a pretty heavy indicator that it's connected to a grid or connected upstream in a private operation or wherever. It could be connected to a nonjurisdictional customer. It doesn't really matter. It takes three-phase, four-wire power at 415 phase-to-phase and 240 phase to -- line to neutral.
MR. NELSON: Q So a little bit later on in paragraph 177 you talk about that the diagram illustrates custom PDU logic and fan control to provide fine grain local control for the miners. Do you see that?
A Uh-huh.
Q So there's a bubble on here that says custom PDU and fan control logic -- fan control hardware and logic. I see that.
A Uh-huh.
Q What on here talks about fine grain load control for the miners?
A I thought it was in here in the text.
It talks about -- the page 91 talks about cgminer watchdog, database miner logging, PDU related

mapping, full automation, realtime breakeven monitoring. That to me indicates fine grain load control.
Q So the words --
A I thought it was in here. I may be missing it.
Q Well, I don't -- I don't see it in there, but the portions of it under the software management bullet that you just read, none of those use the words fine grain load control, do they?
A No, it doesn't seem to use those words. I thought for sure it was in here like that.
Q Well, I'll represent to you I looked pretty hard and didn't find it. So what is the -- You pointed to the software management bullet point on page 91. What is the local cgminer watchdog?
A Cgminer is an open source software that's used for mining, and watch dog is -- watchdog is a term that means that system will manage itself, and if it goes out of -- if it loses power, it will force itself to reboot when the power comes back on, or it will watch when sub processes die and it will restart those sub processes. I mean, watchdog is a monitoring kind of thing that keeps the software or the system functioning.
Q Watchdog doesn't have anything to do with fine grain load control, does it?

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A No, that's a system health issue. Fine grain load control, come -- I believe -- it looks to me like it comes from PDU and relay mapping. So all the PDUs are individually controllable, can be fully automated, and then you have optional realtime breakeven monitoring. You only have breakeven monitoring in realtime when you have fine grain control of the load. If you have course control -- if you have control of the load, you can do breakeven monitoring, but it wouldn't happen in realtime.

Q So none of what you just said though is on this bullet point, is it?

A None of what I just said --

MR. RICORDATI: Objection. Mischaracterizes the testimony.

MR. NELSON: Q None of the testimony you just gave me regarding fine grain monitoring, none of that is in your report, and none of it is written on page 91 anywhere, is it?

MR. RICORDATI: Objection. Mischaracterizes the testimony.

THE WITNESS: The term fine grain load control doesn't appear to be written on these pages, but the interpretation of realtime breakeven monitoring would give that -- would -- fine grain load control would be

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necessary to implement realtime breakeven monitoring.

MR. NELSON: Q And would a person receiving this information -- would they recognize that just from receiving this information?

A I don't know what somebody would recognize. That's what it -- That's what it speaks to me. When I read that, that's what I see.

Q And when you see that, is that based on your knowledge of the source code and other things, or is it just based on this document and the other email -- or the other documents in this email?

A Well, I think if this document was the only thing that you saw and you looked closely at realtime breakeven monitoring you'd have to say to yourself well, how do you do breakeven monitoring in realtime unless you can control the load rapidly? All right. So, yeah, that bullet right there would say I have rapid control overload soak or the ability of the load to consume or use power. So an interpretation of that could be fine grain load control, and then when you look into the code and you see that the thing really does have the ability to map directly into each of those PDUs, it kind of confirms the interpretation that that indicates fine grain load control.

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Q We're not -- Mr. McNamara didn't have the code. So I'm talking about what is communicated between Mr. Storms and Mr. McNamara.

A Uh-huh.

Q And so what out of the documents in this email would communicate in your opinion fine grain load control?

A I think I already answered that. If you look at that bullet, to implement break even monitoring in realtime, you'd have to have control of the power consumed by the load with a fast cycle time. Your duty cycle for the load would have to be manageable at a very refined rate. So that would be fine grain load control. Fine grain load control is just a way to interpret that statement.

Q Is there anything else in these documents, 90 through 97, that informs your opinion about whether fine grain load control was communicated?

MR. RICORDATI: Objection. Asked and answered.

THE WITNESS: Well, another interpretation -- an additional interpretation based on just the information in the email -- and I honestly think that the interpretation of that one bullet is enough, but the interpretation of that one bullet along with the details

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in the spreadsheet indicate that the breakeven mining cost can change at five-minute intervals. So that would be another form of break -- of fine grain load control. Because if you can change the breakeven mining cost at five-minute intervals you have the ability to change the consumption of the load at least as fast as five minutes. So that interpretation of the CSV file reinforces the interpretation of the realtime breakeven monitoring.

Q And again looking -- looking at these documents -- and when I say these documents, can we just have an agreement that I'm talking about Exhibit -- is it 204? Exhibit 204, this email and the attachments.

A Yeah.

Q Okay. So looking at these documents, is there any disclosure of how the -- how this system -- how this drawing and associated spreadsheet did -- achieved the fine grain load control that you're talking about?

MR. RICORDATI: Object to form.

THE WITNESS: I'm not exactly sure I'm following what it is you're asking. If I consider these documents alone, does it inform how to do fine grain load control?

MR. NELSON: Q Well, let me ask it. So I asked you before what -- what in the documents you believed indicated fine grain load control and you gave me an

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answer.
A Uh-huh.
Q So now I'm asking if there's anything in the documents -- or I guess otherwise again in the context of the communications between Mr. Storms and Mr. McNamara indicated how to do the fine grain load control.
A How to do the fine grain load control. Well, you have realtime breakeven monitoring which tells you that there's some form of load control that's happening fast, happening quickly, so you have a very flexible system. You have the ability to address -- because it talks about full automation of the PDU and relay mapping, you have the ability to address the power consumption of the devices individually, and then if you look in the spreadsheet, it confirms the fact that you have the ability to manipulate the power consumption of those devices at least on a five-minute interval.
Q Okay. How does the spreadsheet indicate you have the ability to manipulate power consumption on a five-minute interval?
A I think I already answered that with the breakeven mining cost. You can't calculate a breakeven mining cost when your power thresholds are changing unless you're able to manipulate load and the breakeven

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mining cost is changing on a five-minute interval. Of course this spreadsheet is -- doesn't give all the details, but it would indicate that.
Q So the spreadsheet doesn't give any of the details, does it, it just gives columns and numbers, there's no calculations in the spreadsheet?
A It sure does. You can infer them very easily. I see a host of things in this data. This data gives me an enormous amount of information. This is the output of a simulation. This is the unfiltered output of a complicated simulation that allows me to look directly back into how that simulation works.
Q And so --
A What it does.
Q You're basically saying you can reverse engineer the calculations from looking at the simulation?
A Absolutely.
Q So going to the column on the far right, the realized revenue, what calculation is used to accomplish that?
A It's a max of three of the other columns. If you look at three of the other columns, the value that's in realized revenue is the maximum value from mining revenue, day-ahead LMP revenue, and one other one. And

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realtime LMP revenue.
Q So the next column to the -- one in from the far right is realtime -- real_time_LMP_revenue. Do you see that?
A Uh-huh.
Q How is that calculated?
A That's the revenue that's calculated based on selling back the power using the realtime LMP strike price and the amount of power maximally consumed by the miners if they weren't being used.
Q What is the realtime LMP strike price?
A That's the third column from the right.
Q So it's real_time_LMP?
A Yeah, it's the data being received from the marketplace in realtime.
Q The simulated data?
A I believe this is actual data.
Q He's not hooked up to the marketplace. He's pulling this from a website, right?
A I believe his simulation in this -- yeah, that's right. It's being retrieved from somewhere else. I don't think it's actual realtime data from the ERCOT system. I think -- but it's being retrieved from somewhere else.

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Q So network difficulty, that's a publicly available data, right?
A Yep.
Q What is mining revenue?
A Mining revenue is the amount of money you would make by mining using those miners with that power threshold and that day-ahead price.
Q The power threshold for the miners is the amount of power the miners would use if they're turned on, right?
A Which is contained in this document here.
Q What is the day_ahead_LMP_rev?
A That's the revenue you make from -- that's the -- the day-ahead LMP is the day-ahead price, and day-ahead LMP revenue is the revenue you would make -- that's day ahead -- from consuming that power without mining. That doesn't make sense. That would be the sell back. That's a revenue column. Okay. So I'm a little confused on that one, but that's the day-ahead LMP revenue. That's the revenue you would get from selling at the day-ahead LMP price a certain amount of power. I think it's the certain amount of power that you were consuming by your miners. That one is a little confusing. I believe this other one is -- Let me make a

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quick calculation, double check.
That's very close. So the breakeven mining -- the daytime is obvious, that's when the data was retrieved. The block height, the bitcoin price, network hash rate, network difficulty, those are all bitcoin parameters that are retrieved from the bitcoin network. Breakeven mining cost is the amount of cost you incur by computing -- by doing bitcoin mining using your -- the power that you've -- outside the scope -- it's your downside, right, that's what you -- that's what -- you got to get past that to break even. So that's your -- that's the amount of money that you have to be able to make to break even based on the cost of bitcoin mining and the cost of power.
Q So the simulation that this spreadsheet represents, the day-ahead LMP revenue, is that money that would be generated by the bitcoin miner if it wasn't mining but is selling power, or is it -- or is it something else?
A That one is confusing to me. I don't -- I'm struggling with what that one means. The one on right-hand side, the realtime LMP revenue is what you would make if you sold back at the realtime price.
Q And is that the bitcoin miner selling back at

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the realtime price?
A No, that's selling back the power without using it.
Q I know. But what is the entity selling the power back?
A The thing that's not doing the bitcoin mining.
Q So the generator?
A Yeah, that's selling the power that you've contracted to provide. That's passing the power through to the market rather than using it to mine bitcoin. That's the markup on the pass through. This data here is just -- this lays out the whole scheme. It's great.
Q Trying to -- What is the entity though that's doing -- So the realized revenue is -- I think you told me this before, but what is the realized revenue column?
A The realized revenue column is the maximum of three previous revenue columns.
Q And those three revenue columns are which ones?
A The ones that have rev in the name.
Q And presumably then the strategy is to implement whichever is the highest realized revenue? Wherever the realized revenue column comes from is what you would do in a given timeframe?
A Yep.

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Q And what entity would be the one that would be doing it is my question.
MR. RICORDATI: Objection. Vague.
THE WITNESS: Doing what?
MR. NELSON: Q That would be implementing the realized revenue. So if you install -- If somebody was -- In this simulation what perspective was Mr. Storms simulating? Was he simulating it from his system would be installed at a wind farm or his system would be installed at a bitcoin line?
MR. RICORDATI: Object to form.
THE WITNESS: That question doesn't make sense. The system is the bitcoin mine. So a system couldn't be installed at the bitcoin mine. It is the bitcoin mine. The assumption is that you have his system, you fill it up with bitcoin miners, you feed it power from somewhere that you're purchasing, according to some power agreement, and the power agreement has a minimum threshold that allows you to compute your breakeven point which you must get past with bitcoin mining to make any money.
Then, if you get past that, and it's higher than what you could sell the power back at, then you mine bitcoin. If it's not, then you sell the power back.

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MR. NELSON: Q And you -- the entity that is the you there is the bitcoin mine selling the power back, not taking it, in other words?
A It's this device, it's this system, the Bearbox -- It's the Bearbox system, it's the control -- it's the control algorithm of the Bearbox system making those decisions based on inputs -- if you look at the diagram --
Q You're on page 92 and 91?
A 92. Yeah, it's -- You look at the diagram, you look at the spreadsheet, you go, oh, I get it. Doesn't matter where the power comes from, as long as it's three phase, four wire, 415, line to line, and that can be changed. All you have to do is swap out the PDU, and you can do it a different way. Swap out the PDU, get three phase, four wire, 208 then you plug it in in your house. It can work anywhere.
Put a stepdown transformer in front of it, put a stepup transformer in front if, you want to jack it up.
Q So let's go back and look at page 92 again. So you've got -- You see the bubbles on the right side?
A Uh-huh.
Q What do those bubbles represent?
A That's the Python code.

Q Well, one of them. It say Python, right?
A It's just an indicator -- They're all written in Python. I mean, one says post -- one says SQL database. That's a database. Right. It can be local or it can be somewhere else. One says -- one says API, right. So it's a bitcoin API. It's a Python -- it's implemented in Python to interface with bitcoin network. One says bitcoin core node, that's the one that's making the computations. One says custom PDU and fan control logic, that's implemented in Python. It's pulling information off the PDUs and sending information back to the PDUs as well as the fans.
The other one says LAN cgminer watchdog with database table logging. That's the bitcoin miner activity. One says day-ahead LMP, blah, blah, blah, that's the interface implemented in Python that talks to the external entities to get power price.
Q Anything else in the context of those seven bubbles?
A Those seven bubbles are the Python code. They're the functions that are implemented by the Python code.
Q So looking at these documents that we've been talking about, is there anything in here that discloses

minimum power thresholds?
A Well, the breakeven gives you the minimum power thresholds. It's implicitly using minimum power thresholds. It talks day-ahead LMP pricing, so it's trying to compute the breakeven point for the bitcoin, so that's a minimum power threshold. That's the minimum amount of power that I have to use, right, to calculate my breakeven.
Q I guess help me understand why you believe that a minimum power threshold here is implicit in the breakeven calculation.
A Because that's what the breakeven would mean.
Q So in the context of that assumption, what do you understand the minimum power threshold to be?
A It's whatever power is driving the calculation of the breakeven mining cost based on what the bitcoin mining cost bitcoin difficulty is.
Q So where is that power coming from?
A The lightning bolt.
Q So --
A It's coming from the three-phase, four-wire --
Q It's coming -- yeah -- So in your view the minimum power threshold that you're discussing here in connection with these documents is the amount of power

that's coming from the system or from the, you know, either from a wind farm or generator or somewhere else, the amount of power this system is taking in?
A No. It's the threshold that's coming in through the day-ahead price, or it's -- it's the threshold that you're using to calculate the breakeven mining cost.
Q And how -- What is the calculation -- That threshold, what is the calculation that you're using to calculate the breakeven mining cost?
A We'd have to look specifically at the code.
Q So to figure that out you have to look at the source code?
A Yeah. I mean, we can try to back into it from this, but it's -- that would be fraught with trial and error, but we can look into the source code and find -- we can see in the course code where it writes this table out.
MR. RICORDATI: We've been going over an hour.
MR. NELSON: Yeah. Let me -- Five more minutes on the drawing here.
MR. RICORDATI: Sounds good.
MR. NELSON: Q These documents we've been talking about, do they disclose the performance strategy

comprising a power consumption target?
A These use a power consumption target that's uniformally above the threshold, and it's trying to find the maximum so it's using the power consumption target which is the full out, right. It's a corner case, it's full out. Turn them all on and let them run.
Q Do these documents disclose that responsive to receiving the power option data you determine the performance strategy for the set of competing systems based on the combination of the power option data, meaning the time and the power threshold -- minimum power threshold, at least one condition in the set of conditions?
A You can see that the computations change every five minutes, so they're sensitive to the data that's coming in, you can see that the bitcoin mining cost changes every five minutes. So you can see that it's recomputing -- it's re-centering itself based on what its costs are going to be, and you can see the revenue that's realized after that, and it's making a decision as to which revenue path to take. Yes -- the spreadsheet illustrates all of that.
Q And so where is it illustrating determining a power consumption target?

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A Based on the breakeven mining cost.
Q How is that indicating that it's actually -- that it's actually creating a power consumption target for the set of computers?
A Because if I don't break even, I shouldn't mine. If I break even -- if I do more than break even with mining, that's a target.
Q So that's your -- your power consumption target is whatever the target is that will let you break even or greater?
MR. RICORDATI: Objection. Mischaracterizes the testimony.
THE WITNESS: Your power consumption -- your minimum threshold for power consumption coincides with your minimum threshold for bitcoin mining, because if you're mining bitcoin and you're below that, you're just wasting time. So I compute my bitcoin mining threshold to coincide with that threshold, and anything above that, I'm in fat city when I'm mining bitcoin, unless if I sell back, it's higher than that.
MR. NELSON: Q And so in that context, what's your minimum power threshold?
A We'd have to back it out of the breakeven mining cost.

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Q So you'd have to look at the code basically?
A I mean, the power threshold is associated with the breakeven mining cost. You can probably compute it right here. It may take into account some -- it may take into account some dead cost, so I don't know if you'd be able to compute it exactly from here. You might have to take into account some of the dead cost from the systems. The code would be explicit on that and would tell us exactly how to compute it.
MR. NELSON: Why don't we take a break.
THE VIDEOGRAPHER: The time is 3:37 p.m. This is the end of media unit 2 and we're going off the video record.
(Off the record)
THE VIDEOGRAPHER: The time is 4:00 p.m. This is the beginning of media unit 4, and we're back on the video record.
MR. NELSON: Q So, Mr. McClellan, let me get you to focus on pages 91 and 92 of Exhibit 204 for a minute.
A Okay.
Q Now, if I understand correctly, you have an opinion in your report that Lancium misappropriated certain amount of trade secret -- certain trade secrets from Bearbox and in your reply report that those -- that

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basically they converted that -- that same information, whether it's characterized as trade secret claim or conversion claim, that Lancium took something from Bearbox, is that fair?
A Yes.
Q And so looking at paragraphs 91 and 92 -- I think I asked you before what you thought was taken. But does 91 -- do 91 and 92 either separately or together disclose in your opinion what it is that Lancium allegedly took from Bearbox?
A 91 and 92? Paragraph 91 and 92?
Q No, no. Bearbox documents 91 and --
A Oh, oh, oh. Sorry. I misunderstood. Certainly the concept -- much of the overall concept is described in 91 and 92, but I think -- I think you have to take the entirety of what was emailed, 91 and 92 plus the CSV file.
Q I want to focus on 91 and 92 first. This is -- this is really resp -- regarding what was -- what you -- what you allege in your reports was taken that is outside of the patent. Does that make sense?
A Yeah.
Q So you said that 91 and 92 disclose the concept. What concept do you believe they disclosed that

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was allegedly taken?
A I think the -- the thing that's disclosed here is -- well, the day-ahead pricing and the realtime pricing is something that's known. That's ERCOT stuff, right. The thing that's really disclosed is this collection of bullets down here where you have full automation, optional realtime breakeven monitoring, renewable marketplace data. The concept of breakeven monitoring I think and the sell back price based on the breakeven monitoring I think is a critical piece.
Q All right. And so when you were -- when you were talking just now, you were talking about the bullet points under software management on page 91, and then specifically the last two open bullet point -- the fourth from the bottom open bullet point on software management?
A Yeah, the next to the last bullets -- under software management bullets 3 and 4 I think are critical.
Q You think that is -- how does that disclose the alleged concept that you believe Lancium converted from Mr. Storms?
A Well, I don't think that that discloses the entire concept. I think that gives you a peek at the concept because it talk about breakeven monitoring using marketplace data, and it's a bitcoin miner. So that gets

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you half -- that gets you part of the way there, and then you start using that in context with the CSV file and it starts to become quite clear.

Q I want to focus only right now on 91 -- pages 91 and 92. Okay. So you identified the bullet points we just talked about as disclosing at least part of the concept that you allege Lancium converted from Bearbox, right?

A Yeah. I think you have to take them altogether. I don't think individual -- like one page of 91 and 92 gives you some of it, the other page gives you some of it, but it doesn't -- all of them together give you more than -- the whole is greater than the sum of the parts in this case.

Q And I'm asking you right now to focus on 91 and 92.

A Uh-huh.

Q And what of the parts -- of the thing that you allege Lancium took from Bearbox, what of the parts are disclosed in 91 and 92, without reference to 97, without reference to the spreadsheet.

MR. RICORDATI: Objection. Asked and answered.

THE WITNESS: I think the bullets on 91 that talk about full automation and breakeven monitoring using

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renewable marketplace data gives you the idea that there's a sell back piece here that you might not have thought about before, and you can automate that, and then -- and then the diagram talks about realtime pricing from the local market price every five minutes, and it talks about reoptimizing every five minutes using the custom logic and stuff, and it shows simultaneously the dollars and the bitcoin. Right.

MR. NELSON: Q Uh-huh. So I want you to assume for the purposes of this next question that the Bearbox 97, the spreadsheet, was never communicated to Lancium, doesn't exist for the purpose of this question. Would you still have the opinion that Lancium converted an arbitrage method for Mr. Storms?

MR. RICORDATI: Object to the form.

THE WITNESS: Well, that's a completely -- that's a complete hypothetical that takes out one of an important set of items that we were communicated.

MR. NELSON: Q Can you answer my question?

A I'm saying it's a complete hypothetical. So under those hypothetical situations, I think that it gives a hint of what that concept is, but it doesn't give the entire flavor of it.

Q So the answer to my question would be no, if --

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if the document, the spreadsheet, Bearbox 97 had never been communicated to Mr. Storms, your opinion would be that Lancium had not converted valuable information from Mr. Storms?

A I wouldn't put it that way.

Q I'm asking you again, assume the spreadsheet was not disclosed, and, yes, it's a hypothetical, would you still be of the opinion that Lancium converted valuable information in the form of breakeven arbitrage from Mr. Storms?

MR. RICORDATI: Object to the form.

THE WITNESS: Yeah, on page 91 it uses the term breakeven so, yes.

MR. NELSON: Q So you would still be of the opinion that Lancium's -- Lancium converted Mr. Storms' allegedly proprietary breakeven arbitrage method?

A Well, it uses the term breakeven on page 91. So if all he communicated was pages 91 and 92, they still would have been apprised of the breakeven monitoring capability.

Q And you think that's enough -- that would be enough to support your opinion that Mr. Storms' valuable information was converted by Lancium?

A My opinion is based on the data that was

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actually communicated, not the hypothetical.

Q And my question assumes the hypothetical. So assume that this Bearbox 97 was not disclosed. Is your opinion still that Lancium converted breakeven arbitrage method from Mr. Storms?

A Under the hypothetical if the spreadsheet data -- the simulation data was not disclosed, we need to define what was disclosed, did I -- would he have disclosed in the hypothetical that he had a full simulation, would he have disclosed in the hypothetical what the simulation contained. Once we go down into the hypothetical we have to define some more things.

Q My --

A All he -- all he disclosed was this document, then it gave them the breakeven concept right there.

Q And so in your view based on this document, meaning pages 91 and 92, if that's all he disclosed, would you still be of the opinion that Lancium converted valuable -- a valuable breakeven arbitrage method from Mr. Storms?

A Well, this is a hypothetical situation, right? So hypothetically they could have seen this and asked him some more questions.

Q That's not my question. My question is, if

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this -- pages 91 and 92 were all that were disclosed, is it your opinion that Lancium still converted a valuable -- Mr. Storms' valuable -- allegedly valuable breakeven arbitrage method?

A Well, if it's a hypothetical, then we have to define some things better.

Q I just did. This is what you have.

A Okay. So they weren't able to interact with him anymore, they weren't able to ask anymore more questions, they weren't able to get anymore data, this is where it stopped.

Q The email sent only these two pieces of paper.

A Well, this indicates breakeven monitoring -- realtime breakeven monitoring using renewable marketplace data. And it indicates full automation using individual PDU mapping, it indicates a compatibility with a bunch of different kind of bitcoin mining devices, it indicates a control system that can exchange bitcoin data that can log that data -- the computed data, the simulated data, it contains custom PDU and flow control hardware and logic where you have better control over the devices, and it contains logic that deals with day-ahead pricing as well as realtime pricing to compute the realtime breakeven monitoring, and it shows simultaneously dollars

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and bitcoin. I think it gives the concept -- it gives the overall concept. I think the CSV file gives details that get very directly to the conversion.

Q So the answer to my question was yes, based only on paragraphs -- on documents 91 and 92, your opinion would not change, you still would believe that Lancium converted Mr. -- Mr. Storms' breakeven arbitrage method -- system?

A My opinion would not change.

Q So coming back out of the hypothetical now. Has Lancium done anything to your knowledge that would prevent Mr. Storms from utilizing his breakeven arbitrage method?

A Well, they filed the patent. That prevents a barrier to entry in the market.

Q The patent doesn't cover the breakeven arbitrage method, or do you believe it does?

A If he were to use his system, it might be infringing the patent anyway. Even if he used his system -- because the arbitrage adds onto the capabilities disclosed in the patent. It adds some things onto that aren't specifically disclosed in the patent, but they're hinted at. So I think even if you implemented a system like this, you end up -- you may end

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up infringing the patent regardless.

Q Okay. So let's take the patent out of it. So assume that you could implement this system without infringing the patent. Has Lancium done anything that would prevent Mr. Storms from doing it?

A I don't know. I can't speak to that.

Q You're not -- are you aware of anything?

A I'm not aware of anything that they've done to prevent him.

Q Looking back at the spreadsheet here, Exhibit -- Bearbox 97. So the break even calculation -- We just take the first line here dated 5-6-19 at 11:37. Do you see that, 11:37 -- don't know if it's a.m. or p.m., but --

A Well, it's military time so it's a.m.

Q Okay. You're right. It is. So the breakeven calculation that's being done is being done for that point in time, right?

A It's being done for that five-minute period, I believe.

Q Well, it's not done every minute. It's done -- it's done at this specific time, and then it's done again five minutes later?

A Every five minutes for -- yeah, it's a sample

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and hold for that five-minute period.

Q Yeah. So for -- I don't know how long it takes to do the calculation, but it's done, and then there's an assumption made that it's -- that's going to hold for the next five minutes, right?

A I believe the realtime market pricing only comes in five-minute intervals, so --

Q And the realtime market pricing that's being used here is also the realtime for this five minute -- five -- for this particular time, right?

A Yeah. I believe that's the data that's driving this cycle. Right. That's the data that's giving you the minimum cycle time on the process, because the realtime market price, it changes every five minutes.

Q And I believe you testified earlier that you had a couple of different options here on this system. You could sell power back at the realtime price, you could sell power back at the day-ahead price, or you could mine and you would choose which is the most profitable of those three options to do?

A That's my interpretation of what this data is doing.

Q So how -- With those options how could -- how could you sell power at the day-ahead price in this

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context?
A Well --
Q You're a bitcoin miner --
A I mentioned earlier that I was a little bit fuzzy about what the day-ahead LMP revenue column actually means. I mean, the other ones jump right out. The day-ahead LMP revenue seems to be calculated dollars. It's revenue, so it's dollars based on the day-ahead LMP column because it's day-ahead LMP. I'm not exactly sure how the revenue number is derived from the day-ahead LMP. It would take a little bit of reading between the lines to figure that out. It's probably -- it's probably based on some of the characteristics that are contained on 91.
Q So looking back at all of this -- the materials here in Exhibit 204, do they teach a person of ordinary skill that the bitcoin mine -- that the bitcoin mine must utilize a specific amount of power? By utilize I mean actually use to mine -- to mine bitcoins.
A Well, they say that if you use that power to mine bitcoin on that date using those mining numbers, you would make that much money.
Q But is there a requirement that the bitcoin mine here that's being depicted and that's being simulated must use a certain amount of power regardless

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of what -- whether it's profitable to do so or not?
A Well, this system is -- like we discussed previously, this system is set up -- and I believe he's running this full open. So this is with a fully populated system running full open, and if you did that, based on these power prices and those bitcoin prices, that's how much money you would make. So if you wanted to make less money than that, you could run less miners.
Q That's not my question. My question is, regardless of profitability, does this system teach that the miners must consume a minimum amount of power, some amount that's more than zero, regardless of whether it's profitable to do so?
MR. RICORDATI: Object to form.
THE WITNESS: It appears to teach that if you use the power that you've pre-purchased you must make at least that much money that's talked about in the breakeven mining cost.
MR. NELSON: Q That's not my question. My question is, under the system that's discussed -- described in Exhibit 204, is there any teaching that the -- the bitcoin mine must use a certain amount of power for a certain time period? Let's say 50 megawatts as an example. Can you use more? But that it must use at

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least that much, regardless of whether they're losing money doing it or not.
A Well, that's the break -- that comes from the breakeven mining cost.
Q But that's -- the breakeven mining cost is telling you whether it makes sense to mine or not mine?
A That's where the power threshold comes from.
Q Right.
A That's the minimum power threshold.
Q But it -- but is there a requirement that regardless of what that breakeven cost is, it could be negative, that the system still must use X amount of power, even if they're losing money mining bitcoin doing it?
A Why would you mine bitcoin to lose money?
Q I'm asking --
A That doesn't make any sense. This doesn't teach that.
Q This does not?
A Because if you're trying to mine bitcoin to lose money, why do it this hard way? I can think of easier ways to lose money.
Q Does the system teach a performance strategy based on that the system must use X amount of power,

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again, regardless of whether it's profitable to do so or not?
A Must -- Well, that again goes back to the breakeven mining cost, you must use that much power to break even for mining.
Q Right. But that's -- again, that's calculating whether you're going to make money or not. I'm saying regardless of profitability, does the system teach a performance strategy that is based on using at least X amount of power, that must be -- that must be utilized by the miners, even it's -- even if they're losing money doing it?
A The assumption in the simulation here is that when the miners are operating, they're consuming the amount of power that's contracted.
Q But we've talked about -- I don't want to use the word consuming because consuming --
A They're using --
Q They're using as in mining or --
A Yeah. Those systems are using -- well, this is a side-by-side simulation. That's one of the nice things about simulation. Right. It's as if you did both things at the same time, right? So if you were to go down this path and use that power to do mining, you would get this

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much money. If you were to stop mining at certain times, you would get this much money. So which one do I use? That's a performance strategy. At this time I turn on the miners, at that time I turn off the miners, and there may be areas in between where I modulate how much mining I do.

Q Okay. That's not my question. My question is, does this system contemplate a performance strategy where X amount of power must be utilized by the miners, they must mine and use X amount of power, regardless of whether or not it's profitable for the miners to do so?

MR. RICORDATI: Object to form.

THE WITNESS: That's the breakeven mining cost. That's associated with the breakeven mining cost. The simulation kind of ignores that -- I'm going to say just for a second nonsensical case, right, because why am I mining bitcoin to lose money. So let's call that --

MR. NELSON: Q Well, I'm -- that's my --

A That's the wrong terminology for it. This simulation ignores that case, because it's focusing on ways to make positive dollars by choosing a performance strategy that enhances the choice of mining versus sell back.

Q No. And I understand that, but my question is

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focused on what you call the nonsensical strategy, which I think probably answers my question. So the system doesn't contemplate a performance strategy where the system must run, must consume X amount of power, regardless of whether they're going to make money consuming that X amount of power or not consuming it?

MR. RICORDATI: Objection to form.

THE WITNESS: I believe that's -- I'm sorry. As I've said, I believe that's built into the breakeven mining cost.

MR. NELSON: Q How?

A That's -- I believe that that's the amount of -- if you use the minimum amount of power, that's the cost per power unit that you'd have to achieve. Anything below that, you're losing money. Anything above that, you're making money. That's why it's break even.

Q Let's say that you have -- I'll leave it at that.

So in calculating the breakeven price and the respective realized revenues, do you know if that's done on the power prices being zonal power prices or nodal power prices?

A I don't know. It's a day-ahead LMP. It doesn't qualify the day-ahead LMP more than that.

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Q Do you know what base point information is?

A I think -- In terms of a power system?

Q In terms of your opinions.

A In what context? In terms of opinions with this case?

Q Yes.

A I don't think -- I don't know if that terms has showed up. It may, but I don't recognize it right offhand.

Q So go to paragraph 285 of your report.

A 285?

Q Yes.

A Yes.

Q So what's a base point?

A It says that the base point is the minimum required power usage value which corresponds to the claimed minimum power thresholds.

Q And how does that correspond to the claimed minimum power threshold?

A That's the amount of power that you need to use or need to pay for depending on how the contract is structured.

Q So that's what the base point is or that's what the minimum power threshold is?

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MR. RICORDATI: Objection. Mischaracterizes the testimony.

THE WITNESS: It corresponds to the minimum power threshold. So that's the base utilization value.

MR. NELSON: Q That's what I'm trying to figure out what you mean. You say it corresponds to it. What does that mean?

A Well, I think the power thresholds are power -- this goes back to the discussion earlier about using power versus paying for power. You have to pay for the power. If you do one of these option agreements, you have to pay for the power whether you use it or not. It's not clear to me whether you're required to use it. It's clear to me that you have to have the capability of using it, otherwise, you couldn't stroke the contract, but it's not clear to me -- because this is a question for Mr. McCamant, it's not clear to me if you have to consume that power because if you didn't consume that power, that just leaves a little bit of surplus, but that's okay, because they got paid for it.

So it makes me think that the minimum power thresholds are something you commit to pay for and something that you can use, but not something that you must use.

Q My question was relating to base points though. Does the base point come from the independent system operator?
A It says it comes from the QSE.
Q And does it ultimately come from the independent system operator? Do you know or not know?
A Well, the QSE is a function of -- is a marketplace. It's associated with the ISO. So I see them as kind of the same thing. Again, this is a -- this is an ERCOT question. I don't know the specifics of this.
Q Okay. Do you know how the base point is determined?
A Power systems have a base load that they expect to be able to fill, and they have to purchase that power -- at least that much power to service that base load, and if they go -- if they have power requirements that go beyond the base load, then they have to go to reserves. I think that the base point is your element of that base load. Right. If you bid into the marketplace at minimum power thresholds, that's the base -- that's the element of the base load that you've committed to take if you have to.
Q Do you know how it's determined whether a

company would receive base point information from a QSE?
A I don't know. I assume that's a -- once you -- once you -- once you stroke that contract to be able to do power options, then you're qualified to soak that load and you can get the information.
Q You say assume. Do you know or not?
A I think that's how it works, but I'm not an expert in this. We have to talk to Mr. McCamant about that.
Q Do you know if Mr. Storms' simulation contemplating -- contemplated receiving base point information?
A I don't know. It talks about day-ahead pricing and realtime pricing. I mean, it talks about if base point is a minimum required power usage, then that corresponds to a minimum power thresholds, then we've already discussed the fact that you can back into the minimum power thresholds from his data.
Q So my question was, do you know if Mr. Storms' system received or was -- simulation was capable -- Strike that.
Do you know if Mr. Storms' system contemplated receiving base point information, yes or no? Do you know?

MR. RICORDATI: Objection. Asked and answered.
THE WITNESS: I -- I -- I don't know the specifics. I know that there's a minimum power threshold as we've discussed.
MR. NELSON: Q So go to paragraph 298.
A Yeah.
Q And the second -- the second sentence reads: The .CSV file also described and/or explained how to determine a generated mining revenue figure to be expect from using power to mine bitcoin, a realtime LMP revenue figure based on selling energy to the grid at the current realtime energy price, a day-ahead LMP revenue figure based on selling energy to the grid in the future at the day-ahead energy price, and a realized revenue figure that represented the most profitable of the other three revenue figures.
Do you see that?
A Yes.
Q So aren't options two or three mutually exclusive of each other, that you either sell -- you'd either sell realtime revenue based on selling energy to the grid at the current realtime energy price -- Strike that.
I'm going to ask you the same question I asked

you before. I'm not sure if it's going to be any different. I'm still trying to figure out what option the third option means there, a day-ahead LMP revenue figure based on selling energy to the grid in the future at the day-ahead energy price. Why would you do that?
A That's the column in the table that I think is confusing. I think that column is kind of -- kind of sets a lower bound that really is kind of not very useful. I think the day-ahead -- the day-ahead column in the table -- Okay. So I bought -- I bought the power day-ahead at this price per kilowatt or per megawatt or whatever. What if I just turned around and sold it at exactly that price and ignored the realtime price? Oh, that would be -- that would be if I wanted to make zero money.
Q Well, sitting here today, can you explain to me how the third option here, which is the day-ahead LMP rev column, how that -- how that's calculated or even what it means?
A That's using the day-ahead energy price and multiplying that by the amount of energy -- day-ahead energy price -- Let me look at the table. That's why that table -- that element of the table is confusing to me. I don't -- I think that's -- I think the day-ahead

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LMP is the per unit price and the day-ahead LMP revenue price is the per unit price multiplied by the number of units I committed to.

All right. So day-ahead LMP is dollars per kilowatt, and day-ahead LMP rev is dollars per kilowatt multiplied by kilowatt to get my dollars back. So it's kind of a -- That column just doesn't make any sense to me.

For example -- To clear this up a little bit, if this -- if this scenario that this simulation was run against had committed to purchase one unit at the day-ahead price, then day-ahead LMP and day-ahead LMP rev would be the same number, because it would be dollars per kilowatt multiplied by one kilowatt, or dollars per megawatt multiplied by one megawatt. So those two columns would be the same number. So it's just -- it's just -- it's a volume scaling based on the things that I've committed to buy.

Q Let me hand you what we'll mark as Exhibit 205.

(Exhibit 205 marked as requested)

Q Can you look at Exhibit 205, tell me what it is?

A Looks like reply report based on a rebuttal of the original report.

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Q Is that your signature on the last page?

A Yes.

Q Did you write this report?

A I provided the input to it and I set up the initial draft, and then it got rearranged, and we talked about it, and I did the final edits on it and approved it.

Q So on paragraph 9 you state that you understand that Lancium's taken the position that claim construction is not necessary. Do you see that?

A Paragraph 9?

Q Yes.

A No, I don't see that. Is that on page -- paragraph 8?

Q Maybe. Maybe I mislabeled it here.

A Yeah. Paragraph 8 talks about plain and ordinary meaning. Yeah. Position that claim construction is unnecessary, that's paragraph 8.

Q Okay. What is the basis for your opinion or your understanding there that you believe that Lancium has taken the position that claim construction is not necessary?

A That's what I was informed, and I understand that there hasn't been -- normally intellectual property

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cases there's -- I think it's called a Markman hearing where they do claim construction and different elements of the claim are laid out. I don't believe that happened in this particular case.

Q Yet.

A Yet. Okay. I haven't seen anything to that effect.

Q Right. My question is just what is your basis for believing that Lancium took the position that claim construction was not necessary.

A That's what I was told.

Q Okay. That's all I wanted to know. So in applying your analysis -- so paragraph 10 talks a little bit more about legal standards. And my question is in applying your analysis, did you understand that corroborating conception alone is enough for something -- for someone to be considered a joint inventor?

MR. RICORDATI: Object to form.

THE WITNESS: Say it again.

MR. NELSON: Q So in performing your analysis, did you understand that corroborating conception by itself is enough for one -- a purported person to be considered -- Let me start over again.

In forming your opinions did you understand

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that corroborating conception alone is enough for a would-be inventor to be considered a joint inventor?

A Corroborating evidence is required. So corroborating -- You're asking if corroborating evidence alone -- in the absence of what else? Right. There's a claim that says I'm an inventor and I have conception and it's obvious that it has the idea, and then you find corroborating evidence that -- That's my understanding of how this works. I don't understand your question.

Q Let me see if I can ask it differently. So in forming your analysis -- your opinions, did you form your opinions based on the idea if Mr. Storms could corroborate that he had conceived the different elements or some of the elements of the '433 patent that that alone was enough for him to be considered a joint inventor, or did you form your opinion based on that he must corroborate that the information that he communicated to Mr. McNamara was information that disclosed aspects -- claimed aspects of the inventions?

A An inventor may prove his conception by testimony, by corroborating evidence, documents, and so on. Some corroborating evidence is required. So you have to prove -- so corroborating evidence is separate from conception. Corroborating evidence corroborates

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conception.
Q But my question is, in forming your opinions, did you focus on the corroboration of conception only, or did you focus on corroborating the evidence -- corroborating what Mr. Storms communicated to Mr. McNamara and that whatever that was met the elements of the claims?
A To establish as evidence of -- as evidence corroborating inventorship by Mr. Storms, the primary evidence there was documents that were produced that showed the development of the system in various stages, as well as the source code. Right. The evidence that corroborates the communication is the stuff that was exchanged. So evidence -- The evidence that was exchanged to corroborate the communication plays a double role.
Q Okay. Do you have an understanding that Mr. Storms worked with Mr. McNamara to develop Mr. Storms' systems?
A Storms worked with McNamara?
Q Yeah, to develop Storms' systems.
MR. RICORDATI: Object to form.
THE WITNESS: No. It looked to me based on the text messages that we were looking at earlier that Storms had

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a system developed, which is these documents that we've been going over, and he provided that to Mr. McNamara. There wasn't a joint -- there may have been a joint development after that, but that particular activity was kind of one directional.
MR. NELSON: Q Do you understand that Mr. McNamara worked with Mr. Storms to develop the Lancium system?
MR. RICORDATI: Object to form.
THE WITNESS: McNamara worked with Storms to develop the Lancium system?
MR. NELSON: Q Yes.
A No.
Q So on paragraph 12 of your report you state that you note that Dr. Ehsani does not rely on the deposition testimony or any other discussions with either named inventor McNamara or Cline.
Do you see that?
A Uh-huh.
Q On what do you base that?
A I don't recall seeing in Ehsani's report that he relied on depositions from the inventors.
Q Anything else?
A No.
Q In paragraph 13 -- Let me -- Strike that.

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So do you have an understanding that the Bearbox simulation would permit the miners to operate at less than 100 percent capacity?
A The Bearbox -- the Bearbox simulation that we have only operates the miners at 100 percent capacity. It seems clear that they could operate at something less than 100 percent capacity.
Q You're not aware of any code or anything that was written that would accomplish that?
MR. RICORDATI: Object to form.
THE WITNESS: Well, making a system operate at less than 100 percent capacity involves interacting with both the operating system and the application. And it's possible that the mining application can be controlled to change the amount of CPU time spent on there, so it's pretty straightforward to manipulate the Bearbox system to communicate with the miners and slow them down or speed them up. It's built into the open source code.
MR. NELSON: Q So my question was, has Mr. Storms written any source code that actually accomplished that?
MR. RICORDATI: Object to form.
THE WITNESS: I don't recall offhand. We can run through the code and take a look.
MR. NELSON: Q I don't see it in your report. If

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it was in the code, would it be in your report?
A If it's in the code, it should be mentioned in the appendix in the report.
Q I have not seen it in there either so --
A Okay. Well, I can look through real quick and see if it's there.
Q You make the statement in the reply report. So --
A Which paragraph we talking about again, 13?
Q I think it's 13. I don't know if you make the exact statement. My question was whether or not you're aware whether -- that Bearbox had written code that would enable the miners to operate at less than 100 percent capacity.
MR. RICORDATI: Object to form.
THE WITNESS: I don't recall offhand without looking into the appendix and seeing if there's anything that indicates that and then looking back at the code.
MR. NELSON: Q So let me direct your attention to paragraphs 28 and 29 of your reply report.
A Okay.
Q Really paragraph 29.
A Got it.
Q So you disagree that Dr. -- with Dr. Ehsani's

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allegation that Mr. McNamara and Cline are the sole inventors of limitation 1(d) of Claim 1, at least because the Lancium system did not consider multiple time intervals with associated power thresholds until after its communication with Storms. I assume by its you mean Mr. McNamara's?

A Lancium's communication with Storms, whoever was representing Lancium.

Q Are you aware of any other communications between anyone at Lancium and Mr. Storms other than Mr. McNamara's?

A I think McNamara was the only one, but this -- the terminology there is focusing on Lancium system and Lancium communications.

Q Okay. You also state then that the Lancium system did not determine a performance strategy encompassing multiple time intervals with associated power thresholds prior to its communications with Storms. Do you see that?

A Uh-huh.

Q So other than those two reasons, are there any other reasons that you disagree with Mr. Ehsani that McNamara and Cline are not the sole inventors?

MR. RICORDATI: Object to form.

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THE WITNESS: It seems clear to me that what Storms conceived of and implemented in simulation filled in some gaps in the Lancium strategy as well as extended some possibilities for the Lancium system.

MR. NELSON: Q Well, your opinion here -- and you expressed in your reply report is your disagreements with Dr. Ehsani and later on with Dr. Baer -- with Mr. Baer, correct?

A Yeah.

Q And in paragraph 29 you give two reasons why you disagree with Dr. Ehsani's allegation that McNamara and Storms were the sole inventors of element 1(d), right?

A Uh-huh.

Q And you qualify that with at least because, do you see that?

A Uh-huh.

Q And so my question is does this report contain all of the reasons that you believe McNamara and Storms were not the sole inventors of element 1(d)?

A Well, that language is taken directly from the claim element, and so at least because claim element considered multiple time intervals, at least because determine the performance strategy multiple time

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intervals, that's information -- that's a statement taken from the claim language.

Q At least because is not used in this claim language?

A No. The stuff after at least because is.

Q Right. But your opinion -- you give two reasons, but you qualify it with at least, and my question is are there -- do you have other reasons that are not in this report that you believe McNamara and Cline are not the sole inventors?

A I don't know why there need to be other reasons because those cover the claim language.

Q That's not my question. My question is, do you have other opinions that aren't in this report that indicate Mr. McNamara or Cline are not the sole inventors, or are all -- or are your opinions connected -- are your opinions -- are the opinions contained in the report complete?

A The opinions contained in the report are focused on the specific claim language of the claim element. That's why it says at least because, because it outlines the elements of the claim.

Q And for this claim element you give two reasons, and are those -- is your report complete that

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those are the only reasons you believe that Mr. Storms and Mr. McNamara are not the inventors of this element?

A Those are the only reasons necessary to cover this claim element.

Q So is the answer yes?

A The report focuses on the language in the claim element, so that's why that's worded that way. So there's no need to --

Q So you have no other opinions that you're going to offer at trial, for example, that are different than what's in paragraph 29 with respect to this claim element?

A Well, those reasons cover the claim element.

Q So the answer to my question is yes. You have no other opinions that you intend to offer at trial that are different than the ones in paragraph 29?

A I wouldn't say it that way. I would say that the reports are always couched with other data may change some of the opinions that are expressed in the report, but right now the report -- the purpose of the report is to focus on the elements of the claim, and that's what the report does.

Q And so you used the term -- you used the phrase in paragraph 29 associated power thresholds. That's not

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in the claim, is it?
A Yeah. There's the threshold associated with each time interval, that's the claim language. Right at the end.
Q So is that -- Are you referring -- Multiple time intervals with associated power threshold, the time -- the power thresholds that are associated with each time interval, the claim language there is referring to the minimum power thresholds, isn't it?
A Well, that's the power thresholds that it's referring to, yeah.
Q So you're -- when you use the word associated power thresholds here, you mean minimum power thresholds?
A The claim says --
Q The claims says: Wherein each power consumption target is equal or greater than the minimum power threshold associated with each time interval.
A Yeah. Those are the time intervals associated with each time interval.
Q You use the word associated power thresholds.
A Probably would have been clearer to say exact -- use exactly the claim language, the minimum power threshold associated with each time interval, but it just kind of -- the verbiage is kind of turned around.

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Q So just to be clear, what you mean to say by associated power thresholds is the minimum power thresholds associated with each time interval?
A Those are the thresholds that are provided in the data, yeah. So it's the minimum power thresholds that are provided in the data.
Q So just to be clear -- Because you use this phrasing throughout your report in connection with minimum power threshold, and I just want to understand your opinion. So in paragraph 29, when you're using the word associated power thresholds, you are intending to refer to the minimum power threshold associated with each time interval?
A Yes. It's supposed -- it's supposed to correspond with the claim language. It's just a simplification. There's a threshold associated with each time interval. The threshold can be changed between time intervals. The threshold is -- According to the power agreement, the threshold is a minimum consumption target.
Q So let's go to paragraph 76.
A Of the same report, the reply?
Q Yeah, yeah.
A Okay.
Q At the very end of that -- and you use this

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language in a lot of places in the report. I'm just focusing on this paragraph. But you say: Dr. Ehsani conflates minute details of the simulation Storms built with the full breadth of the capability at which the system both described in the various documents and embodied in the simulation serve as proof of concepts.
Do you see that?
A Yeah.
Q So you're criticizing Dr. Ehsani there, but does that mean that you're agreeing that Dr. Ehsani's paragraph 118 is correct but he's just conflating the minute details, or do you believe he's not correct?
A This has a quote for part of paragraph 181. Do we need to look at the entire paragraph 181 or are you talking about the quote that's contained in here?
Q You can look at the entire paragraph 181 too if you want.
A Well, he says in the quote, for grins, he says in the quote: Additionally, I understand that it is not disputed that Storms' simulation did not communicate with an ISO or QSE. I mean, that's not in dispute, so I don't disagree with him there. The simulation, therefore, could not receive power option data, not directly from the QSE, and not based on a power option agreement. I

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agree with that, because there was no power option data, but it could receive simulated power option data. And it could use that simulated power option data to perform -- to create a performance strategy comprising a power consumption target for the set of computing systems for the interval that was either equal to or greater.
The first half of that quote, I agree with. The second half of the quote is predicated on the actual connection with the ISO or the QSE, but it's a simulation. So we all agree that it's a simulation, but a simulation doesn't connect with the QSE. So the simulation can still do the stuff in the later part of the quote, and that's actually good engineering design. Before you unleash something on the world you test it in isolation. So I agree that -- everybody agrees that the simulation did not communicate with the QSE. Yeah. We agree with that.
We disagree that it could not compute these other things because that's what the purpose of the simulation was for, to use simulated QSE data to cause these performance strategies to be realized.
Q So turn to paragraph 77, couple paragraphs ahead.
A Uh-huh.

Q And you have a statement in there about simulations. Do you see that?
A Yeah. It's basically what I just said.
Q So looking at the last sentence, you state: Based on my experience writing software, it's my opinion that a POSA would understand that Mr. Storms' simulation assumed an unlimited amount of power to test his profitability determination algorithm, and that any real world system would necessarily need to account for power availability, and replacing Mr. Storms' assumed power availability with data from an ISO or QSE was well known, conventional that would have been required in the ordinary skill.
Do you see that?
A Yes.
Q So did Mr. Storms -- Are there any other assumptions that you're aware of that Mr. Storms' simulation used?
A I can't think of any right off the bat. Since it was a simulation there were probably a couple of other ones, but the simulation describes the function of the system with sufficient fidelity for someone to take the information that was passed and take the simulation output that was passed and understand how the system

functioned.
Q So in paragraph 78 you talk about Dr. Cline, and you basically state right before the quote portions of Dr. Cline's deposition that Cline had no issues deciphering the methodology embodied in the spreadsheet. Do you see that?
A Uh-huh.
Q Do you have an understanding of what Mr. Cline's technical background is?
A No.
Q Do you know whether Mr. Cline would be considered a person of ordinary skill under your definition?
A I may have looked at his qualifications sometime ago, but I don't recall them right off the bat. I think he would be a person of ordinary skill.
Q Do you think he would be a person of extraordinary skill?
A I can't speak to that.
MR. RICORDATI: Objection to form.
MR. NELSON: Q So if you go to paragraph 89.
A Yep.
Q And paragraph 89 says: In paragraph 203, Dr. Ehsani mischaracterizes well-known principles and

features of the art as supposed contributions by Mr. McNamara and Cline.
Do you see that?
A Yes.
Q I need to -- Let me hand you Dr. Ehsani's report. I guess -- I'll just mark it.
(Exhibit 206 marked as requested)
Q I only have two copies of that, I think.
So go to paragraph 203 of Dr. Ehsani's report.
A Yep.
Q And so 203 says: It is further my opinion -- this is Dr. Ehsani speaking -- it's further my opinion that Lancium's documentation indicates that Messrs. McNamara and Cline -- and/or Cline conceived this element independently and without utilizing any information or allegedly provided by Mr. Storms as described above in paragraphs 115 and 116.
Do you see that?
A Uh-huh.
Q So let's go to paragraphs -- So you make a statement with respect to -- in your paragraph 89 Dr. Ehsani mischaracterizing well-known principles. So let's go back now to 115 and 116 of Dr. Ehsani's report.
A Uh-huh.

Q And take a look at those. And my question is, looking at paragraphs 115 and 116, do you believe those paragraphs describe well-known principles?
A Flexible data center, could ramp and absorb and drop power within five-minute windows, operate it remotely, that's fairly straightforward. Respond to signals from grid operators, again relatively straightforward. Aware of ERCOT and peripherally aware of ancillary services, that's not inventive. McNamara and Cline developed technology, blah, blah, blah.
Paragraph 116, it was not until 2019 that they appreciated the benefits of applying their technology to ancillary servs, I guess that means services, and that is when they subsequently conceived of using their technology for receiving power option data based on a power option agreement. That's standard contractual stuff. Specifying a set of minimum power thresholds and a set of time intervals, again standard stuff, in furtherance of performing ancillary services with their fast ramping data centers.
Q So if I understand correctly, based on your paragraph 89, it's your belief that the information in Dr. Ehsani's report in paragraphs 115 and 116 are well-known principles and features of the art, is that

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fair?
A Well, further in paragraph 116, it talks about -- Ehsani says, in my opinion this was the flash of insight that lead to conception. Because this is when they understood that their system would need to receive the award -- that's standard stuff -- which would be sent to Lancium in response to the accepted prior offer, which is a power option agreement, and that the award includes the minimum power thresholds, the awarded offer, this is open information on ERCOT's stuff, all right.
So they had a flash of insight that was not inventive. It was a flash of incite that was a realization they had to enter into a business contract under certain conditions and they had to comply with that contract. Now, that flash of insight is not conception. It's realization. So that's what this paragraph 89 says, well-known principles and features of the art as contributions by McNamara and Cline. McNamara and Cline -- he talks about a flash of insight that is not a flash of insight. It's a flash of realization.
Q So you have -- I won't go through all of them, but you have a similar paragraph throughout your reply report referring to different Ehsani paragraphs where you basically say the same thing. You say Dr. Ehsani

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mischaracterizes well-known principles and features of the art as supposed contributions. So is it fair that wherever you're using that language referring to Dr. Ehsani's report, it's your opinion that what Dr. Ehsani is referring to was something that was already well-known?
A Yeah. I mean -- That's what it says. He mischaracterizes well-known principles and features of the art as supposed contributions. It might have been better to say as supposed conception rather than contributions, because in that paragraph that we just read there was no contribution. That was a realization they had to enter into a business agreement.
MR. NELSON: Why don't we take about a five-minute break here.
MR. RICORDATI: Okay.
THE VIDEOGRAPHER: The time is 5:07 p.m. We're going off the video record.
(Off the record)
THE VIDEOGRAPHER: The time is 5:24 p.m. and we're back on the video record.
MR. NELSON: Q Good afternoon, Dr. McClellan.
A Yes.
Q So turn to paragraph 6 -- 615 of your reply

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report -- 15 of your reply report?
A Okay.
Q There you're talking about the '632 application, and if you look at the last sentence you say: The system described in the '632 application, however, merely responds to current conditions and reacts when a threshold condition is met, e.g. starting lining when energy producer is selling power to the grid at a negative priced, closed paren.
Do you see that?
A Uh-huh. Yes.
Q What did you mean by?
A The system in the '632 application is purely reactive. It doesn't do any proactive estimation, it doesn't think about anything, any other options. It just reacts to the current conditions.
Q All right. So '632 then, in your opinion, doesn't -- doesn't respond to future expected conditions at all?
A It's -- the '632 application in my opinion and from what I recall of it and what I wrote here is that it's looking at instantaneous conditions and reacting based on that.
Q And it's making decisions then to mine or not

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mine based on those instantaneous decisions?
A Yeah, or do something, yeah.
Q In your opinion was Mr. Storms the first person to conceive of the concept of using a breakeven price for mining bitcoin to make the decision whether or not to mine or not mine at a certain power price?
A I've certainly never seen it before.
Q In your opinion was Mr. Storms the first person to have the idea of selling power back to the grid if it was more profitable to sell that power than to use that power?
A I think that's standard ERCOT business model.
Q So no is the answer?
A Yeah.
Q In your opinion was Mr. Storms the first person to have the idea of buying power on the day-ahead market and then selling power back to the grid at the realtime price if doing so was more profitable than using the power?
A I don't know if he was the first person to do that or not, no. I think that he was the first person to do that in the context of a tradeoff with bitcoin mining, but I haven't seen any other systems that do that.
Q That do that with respect to bitcoin mining or

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that do that generally?
A As I mentioned, I haven't seen anything like what he had done.
Q Okay. My question though was not specific to bitcoin mining. So I just want to make sure we're on the same page with the question and the answer. My question was, in your opinion was Mr. Storms the first person to have the idea of buying power on the day-ahead market and then selling that power back to the grid at realtime prices if doing so was more profitable than using the power?
A I doubt it. That seems like a pretty straightforward strategy. Very dangerous, but straightforward.
Q So look at paragraph 218 of your reply.
A Okay.
Q So you make a statement there that Storms' method of arbitrage as depicted in Bearbox page 97 -- Bearbox Bates No. 97 matches Mr. Storms' -- Mr. McNamara's Excel spreadsheet, Exhibit 15 to your report, which is later described in a Lancium presentation for investors.
Do you see that?
A Yes.

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Q And in the presentation you label it Lancium -- you identify it Lancium 35852 through 35856. Do you see that?
A That's the presentation.
Q Let me hand you that presentation here.
(Exhibit 207 marked as requested)
Q I hand you what's been marked as Exhibit 207.
A Right.
Q So you refer to five -- five pages of that exhibit, Lancium 35852 through 35856. Do you see that?
A Yeah. It's Section 5 of that presentation, yeah.
Q Okay. I want to focus you -- specifically on -- well --
MR. RICORDATI: What page was that, Counsel?
MR. NELSON: 35852 through 35856.
Q You say all of these pages describe Mr. Storms' arbitrage method, is that right?
A The original spreadsheet does, and this page -- this section of this report talks about their growth strategy that leverages that arbitrage method. It's specifically the example on 35855. There's an example in one of the cells on 35855 that seems to almost come verbatim from that spreadsheet.

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Q And that is the economic turn down example?
A Yeah.
Q So is it your opinion that the other four things on this -- on page 35855 also relate to Mr. Storms' arbitrage method or something different?
A They're all kind of interrelated, but it's primarily economic turn downs thing that's the hash or cache thing is very explicitly related to Storms.
Q Well, do you think transmission cost avoidance for CP is related to Storms' arbitrage method?
A No.
Q Do you think ancillary services dynamic pricing and optimization is related to Storms' arbitrage method?
A It's the same general concept with bitcoin replaced by something else. So it's not Storms' -- that's not Storms' invention.
Q Is it Storms' arbitrage method?
A It's -- it seems to be a form of arbitrage method, but that's the only detail we have on it. It doesn't seem to be related to Storms directly.
Q Selling out the money OTM covered call out options, is that related to Storms' arbitrage method or Storms' alleged arbitrage method?
A It could be.

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Q How?
A Because it involves bitcoin mining versus selling back profit, selling back power, all these ones under energy and bitcoin hash with the gray bar on the left-hand side, all of those are kind of related.
Q Do you know how selling out the money OTM covered call out options work?
A This is the only description I have right here. Next week power is trading at 35, so we're going to mine, right. That's the same sort of thing as what Storms had. We can sell calls next week, that's associated with variability in the market.
Q So how does the selling out of the money OTM covered call out option method work?
MR. RICORDATI: Objection, asked and answered.
THE WITNESS: If you look at the subsequent cell there, it talks old generation miners which could be viewed as super cheap out of the money option on bitcoin price --
MR. NELSON: Q Let me stop you for a second. Because that's a separate cell and a separate thing, isn't it?
A Yeah, but it uses the out of the money concept so it's related.

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Q Okay. So --
A This says old generation miners can be viewed as a super cheap out of the money option on bitcoin price. So old generation miners are a cheap out of the money option because they consume more power versus the amount of bitcoin revenue they generate. So that's related.
Q So do you know how selling out of the money OTM covered call options actually works?
MR. RICORDATI: Objection. Asked and answered.
THE WITNESS: No. I only know what's written right here, and this is all similar sort of stuff as certain types of stock market investing so it's the same concepts.
MR. NELSON: Q You're just making the assumption based on written -- When you say the same concept, what do you mean?
A Well, there's a call -- there's covered call options in stock market investing. There's calls and puts and different kind of risk investments. Right. It's the same sort of idea. This is -- this is hedging against risk versus taking advantage of risk.
Q So are you saying that Mr. Storms' arbitrage method is the same concept as stock options, calls, and

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puts except done in the bitcoin context?
MR. RICORDATI: Object to form.
THE WITNESS: No.
MR. NELSON: Q So how is selling out the money OTM covered call options -- how is that related to Mr. Storms' alleged -- allegedly converted breakeven arbitrage method?
A Well, it has something to do with bitcoin mining because it's in this group of energy and bitcoin hash. Right. So it's related through the fact that it uses bitcoin miners as some form of hedging or some form of speculation.
Q So other than that, do you have any other opinion as to how it's related to Mr. Storms' allegedly converted arbitrage method?
A No, I'm just reading what's here.
Q The same question with respect to the open position management dynamic hedging, how is that, if at all, related to Mr. Storms' allegedly converted breakeven arbitrage method?
A Well, this is talking specifically about a cheap out of the money option. So it relates to out of money option based on bitcoin miners that are less efficient. Right. So if you have -- if you can compare

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across bitcoin mining installations, you can take advantage of that.
Q And other than what -- the opinion you just gave, do you have any other opinion regarding the relationship or alleged relationship between Mr. Storms' allegedly converted breakeven arbitrage method and block four on Lancium 35855?
A No. I'm just reading what's here and trying to interpret it in the context that you're talking about, but it is clearly related because it's related to energy and bitcoin hashing. So it's optimization of profit based on trading energy and/or bitcoin futures.
Q And do you think that's simply optimizing profit based on energy and bitcoin futures, do you think that would -- that if a company used a system that did that or Lancium used a system that did that, that is utilizing information allegedly converted from Mr. Storms?
A Yeah, the bitcoin break even issue and the tradeoff of using bitcoin versus selling power back. Right. If you can compute bitcoin break even in the future based on different types of bitcoin mining operations, the different costs associated with those, and the different costs and potential profits associated

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with the power, that's exactly what Storms' simulation did.
Q So is that the crux of the alleged conversion in your view is Storms' simulation was able to allegedly utilize the ability to sell -- calculate whether it made sense to mine bitcoin and use the power or whether it made sense not to mine bitcoin and sell the power back? Is that what is the allegedly converted technology here?
A Storm's simulation is an automated cherrypicker, and it's the first time I've seen anybody do this kind of automated cherrypicking using bitcoin versus energy futures.
Q Have you seen such automated cherrypicking using other -- in other industries using other things?
A Yes, yep.
Q What industries?
A Computer industry, cost of memory.
Q Anything else?
A I haven't seen it using -- cherrypicking is -- Well, let me phrase it a different way. I've seen things in the computer industry based on things like future cost of memory and locking customers in, which is a -- similar to a power option agreement, locking customers into a price and betting that the memory price will go down and

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hedging against the memory price going up. Right. It's nothing to do with bitcoin because not associated with bitcoin. Storms did something different where he's essentially running two simulations in parallel and cherrypicking between them, or three simulations in parallel and cherrypicking between them to maximize. I've only seen that in an information theory context that had to do with coding gain for encryption and compression methods.

MR. NELSON: Can we go off the record real quick?

THE VIDEOGRAPHER: The time is 5:43 p.m. and we're going off the video record.

(Off the record)

THE VIDEOGRAPHER: The time is 5:48 p.m. and we're back on the video record.

MR. NELSON: Q Dr. McClellan, in -- you read Dr. Ehsani's report, correct?

A Yes.

Q And he cites a lot of documents in there, correct?

A Correct.

Q Deposition testimony, other things?

A Right.

Q Did you read all the documents that he cited in

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his report?

A Some of them were common between the ones that I had already read. I didn't read all of them.

Q You did not read --

A I skimmed through some of the ones that I hadn't seen before.

Q So you did not read all the documents that Dr. Ehsani cited in his report?

A Not in great detail, not all of them.

Q Did you look at all the documents that Dr. Ehsani cited in his report?

A I think I looked at the vast majority of them, but I don't recall exactly which ones I looked at and which ones I didn't.

Q So sitting here right now, can you tell the jury whether you actually looked at all of the information that Dr. Ehsani cited in his report?

A I don't think I looked at all of it.

Q I may have misunderstood you earlier. Did you say that it's your opinion that Mr. Storms is the first person who considered the price of bitcoin and the price of the power that it costs to mine the bitcoin in conjunction in making a decision whether or not to mine the bitcoin?

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MR. RICORDATI: Objection.

THE WITNESS: Go ahead.

MR. RICORDATI: Objection. Mischaracterized testimony.

THE WITNESS: No, that's not what I said.

MR. NELSON: Q All right. What did you say with respect to what you believe Mr. Storms to be the first person to accomplish here?

A I said that I hadn't seen anything like what he'd done in this context with bitcoin.

Q And you say like what he'd done. So what is it that you think he's done that is different?

A The -- I think we've explained that already. This cherrypicking concept I think was -- is -- is different. It's not something that I had seen before.

Q And when you say cherrypicking concept, what do you mean?

A Well, if you look at the -- if you look at what his simulation does, he's running -- he's racing three horses at the same time and then picking -- picking a different winner at different time points.

Q What are those three horses?

A The three revenue streams that are in the CSV file.

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Q And the day-ahead LMP revenue, you can't tell me how that is computed, correct?

A I believe it is the day-ahead price multiplied by the number of units purchased or number of units committed to. I believe that's what it is.

Q Let me mark this as another exhibit here.

(Exhibit 208 marked as requested)

Q Do you recognize what's on the first page of Bearbox 1?

A These look like --

Q The question is just relating to the first page. Do you recognize what's on the first page?

A Looks like maybe a power device and some computing devices and some power distribution devices and some relays and a Python book.

Q Do you know if that's Mr. Storms' simulation or not, the -- the miner that was run on his simulation?

A I don't recall what -- the simulation is a simulation. It may have some hardware in the loop in some cases, but I think this was related to him trying to build controllable PDUs if I recall this correctly.

Q Look at as many as you need to, Bearbox 3, 4, 5. Do you know what -- do you know what that represents?

A Yeah. That's a GUI that controls relays

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with -- the number 3 is GUI -- the control relays with buttons or to show status of relays that have -- 3, 4, 5, yeah.
Q Is it to control relays or show status of them?
A Well, it looks like those are buttons. So it may be able to control them with a GUI as well as show status.
Q And the buttons here would be that you touch them and they're on and you touch them -- you touch the on and it turns on, you touch the off, it turns off, is that right?
A If it's an interface that is reactive to those kind of inputs. It may also be able to display status from different types of state values.
Q Look at page 21. Do you know what that is?
A I got to find 21. Yeah. That looks like experimenting with controlling PDUs or building your own PDU and trying to control it.
Q Do you know the physical location where this is taken?
A My understanding is that was somewhere Austin Storms' garage or building or some sort of thing like that.
Q Do you know if the location of 21 is the -- is

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the same location where the simulation was running?
A I don't know.
Q Do you know if the simulation was ever connected to Mr. Storms' PDUs as partially constructed in picture on page 21?
A I think at different stages it was connected, but I don't know if the simulation data that was produced was based on that because I think the simulation was pure simulation.
Q You say you think it was connected. My question is, do you know if it was connect the?
A I said it may have been connected at some point, but I think -- I'm pretty sure the simulation data that we've been talking that's in the CSV file was just pure simulation data because there were no miners associated with it. So if there's no miners, why connect PDUs.
Q And my question is, do you know if multiple miners were ever connected to PDUs in connection with Mr. Storms' running his simulation?
A I can't say.
Q Go to page 62. Do you know what that is?
A Well, it's something that generates heat. Looks like a computer system.

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Q Other than that, do you know what it is?
A And it's got an ether Internet cable into it. It's some sort of network based system that generates heat. That's why it's vented out. It may be a network connected fan assembly, there may be a computer. I don't know exactly.
Q That's my question. You're speculating at what it is. Do you know what it is, yes or no?
A Not just from the picture.
Q Do you know what it is from other things?
A No.
Q What did you to investigate -- So you indicated what you thought Mr. Storms was the first to develop. What did you do to investigate whether he was in fact the first to develop what you indicated he was the first to develop?
A I didn't indicate he was the first to develop. I said I've never seen anything like it before. I can't say if he's the first anywhere to develop anything like this.
Q You said you've never seen anything like it before. Did you look for -- Have you done any looking for anything like what Mr. Storms had done?
A Yeah. After I became aware of this case I

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looked around to see if there was any sort of concepts like this, and I haven't seen any. The controllable PDU stuff, I've seen PDUs that were controllable so I didn't pay much attention to that.
Q Okay. So outside of the controllable PDU stuff, you said you did some looking. What did you do?
A The question is are any of the concepts that Storms had, which is basically the arbitrage method, the cherrypicking method, does anything jump up like that. So I asked some people that I'm familiar with if they're familiar with different types of arbitrage methods using power systems. They were not familiar, and they're very knowledgeable.
We talked to Mr. McCamant about it, and he said he had not seen anything like it. I -- you know, you do the Google, you Google for things like that, and I have not seen anything associated with bitcoin mining that was energy arbitrage so --
Q Have you read the report of Mr. Shams Siddiqi in this case?
A I have gone through it, yes.
Q Do you know Mr. Siddiqi?
A No.
Q Is it your opinion that Mr. Storms' breakeven

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arbitrage method is covered by the claims of the '633 patent?
A The '433 or the '632?
Q Sorry. Let me try that again.
Is it your opinion that Mr. Storms' arbitrage method is disclosed in the '632 application?
A No.
Q Is it your opinion that Mr. Storms' breakeven arbitrage method is covered by the claims of the '433 patent?
A No.
Q Why not?
A Because the '433 patent doesn't really talk about breakeven arbitrage.
Q If this case goes to trial, do you intend to appear on behalf of Bearbox?
A Yes.
MR. NELSON: I think with that I'll pass the witness.
MR. RICORDATI: Can we take a five-minute break.
THE VIDEOGRAPHER: Okay. The time is 6:00 p.m. We're going off the video record.
(Off the record)
THE VIDEOGRAPHER: The time is 6:09 p.m. We're back

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on the video record.
EXAMINATION
By Mr. Ricordati:
Q Dr. McClellan, if you could refer to Exhibit 202.
A Okay.
Q And I'd like to direct your attention to page --
MR. NELSON: Is that his first report?
MR. RICORDATI: That's his first report, yes.
Q We're going to look at page 94, the module descriptions. So in the fifth bullet point on page 94, you refer to -- you use two words her -- so you refer to miner_hash rate and KW -- KW_load. What does KW_load refer to in the simulation?
A In the simulation KW_load is -- KW_load is the amount of power to be consumed by the miner which corresponds to the target. It's the target power consumption of the miner which under the simulation can -- corresponds to the minimum threshold.
Q Earlier you testified that it's tough to maintain a load at a certain level. Is it difficult to maintain a load above a certain threshold?
A No. No. If you know what the minimum -- you

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can figure out the minimum power consumption of the load. It's hard to hit a specific threshold. It's hard to hit a specific power consumption number because you don't control all of the aspects of the system, but it's easy to keep it above a threshold.
Q When you determined the plain and ordinary meaning of the term power option agreement, did you interpret it to include at least the specific data elements that are recited in the body of Claim 1 as well as any other dependent claims referring to the power option?
MR. NELSON: Objection. Leading.
THE WITNESS: Does he have to restate or do I have to answer?
MR. RICORDATI: Q What -- I'll restate it. What -- what elements did you include in determining the plain and ordinary meaning of the term power option agreement?
MR. NELSON: Objection. Leading.
Go ahead.
THE WITNESS: Well, power option agreement is a fairly standardized thing. It includes certain items that are associated with the pre-purchase of units of power. The claims in the patent and the other documents have indicative values that are included in there. They

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might consider it a subset of the values that might be included in there.
MR. RICORDATI: No further questions.
FURTHER EXAMINATION
By Mr. Nelson:
Q So, Dr. McClellan, during the break after I concluded the deposition and you and counsel went outside the room together, did you talk about the substance of your testimony?
A No. I asked for feedback on whether I -- what I screwed up.
Q What feedback did you get?
A I'll show you the beating later.
Q Do you remember any feedback you got?
A No. He always says the same thing, it doesn't help.
Q Did you --
A He always says he can't tell me that and I keep asking.
Q Did you discuss -- Have you worked with this counsel before?
A No, this is the only case.
Q Did you discuss the questions that counsel just asked you?

A We discussed several different points that -- that I asked about that I thought were potentially needed to be cleaned up or needed to be discussed, and then we discussed those at least those three questions -- those three concepts. We didn't discuss the question. We discussed the concept.

Q What did you discuss about the concepts?

A Well, the first question -- the first question was about the -- What was the question first question about? It was about the -- the first question was about the report and the appendix, and he said he was going to go back over the minimum power threshold and the load specification.

The second question -- I don't even remember the second question at this point.

Can you read it back?

Q It was a question about being above a threshold.

A Yeah. He asked me about -- When I said it was difficult to maintain a computer system at a specific power threshold, he wanted clarification on that I meant at a specific power threshold rather than above or below a specific power threshold, and I said I thought that that's what I had described earlier.

MR. NELSON: No further questions.

THE VIDEOGRAPHER: Okay. The time is 6:15 p.m. This is the end of media unit 4, it's also the end of the deposition of Dr. Stan McClellan. And we're going off the video record.

Thank you, Dr. McClellan.

(Off the record)

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STATE OF ILLINOIS)
) SS:
COUNTY OF C O O K)

The within and foregoing deposition of the aforementioned witness was taken before CAROL CONNOLLY, CSR, CRR and Notary Public, at the place, date and time aforementioned.

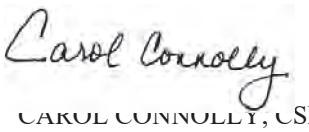
There were present during the taking of the deposition the previously named counsel.

The said witness was first duly sworn and was then examined upon oral interrogatories; the questions and answers were taken down in shorthand by the undersigned, acting as stenographer and Notary Public; and the within and foregoing is a true, accurate and complete record of all of the questions asked of and answers made by the forementioned witness, at the time and place hereinabove referred to.

The signature of the witness was not waived, and the deposition was submitted, pursuant to Rule 30 (e) and 32 (d) 4 of the Rules of Civil Procedure for the United States District Courts, to the deponent per copy of the attached letter.

The undersigned is not interested in the within case, nor of kin or counsel to any of the parties.

Witness my official signature and seal as Notary Public in and for Cook County, Illinois on this 6th day of June, A.D. 2022.



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June 6, 2022

To: RAYMOND R. RICORDATI III

Case Name: Bearbox, LLC, et al. v. Lancium, LLC, et al.

Veritext Reference Number: 5259459

Witness: Stanley A. McLellann, Ph.D. Deposition Date: 6/3/2022

Dear Sir/Madam:

Enclosed please find a deposition transcript. Please have the witness review the transcript and note any changes or corrections on the included errata sheet, indicating the page, line number, change, and the reason for the change. Have the witness' signature notarized and forward the completed page(s) back to us at the Production address shown above, or email to production-midwest@veritext.com.

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Sincerely,
Production Department

NO NOTARY REQUIRED IN CA

DEPOSITION REVIEW
CERTIFICATION OF WITNESS

ASSIGNMENT REFERENCE NO: 5259459
CASE NAME: Bearbox, LLC, et al. v. Lancium, LLC, et al.
DATE OF DEPOSITION: 6/3/2022
WITNESS' NAME: Stanley A. McLellann, Ph.D.
In accordance with the Rules of Civil Procedure, I have read the entire transcript of my testimony or it has been read to me.
I have made no changes to the testimony as transcribed by the court reporter.

_____ _____
Date Stanley A. McLellann, Ph.D.
Sworn to and subscribed before me, a Notary Public in and for the State and County, the referenced witness did personally appear and acknowledge that:

They have read the transcript;
They signed the foregoing Sworn Statement; and
Their execution of this Statement is of their free act and deed.

I have affixed my name and official seal

this _____ day of_____, 20____.

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DEPOSITION REVIEW
CERTIFICATION OF WITNESS

ASSIGNMENT REFERENCE NO: 5259459
CASE NAME: Bearbox, LLC, et al. v. Lancium, LLC, et al.
DATE OF DEPOSITION: 6/3/2022
WITNESS' NAME: Stanley A. McLellann, Ph.D.
In accordance with the Rules of Civil Procedure, I have read the entire transcript of my testimony or it has been read to me.
I have listed my changes on the attached Errata Sheet, listing page and line numbers as well as the reason(s) for the change(s).
I request that these changes be entered as part of the record of my testimony.

I have executed the Errata Sheet, as well as this Certificate, and request and authorize that both be appended to the transcript of my testimony and be incorporated therein.

_____ _____
Date Stanley A. McLellann, Ph.D.

Sworn to and subscribed before me, a Notary Public in and for the State and County, the referenced witness did personally appear and acknowledge that:
They have read the transcript;
They have listed all of their corrections in the appended Errata Sheet;
They signed the foregoing Sworn Statement; and
Their execution of this Statement is of their free act and deed.
I have affixed my name and official seal this _____ day of_____, 20____.

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Notary Public

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ERRATA SHEET
VERITEXT LEGAL SOLUTIONS MIDWEST
ASSIGNMENT NO: 5259459
PAGE/LINE(S) / CHANGE /REASON

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_____ _____
Date Stanley A. McLellann, Ph.D.
SUBSCRIBED AND SWORN TO BEFORE ME THIS _____ DAY OF _____, 20_____ .

_____
Notary Public

_____
Commission Expiration Date

Exhibit 2

Exhibit 3

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IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

BEARBOX LLC and AUSTIN STORMS, Plaintiffs, v. LANCIUM LLC, MICHAEL T. MCNAMARA, and RAYMOND E. CLINE, JR. Defendants.	)	C.A. No. 21-534-GBW-CJB

CERTIFICATE OF SERVICE

I certify that on November 15, 2022, I caused a sealed copy of **Defendants' Opening Letter Brief in Support of its Emergency Motion to Strike Plaintiffs' Newly Disclosed, Untimely Expert Report and Request for Expedited Briefing** to be served on the following counsel of record by electronic mail.

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Dated: November 15, 2022

BARNES & THORNBURG LLP

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Attorneys for Lancium LLC, Michael T. McNamara, and Raymond E. Cline Jr.

JOINT PRETRIAL ORDER EXHIBIT 1

JOINT STATEMENT OF FACTS THAT ARE ADMITTED AND REQUIRE NO PROOF

Pursuant to Local Rule 16.3(c)(3), the following facts are admitted and require no proof:

1. BearBox LLC is a Louisiana limited liability company with its principal place of business at 4422 Highway 22, Mandeville, Louisiana 70471.

2. At the time this case was filed, Austin Storms was a citizen of Louisiana.

3. Lancium LLC is a Delaware limited liability company with its principal place of business at 6006 Thomas Road, Houston, Texas 77041.

4. Michael T. McNamara is the Chief Executive Officer and a founder of Lancium and resides in Newport Beach, California.

5. Raymond E. Cline, Jr. is the Chief Technology Officer of Lancium and resides in Houston, Texas.

6. U.S. Patent No. 10,608,433 ("the '433 Patent") is titled "Methods and Systems for Adjusting Power Consumption Based on a Fixed-Duration Power Option Agreement," and was issued by the United States Patent and Trademark Office ("USPTO") on March 31, 2020.

7. The application that matured into the '433 Patent, Application No. 16/702,931, was filed on December 4, 2019.

8. The provisional application to which the '433 Patent claims priority, Application No. 62/927,119, was filed on October 28, 2019.

9. Austin Storms and Michael McNamara first met the evening of May 3, 2019 at the Fidelity Center for Advanced Technology Bitcoin Mining Conference in Boston, Massachusetts ("Fidelity Conference").

E. Level of Ordinary Skill in the Art and Claim Construction of the Terms of the '433 Patent

1. Level of Ordinary Skill in the Art

39. I was asked to form an opinion regarding the level of skill in the art for the purpose of understanding the '433 patent. To make this determination, I first considered the relevant art, and then considered the education and experience of a person of ordinary skill in the field at the time of the filing of the '433 patent (a "POSITA"), which I understand to be either October 28, 2019 (the date of the filing of provisional application no. 62/927,119), or December 4, 2019 (the date application no. 16/702,931 was filed). I note that Dr. McClellan relied on the December 4, 2019 date (McClellan report, at ¶ 45), but my definition of both the field of the relevant art and a POSITA would be the same regardless of whether the relevant date is October or December 2019.

40. In my opinion, the field of the relevant art is power control of flexible data centers operating in power markets. With respect to the definition of a POSITA, I disagree with Dr. McClellan. A POSITA should have a Bachelor's degree in electrical engineering, computer science, or a similar field, plus at least two years of experience designing and/or implementing power control systems for datacenters. My opinions would not change if I applied Dr. McClellan's definition of a POSITA.

41. My qualifications and experience are at least those of a POSITA.

2. Claim Construction of the '433 Patent

42. I understand that the court has not yet been asked to construe the claims of the '433 patent. I further understand the legal principles related to claim construction and recite them above. I also understand that the words of a claim are generally given their ordinary and customary meaning as understood by a person of ordinary skill in the art at the time of the purported invention.

43. I note that Dr. McClellan did not perform any claim construction. Instead, he applied the "plain and ordinary meaning of the claim terms." (McClellan Report, at ¶ 49). But Dr. McClellan did not provide his understanding of the "plain and ordinary meaning" for any claim terms. I understand that Plaintiffs have the burden of proof on the inventorship issue.

44. To determine conception, I also apply the plain and ordinary meaning of the claim terms as would have been understood by a POSITA and, for certain terms, I discuss the specification's use of those terms. I reserve the right to supplement my report should Plaintiffs' or any of Plaintiffs' experts use a different construction, or provide their understanding of the plain and ordinary meaning that is different than my understanding of the plain and ordinary meaning.

VII. LANCIUM INDEPENDENTLY DEVELOPED, CONCEIVED, AND REDUCED ITS TECHNOLOGY TO PRACTICE, INCLUDING EACH OF THE INVENTIONS CLAIMED IN THE '433 PATENT

45. It is my opinion that Lancium independently developed, conceived, and reduced its technology to practice, including each of the inventions claimed in the '433 patent, and that such development, conception, and reduction to practice did not involve the use of any information allegedly provided to Mr. McNamara by Mr. Storms. As discussed above, my opinions are based on, among other things, my review of: (1) pleadings; (2) the '632 application and the '433 patent and its file history; (3) the parties' Responses to Discovery (including documents cited in those responses); (4) the deposition testimony from this case and exhibits cited in same; (5) my review of other documents and materials; (6) the communications between Mr. Storms and Mr. McNamara; and (7) my education and forty-plus years of experience. I also relied in part on Mr. Siddiqi's analysis as set forth in his report, and Mr. Baer's analysis of the source code produced by Mr. Storms and relied upon by Dr. McClellan as discussed in Mr. Baer's report.

participation.[92] Lancium understood that it would have to follow ERCOT signals sent to a supervisory control and data acquisition ("SCADA") system (*e.g.*, such as the one installed for its Load Resource qualification) and use those signals to adjust the load, all of which Lancium believed it could automate and integrate into its technology.[93]

3. United States Patent No. 10,608,433

102. Lancium continued the above work in October 2019 and filed U.S. Provisional Application No. 62/927,117—the application upon which the '433 patent claims priority—on October 28, 2019.[94] Based upon my review of Lancium's documents and its SSR to ROG 3, I concur with Lancium's understanding that it conceived the full combination of elements claimed in the '433 patent between August and October 2019. As Lancium states on page 33 of its SSR to ROG 3, it conceived of the combination of receiving power option data as recited in, for example, claim 1, determining a performance strategy for a set of computing systems as recited in, for example, claim 1, and providing instructions to the computing systems as recited in, for example, claim 1 around this time.[95] I also concur with Lancium's belief that it conceived of providing

[92] *Id.* at 31-32 and documents cited therein.

[93] *Id.* Note, Lancium had developed proposals for wind farm installation of its flexible datacenters that included SCADA control systems by February 2018. SSR to ROG 3, at 15; LANCIUM0002779; LANCIUM00027787; LANCIUM00027788.

[94] *Id.* at 32-33 and documents cited therein.

[95] *Id*. at 33-34 and documents cited therein, including, but not limited to, LANCIUM00032863; LANCIUM00032864; LANCIUM00019937; LANCIUM00021608; LANCIUM00030943; LANCIUM00021609; LANCIUM00021600; LANCIUM00021626; LANCIUM00031222; LANCIUM00031214; LANCIUM00021624; LANCIUM00021628; LANCIUM00028860; LANCIUM00030570; and LANCIUM00021964.

instructions to the set of computing systems to perform one or more computational operations based on the foregoing performance strategy around this time as well.[96]

103. It is also my opinion that Lancium constructively reduced the claims to practice by no later than October 28, 2019—the date U.S. Provisional Application No. 62/927,119 was filed.

104. The '433 patent is titled Methods and Systems for Adjusting Power Consumption Based on a Fixed-Duration Power Option Agreement. The '433 patent issued on March 31, 2020 and, as discussed above, claims priority from U.S. Application No. 16/702,931 filed on December 4, 2019, which, in turn, claims priority from Provisional Application No. 62/927,119, filed on October 28, 2019.

105. As discussed above, renewable resources faced several challenges. The inventions of the '433 patent were invented to address these challenges. Referring to Figure 2 below, Lancium developed flexible datacenters (including, but not limited to, cryptocurrency miners) that can be connected to use power from under certain conditions, for example, when there is an oversupply of power to the grid and the power price is economically viable.[97] Under such circumstances, the flexible datacenter may be configured to use load ramping abilities (*e.g.*, to quickly increase or decrease power usage) to effectively operate during intermittent periods of time when power is available from the generator.[98] The flexible data centers are shown as 220 in Figure 2, and may be behind the meter or grid connected. [99]

---

[96] SSR to ROG 3, at 34.

[97] *See* Columns 7-22 for descriptions of various embodiments.

[98] *Id*. at 12:52-59.

[99] *Id.* at 16:18-36; 17:41-18:2.

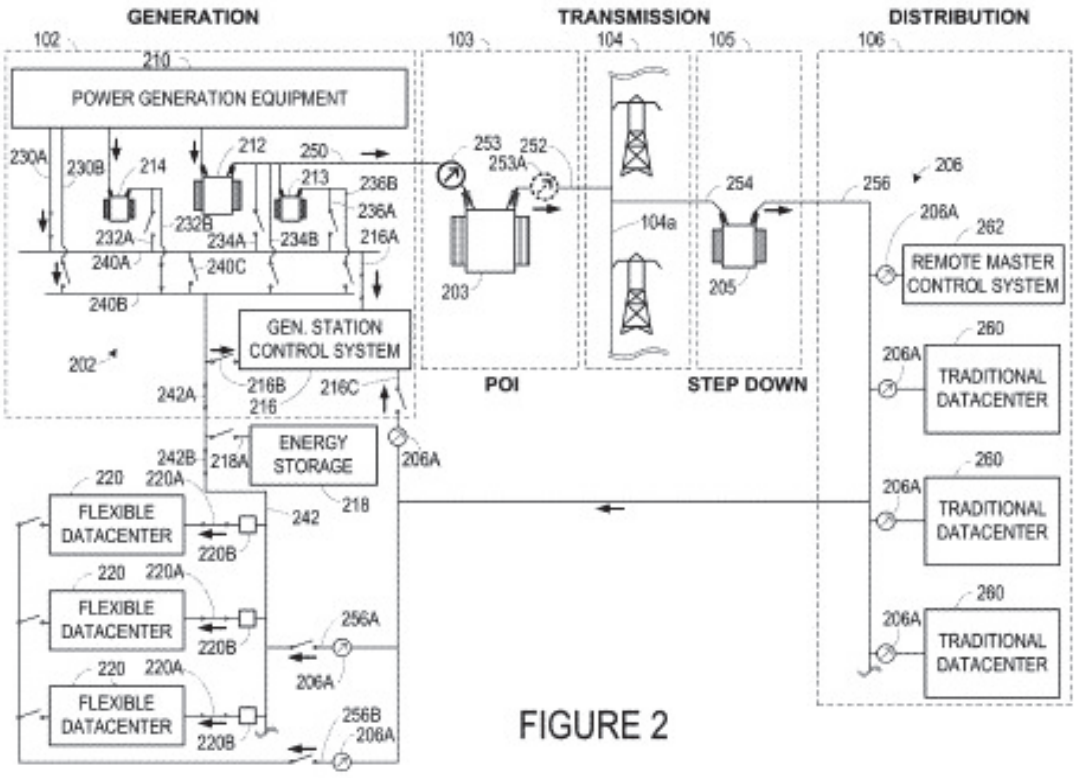


FIGURE 2

106. The ’433 patent also discloses and claims a control system for controlling the flexible datacenters. Referring to Figure 11 (below), a system for implementing control strategies based on a power option agreement is disclosed. The system 1100 is an example arrangement that includes a control system (*e.g.*, the remote master control system 262 of Figs. 2 and 3), a load (*e.g.*, one or more datacenters 1102, 1104, 1106), and a power entity 1140.[100]

[100] ’433 patent, at 43:35-45.

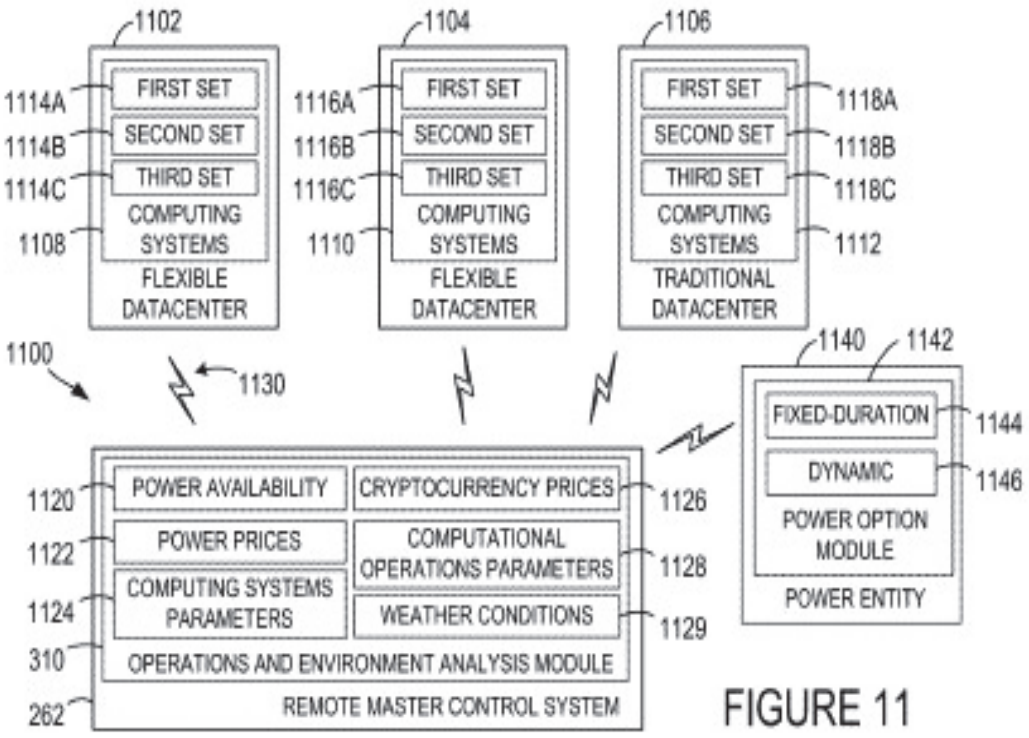


FIGURE 11

107. The '433 patent specification describes a "power option agreement" as an agreement between a power entity associated with the delivery of power (*e.g.*, a grid operator, power generation station, or local control station) and the load (*e.g.*, a datacenter such as 1102).[101] As part of the power option agreement, the load provides the power entity with the right, but not the obligation, to reduce the amount of power delivered (*e.g.*, grid power) to the load up to an agreed amount of power during an agreed upon time interval.[102] To provide the power entity this option, the load needs to be using at least the amount of power subject to the option (*e.g.*, the minimum power threshold),[103] and may grant the power entity with this option in exchange for

[101] *Id*. at 43:46-50.

[102] *Id.* at 43:50-57.

[103] *Id.* at 43:57-65.

monetary consideration.[104] The power entity may use the power option agreement to reserve the right to reduce the amount of grid power delivered to the load during a set time frame such as when the grid power may be better directed to other loads.[105]

108. The remote master control system can serve as a control system to the load and can do so by, for example, monitoring conditions[106] in concert with the minimum power thresholds and time intervals set forth in (or derived from) the power option agreement (*e.g.*, power option data) to determine performance strategies and issue instructions based on those strategies that enable the load to meet the expectations of the power option agreement while efficiently using power to accomplish computational operations.[107] The patent explains that the power entity may be a grid operator, local station control system, power generation source, or a qualified scheduling entity (QSE).[108]

109. The patent explains that power option agreements may be fixed duration power option agreements or dynamic power option agreements.[109] Referring to Figure 12 (below), which represents power option data based on a fixed duration power option agreement, the dark, multi-level line distinguishing the more darkly-shaded area represents the minimum power thresholds in

[104] *Id.* at 43:65-44:2.

[105] *Id.* at 44:3-35.

[106] The patent provides examples of monitored conditions, including, but not limited to, power availability, power prices, computing system parameters, cryptocurrency prices, computational operation parameters, and weather conditions. *Id*. at 47:57-48:61.

[107] *Id.* at 45:5-21.

[108] *Id.* at 45:52-60; 46:20-30.

[109] *See generally* Columns 46-47; *see also* 50:53-51:7

MWs that the load must maintain during the respective time periods per the power option agreement.[110]

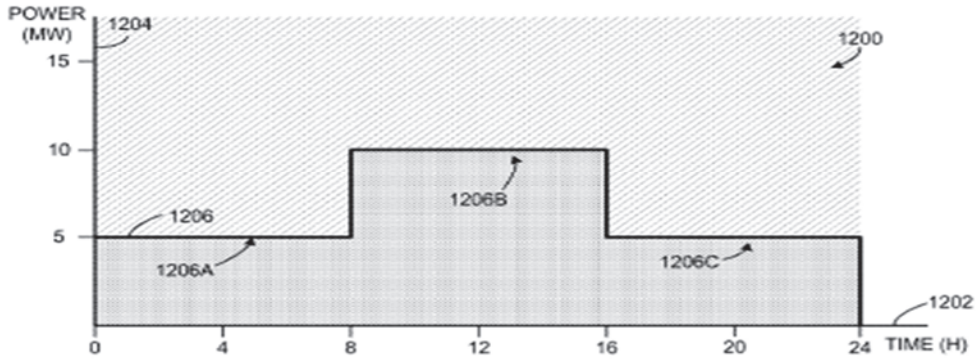


FIGURE 12

For example, as shown in Figure 12, the load must utilize 5MW during hours 0-8, must utilize 10MW during hours 8-16, and must utilize 5MW during hours 16-24.[111] The darkly-shaded area below the graphed line represent the amount of power the load could be directed to reduce power consumption by per the power option agreement.[112] The lighter shaded area above the graph line represents power levels that the load(s) may consume from the power grid during the 24-hour duration that would satisfy the requirements (*i.e.* the minimum power thresholds) set forth by the power option agreement.[113]

[110] *Id*. at 46:31-49; *see also* 50:55-51:7.

[111] *Id.*

[112] *Id.* at 51:19-23.

[113] *Id.* at 51:12-19.

C. Messrs. McNamara and Cline Are the Sole Inventors of the '433 Patent

110. The '433 patent has 20 claims. Claims 1, 17, and 20 are independent. The remaining 17 claims are dependent. The '433 patent's claims recite certain aspects of the above-described specific control system. Based on all of the forgoing discussion and evidence, it is my opinion that Messrs. McNamara and Cline are the sole inventors of each of the inventions claimed in each of the claims of the '433 patent. As set forth above, and described in further detail immediately below, it is well documented that Messrs. McNamara and Cline conceived each of these inventions with no contribution from Mr. Storms. I note that Dr. McClellan did not address Lancium's independent conception, development, or any of this evidence in his report.

1. Claim 1

111. Claim 1 reads:

> 1. A system comprising:
>
> [a] a set of computing systems, wherein the set of computing systems is configured to perform computational operations using power from the power grid;
>
> [b] a control system configured to:
>
> [b1] monitor a set of conditions;
>
> [b2] receive power option data based, at least in part, on a power option agreement, wherein the power option data specify: (i) a set of minimum power thresholds, and (ii) a set of time intervals, wherein each minimum power threshold in the set of minimum power thresholds is associated with a time interval in the set of time intervals;
>
> [b3] responsive to receiving the power option data, determining a performance strategy for the set of computing systems based on a combination of at least a portion of the power option data and at least one condition in the set of conditions, wherein the performance strategy comprises a power consumption target for the set of computing systems for each time interval in the set of time intervals, wherein each power consumption target is equal to or greater than the minimum power threshold associated with each time interval; and

[b4] provide instructions to the set of computing systems to perform one or more computational operations based on the performance strategy.

a) The preamble – "a system comprising"

112. I understand that the court has not ruled on whether the preamble "a system comprising" is limiting. Regardless, however, it is my opinion that Messrs. McNamara and Cline are the sole inventors of the claimed system as set forth below.

b) Element 1[a] – "a set of computing systems, wherein the set of computing systems is configured to perform computational operations using power from a power grid"

113. In my opinion, with respect to the specific claims of the '433 patent, Messrs. McNamara and Cline conceived this element independently and without utilizing any information allegedly provided by Mr. Storms. Prior to May 2019, Messrs. McNamara and/or Cline understood that flexible datacenters may include bitcoin or other cryptocurrency miners; that flexible datacenters may perform computational operations, such as block chain hashing operations; that Bitcoin and other cryptocurrency miners are a set of computing systems; [114] and that Lancium had been using grid power at its R&D center to perform computational operations with miners since at least 2018.[115]

c) Elements 1[b] and 1[b][1] – "a control system configured to: monitor a set of conditions"

114. In my opinion, with respect to the specific claims of the '433 patent, Messrs. McNamara and/or Cline conceived this element independently and without utilization any information allegedly provided by Mr. Storms. Prior to May 2019, Messrs. McNamara and/or

[114] *See e.g.*, '632 application, at [0022]; Fig. 2.

[115] *See*, *e.g.*, LANCIUM00018226; LANCIUM00035637 (Calpine Electricity Sales and Purchase Agreement, dated June 18, 2018).

Cline understood that the datacenter control system may modulate power delivery to a plurality of computing systems, and monitor unutilized behind-the-meter power availability, for example to determine when a datacenter ramp-up condition is met.[116] Figure 4 of the '632 application and associated text, for example, teach that Lancium's local datacenter control system 220 could communicate to Lancium's remote master control system 420 and to the generator's local station control system 410, which, in turn, could communicate with the grid operator to "dynamically" adjust power delivery based on conditions or operational directives.[117] Lancium's remote master control system could issue operational directives to Lancium's local datacenter control system and the operational directive may be based on, for example, current dispatchability, forward looking forecasts for when unutilized behind-the-meter power is (or is expected to be) available, economic considerations, reliability considerations, and/or operational considerations.[118] The monitored conditions described in the '433 patent correlate with the conditions monitored by Lancium's overall control system described by Messrs. McNamara and/or Cline in the '632 application: power availability (*e.g.*, operational consideration), power prices (*e.g.*, economic consideration), computing system parameters (*e.g.*, operational consideration), cryptocurrency prices (*e.g.*, economic consideration), weather conditions (e.g., economic consideration), etcetera.[119]

[116] *Id.* at [0006-0007].

[117] *Id.* at [0039].

[118] *Id.* at [0044].

[119] *See*, *e.g.*, '433 patent, at 47:57-61.

d) Element 1[b][2] – "receive power option data based, at least in part, on a power option agreement, wherein the power option data specify: (i) a set of minimum power thresholds, and (ii) a set of time intervals, wherein each minimum power threshold in the set of minimum power thresholds is associated with a time interval in the set of time intervals;"

115. In my opinion, with respect to the specific claims of the '433 patent, Messrs. McNamara and/or Cline conceived this element independently and without utilization of any information allegedly provided by Mr. Storms. As described above and in SSR to ROG 3, by March 2018 McNamara and/or Cline understood that Lancium's flexible datacenters could ramp to absorb and drop power within five minute windows and that these datacenters could be operated remotely via Lancium's Network Operations Center ("NOC") that could respond to signals from grid operators.[120] Messrs. McNamara and/or Cline Lancium were, at this time, also aware of ERCOT and at least peripherally aware of ancillary services.[121] Messrs/ McNamara and/or Cline continued to develop this technology and by October 2018 had spent more than $1M on R&D infrastructure, container design, and software development.[122]

116. Messrs. McNamara, Cline, and Lancium continued to develop their technology through 2019,[123] but it was not until the Summer and Fall of 2019 that Messrs. McNamara and Cline appreciated the benefits of applying their technology to ancillary serves and that is when they subsequently conceived of using their technology for receiving power option data based on a power option agreement specifying a set of minimum power thresholds and a set of time intervals

[120] *See*, *e.g.*, SSR to ROG 3, at 16 and documents cited therein.

[121] *Id*.

[122] SSR to ROG 3, at 19 and documents cited therein, including LANCIUM00021489 for R&D numbers.

[123] *See, e.g.,* SSR to ROG 3, at 19-28 (and documents cited therein).

in furtherance of performing ancillary services with their fast-ramping datacenters. On August 27, 2019, Mr. Cline sent an email to Mr. McNamara noting an important point that had not come across in previous conversations with their QSE: the "award" (received after offering into an ancillary services program and received as part of the establishment of the power option agreement) is essentially an "***obligation on our [Lancium's] part, that we consume that amount of power the ERCOT COULD curtail***."[124] In my opinion, this was the flash of insight that led to Messrs. McNamara and Cline conception, at least because this is when they first understood that their system would need to receive the award (the received set of power option data) which would be sent to Lancium based on, and in response to, the accepted prior offer by Lancium (which forms the awarded power option agreement) and the award includes the set of MW (*i.e.*, the set of ***minimum*** power thresholds) corresponding to each hour of the awarded offer (*i.e.*, the set of time intervals).[125] In further support of my opinion, I note that on August 28, 2019, Mr. Cline sends an email to MP2 confirming on Lancium's behalf that, "[w]e are adjusting our economic curtailment plans to assure that we consume the obligated load we have been awarded. If we go below that level we will coordinate with the operations desk. We understand that we cannot receive an award for power that could be curtailed, if we are not using the power."[126] I believe that this correspondence indicates the approximate date that Mr. Cline and Mr. McNamara formed in their

[124] *See* LANCIUM00030839; *see also* SSR to ROG 3, at 29-31 (and documents cited therein).

[125] LANCIUM00030799 and LANCIUM00030801 (examples of awards); *see also* Siddiqi Report, Section 6.4 ("No later than 1:30 in the Day-Ahead, ERCOT shall notify the parties to each cleared DAM transaction (*e.g.*, the buyer and seller) of the results of the DAM including awarded Ancillary Service Offers, specifying Resource, MW, Ancillary Service type, and price, for each hour of the awarded offer").

[126] *See* LANCIUM00024173; *see also* SSR to ROG 3, at 29-31 (and documents cited therein).

minds the definite and permanent idea claimed in this limitation and the following limitations of Claim 1.

e) Element 1[b3] – "responsive to receiving the power option data, determining a performance strategy for the set of computing systems based on a combination of at least a portion of the power option data and at least one condition in the set of conditions, wherein the performance strategy comprises a power consumption target for the set of computing systems for each time interval in the set of time intervals, wherein each power consumption target is equal to or greater than the minimum power threshold associated with each time interval; and"

117. In my opinion, with respect to the specific claims of the '433 patent, Messrs. McNamara and Cline conceived this element independently and without utilization any information allegedly provided by Mr. Storms. I refer back to my analysis immediately above that on or about August 28, 2019, Mr. Cline indicated he understood that the award was an obligation for their Lancium's flexible datacenter system to operate above a ***minimum*** threshold load (*e.g.*, the awarded MW) for each time interval (each hour in the award). As described previously and in other places in my report, Messrs. McNamara and Cline had previously developed control systems for its flexible datacenters that had long monitored or considered other various conditions and developed strategies based on those conditions, including economic considerations such as price response, energy arbitrage, and consideration of the profitability of mining. Following the flash of insight, it is my opinion that Messrs. Cline and/or McNamara then understood that Lancium's control system would need to determine the performance strategy described in this limitation and now adjust a power consumption target for the load by determining a power consumption target for the set of computing systems for each time interval that was ***either equal to or greater than***, the ***minimum*** power threshold associated with each time interval in the award. For example, if economic conditions were favorable for mining, the control system would set the power

consumption target to Lancium's datacenter's maximum limit, which, as they understood at the time, would likely be greater than the awarded MW due to proration of the awards, or if power prices were high compared to mining revenue per MW, the control system would set the power consumption target equal to the minimum threshold for the time interval, and then Lancium would either sell back previously purchased but unused power as previously described or avoid incremental negative revenue above the minimum required load amount, depending on fixed power cost, RTM power price, and bitcoin revenues/margins.[127] Messrs. Cline and/or McNamara were also further aware that the control system could already contemplate a strategy that included adjusting the mix of computing systems acting as the load.[128] Messrs. McNamara and/or Cline further understood that this strategy could be integrated into Lancium's already existing fast ramping technology.[129] Based on my review of the materials in this case, and, in particular, the materials cited in SSR to ROG 3, it is my opinion that on or around August/September 2019, Messrs. McNamara and Cline formed in their minds the definite and permanent idea claimed in this limitation.

f) Element 1[b][4] – "provide instructions to the set of computing systems to perform one or more computational operations based on the performance strategy."

118. In my opinion, with respect to the specific claims of the '433 patent, Messrs. McNamara and/or Cline conceived this limitation independently and without utilization any

[127] *See*, *e.g.*, LANCIUM00033215; SSR to ROG 3, at 31-32 (*e.g.* LANCIUM00033143; LANCIUM00031179; LANCIUM00031180; LANCIUM00033474; LANCIUM00033194; LANCIUM00018824 at 18828, 18833, 18858, 18867, 18871 (Sep. 1, 2019); LANCIUM00033158; LANCIUM00024131; LANCIUM00021587).

[128] LANCIUM00018825 at 18828, 18874 (Sep. 1, 2019); LANCIUM00018824.

[129] *See*, *e.g.*, SSR to ROG 3, at 31-32 (and documents cited therein).