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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SMAXTEC INC. and
SMAXTEC ANIMAL CARE GMBH,
Petitioners

v.

ST REPRODUCTIVE TECHNOLOGIES, LLC,
Patent Owner

Case IPR2024-00885
Patent No. 8,823,515

**ST REPRODUCTIVE TECHNOLOGIES, LLC'S
PATENT OWNER RESPONSE**

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EXHIBIT LIST

Exhibit	Description
EX2001	Declaration of Dr. Tim Bowser
EX2002	<i>Curriculum Vitae</i> of Dr. Tim Bowser
EX2003	Declaration of Thomas W. Landers, IV in Support of Motion to Appear <i>Pro Hac Vice</i>
EX2004	Declaration of Jonathan M. Hernandez in Support of Motion to Appear <i>Pro Hac Vice</i>
EX2005 (Not filed)	Declaration of Timothy J. Bowser, Ph.D. Pursuant to 37 C.F.R. 42.64(b)(2)
EX2006	DOUG BANIA, BUSINESS VALUATION RESOURCES, LLC, THE COMPREHENSIVE GUIDE TO ECONOMIC DAMAGES, VOL. 2, CH. 38 (Jimmy S. Pappas et al. eds., 7th ed. 2023), https://nevium.com/wp-content/uploads/2023/12/Bania-Chapter-38.-Using-Internet-Analytic-Tools-for-Valuation-and-Damages-Calculations-in-Internet-IP-Infringement-and-Defamation-Cases.pdf
EX2007	Emory University, Goizueta Business School, <i>Become a Google Power User: Tips and Techniques</i> , https://libraries.emory.edu/media/5321
EX2008	A.M. Bellon, <i>Does animal charisma influence conservation funding for vertebrate species under the US Endangered Species Act?</i> , Environmental Economics and Policy Studies (2019)
EX2009	Declaration of Dr. Timothy J. Bowser, Ph.D. in Support of Patent Owner Response
EX2010	Deposition Transcript of Tami M. Brown-Brandl, Ph.D. (January 29, 2025)
EX2011	Declaration of Meredith Knoff
EX2012	<i>Curriculum Vitae</i> of Meredith Knoff
EX2013	Dorothea Salo, <i>Innkeeper at the Roach Motel</i> , 57 Libr. Trends 98 (2008), https://dx.doi.org/10.1353/lib.0.0031

EX2014	Kwame Kodua-Ntim, <i>University Academics' Usage of Open Access Institutional Repositories</i> , 30 J. Libr. Res. Sharing 101 (2021), https://doi.org/10.1080/1072303X.2022.2103227
EX2015	Alex Wood-Doughty et al., <i>Do Download Reports Reliably Measure Journal Usage? Trusting the Fox to Count Your Hens?</i> , 80 Coll. & Rsch. Librs. 694 (2019), https://doi.org/10.5860/crl.80.5.694
EX2016	<i>Frequently Asked Questions on Public Statistics</i> , Cornell Univ.: arXiv, https://info.arxiv.org/help/faq/statfaq.html
EX2017	<i>In-depth guide to how Google Search works</i> , Google Search Cent., https://developers.google.com/search/docs/fundamentals/how-search-works
EX2018	<i>Our new search index: Caffeine</i> , Google Search Cent., https://developers.google.com/search/blog/2010/06/our-new-search-index-caffeine (June 9, 2010)
EX2019	<i>Facts about Google and Competition: How Google Search Works</i> , Google, https://web.archive.org/web/20111104131332/https://www.google.com/competition/howgooglesearchworks.html (Mar. 19, 2016)
EX2020	<i>Grey Literature (in the Health Sciences)</i> , USC Librs.: Rsch. Guides, https://libguides.usc.edu/healthsciences/grey_literature
EX2021	Yazdan Mansourian & Nigel Ford, <i>Search persistence and failure on the web: a "bounded rationality" and "satisficing" analysis</i> , 63 J. Documentation 680 (2007), https://www.emerald.com/insight/content/doi/10.1108/00220410710827754/full/html

I. INTRODUCTION

The Petition fails to show that any of the challenged claims are unpatentable in view of the primary references, Trevarthen and Laitinen, either alone or in combination. With respect to Trevarthen, Petitioners do not meet their burden to prove that the electronic undergraduate thesis was meaningfully indexed and sufficiently locatable to qualify as prior art under the public accessibility standard. And even if it were prior art, Petitioners fail to establish that Trevarthen would render any of the challenged claims obvious. Petitioners rely on disparate disclosures throughout the multi-chaptered thesis to cobble together a combined anticipation/obviousness argument, but fail to demonstrate that a person of ordinary skill in the art (“POSA”) would have “at once envisaged” the disconnected components used in a single integrated method, or otherwise had a reason to combine them as claimed.

Petitioners’ arguments with respect to Laitinen fare no better. Although every challenged claim requires using animal milk production data in connection with animal data in a logical expression, Laitinen makes no reference to using milk production data in any capacity. Petitioners contend that this important claim feature would have been an obvious addition, but in making that argument they mischaracterize the reference and other prior art and improperly rely on hindsight. Petitioners further rely on an external sensing device in Laitinen to satisfy the ’515

patent’s recitation of an “RFID device implanted in an animal,” apparently in reliance on an impermissibly broad claim construction. The Board’s initial rejection of Petitioners’ construction was correct, however, and Laitinen does not otherwise disclose or suggests an implantable device that senses the relevant animal information.

Accordingly, because Petitioners have failed to show by a preponderance of the evidence that any challenged claim is obvious, the Board should issue a Final Written Decision determining no Challenged Claims unpatentable.

II. THE ’515 PATENT AND THE CHALLENGED CLAIMS

The ’515 Patent claims novel animal management methods that utilize a specific “RFID device implanted in an animal” that retrieves information from inside the animal. EX2009, ¶¶27-34. After being retrieved, the animal information, such as temperature, is integrated into a “logical expression” along with additional information stored in a database, specifically including “an amount of milk production information or an amount of days milked.” *Id.* A “logical value” is then obtained to provide alerts to farmers that are specific to the animals in their herds based on the integrated data. *See, e.g.*, EX1001, 13:51-14:44; 3:48–53, 14:45–15:3; EX2009, ¶31. Overall, the claimed inventions allow farmers to track the status of their herd in real-time, which is particularly useful in the livestock industry. EX2009, ¶32.

Petitioners challenge claims 1–4 and 15–25, and only claim 1 is independent. Claim 1 is reproduced below, is exemplary of the challenged claims:

1[Pre]	1. A computer implemented method of animal tracking, comprising:
1[A]	connecting a computer to an RFID device reader;
1[B]	reading an RFID device implanted in an animal with said RFID device reader;
1[C]	retrieving an amount of animal identification information from said RFID device implanted in an animal;
1[D]	linking an amount of animal information of said animal stored in a data base of said computer to said amount of information retrieved from said RFID device implanted in said animal, said amount of animal information stored in said data base of said computer comprising an amount of milk production information or an amount of days milked;
1[E]	converting said amount of animal information of said animal stored in said database of said computer linked to said amount of information retrieved from said RFID device implanted in said animal into one or more logical variables;
1[F]	inserting at least one of said plurality of logical variables into at least one logical expression; and
1[G]	obtaining a logical value relating to said animal.

The Board addressed the independent claims in the Institution Decision, but the Challenged Claims also include several unaddressed dependent claims that add limitations not disclosed in the prior art. Claim 3, for example, requires “retrieving an amount of date-time information” from a “plurality of RFID devices” that are

implanted in the animals. Claim 4 is directed to animal tracking method that retrieves “an amount of sensed animal information” as part of the same method that incorporates “an amount of milk production information or an amount of days milked.” And claim 25 requires the claimed “RFID device” to be a “bolus ingested by a bovine animal.”

III. PERSON OF ORDINARY SKILL IN THE ART

For the purposes of institution, the Board determined that a POSA of the '515 Patent would have had a bachelor's degree in animal science, biological engineering, electrical engineering, or computer science, or a related or equivalent field, and three years of experience researching, developing, designing and/or evaluating RFID tracking and sensor systems for livestock management. Paper 16, 21-22. Based on the specific arguments and art raised in the Petition, Patent Owner does not contest the Board's determination as to the level of skill in the art for purposes of this proceeding.

IV. CLAIM CONSTRUCTION – “IMPLANTED IN AN ANIMAL”

The Board correctly determined that “implanted in an animal” in the Challenged Claims means implanted *within* the animal, as opposed to *on* the animal. Because this construction is consistent with the plain and ordinary meaning of the claim language, the specification, and testimony from both parties'

technical experts, the Board should adopt the construction in its Final Written Decision.

Beginning with the claim language, even a layperson would understand that “implanted *in* an animal” means implanted within that animal and is distinct from “implanted *on* an animal.” See *Gemstar-TV Guide Int’l, Inc. v. Int’l Trade Comm’n*, 383 F.3d 1352, 1372 (Fed. Cir. 2004) (stating that “in” denotes a location within a materially bounded object). Because construing the disputed term “involves little more than the application of the widely accepted meaning of commonly understood words.” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1314 (Fed. Cir. 2005).

The Board’s initial construction also aligns with the patent’s specification. See *Trustees of Columbia Univ. in City of New York v. Symantec Corp.*, 811 F.3d 1359, 1366 (Fed. Cir. 2016) (“[T]he ‘construction that stays true to the claim language and most naturally aligns with the patent’s description of the invention will be, in the end, the correct construction.’”) (citations omitted). In a key embodiment of the invention, the RFID is located “in the hollow inside of a bolus” that can be “ingested” by cattle and “retained in a part of the stomach.” EX1001, 10:16-22. This bolus configuration, wherein the RFID is unquestionably “within” the animal, is illustrated in Fig. 3. EX1001, Fig. 3, 3:13-18. When discussing the internal bolus embodiment, the inventors used the precise claim language at issue,

describing the ingested RFID devices as “implanted in an animal.” EX1001, 10:22-38. In contrast, when addressing broad applications of the RFID device that may be applied *on* an object, the inventors did not use the phrase “in an animal,” but used more expansive language. *See* EX1001, 8:12-16 (“the functionalities described herein can be applied in general to asset tracking systems...in which an RFID can be attached, applied, implanted or otherwise coupled to an asset (41) such as goods”).

Petitioners contend that “implanted in an animal” includes devices implanted *on* an animal based on a purported definition in the specification, but the language Petitioners rely on refutes their position. The specification describes an RFID device as one that “can be attached, incorporated, implanted, imprinted, or held (individually and collectively referred to herein as ‘implanted’) on or within an RFID object.” EX1001, 7:66-8:4. Based on this, Petitioners argue that the inventors intended “implanted in an animal” to include an external device “‘attached’ to the ear.” Paper 10, 3. But at most, the cited language defines “implanted.” Nowhere does it suggest that the claim language “in an animal” should be interpreted differently than its plain and ordinary meaning to include “on an animal.” To the contrary, the sentence Petitioners rely on *distinguishes* devices that are implanted “on” an RFID object from those that are implanted “within” an RFID object. The claims are directed to the latter, and without evidence of a clear

intent to deviate from the plain and ordinary meaning of “implanted in an animal” to encompass an external ear tag, there is no basis for adopting Petitioners’ construction. This is particularly true here where Petitioners’ construction would read “in an animal” out of the claims. *See Digital-Vending Servs. Int’l, LLC v. Univ. of Phoenix, Inc.*, 672 F.3d 1270, 1275 (Fed. Cir. 2012) (noting claims should be construed “such that words in a claim are not rendered superfluous”).

Although the claim language and specification alone are sufficient to support the Board’s initial construction, testimony from both parties’ experts provides additional support. Before Patent Owner showed in its preliminary response that the Petition relies on an external device in Laitinen, Petitioners’ expert Dr. Brown-Brandl (“Brown-Brandl”) opined that a “POSA would have understood that a bolus, by definition, is implanted in a cow, with a rumen bolus implanted in the cow’s first stomach compartment.” EX1003, ¶99. She further stated that Trevarthen cites “one” example of an “implantable device[,]” pointing to a subdermal microchip, not an ear tag or other external device. *Id.* Similarly, when addressing whether Laitinen discloses “implanted in an animal,” Petitioners’ expert opined that the reference referred to sensors that “can be ‘an ***implant inside*** the animal.’” *Id.* at ¶150 (emphasis on “inside” added). Brown-Brandl’s initial understanding that “implanted in an animal” means implanted *within* an animal is consistent with the testimony of Dr. Bowser. EX2009, ¶¶38-47.

V. GROUNDS 1, 2, AND 3 FAIL BECAUSE PETITIONERS DO NOT ESTABLISH THAT TREVARTHEN IS A PRINTED PUBLICATION

Grounds 1, 2, and 3 cannot support a finding of unpatentability because Petitioners fail to prove by a preponderance of the evidence that Trevarthen qualifies as prior art. Petitioners claim that Trevarthen, an electronic copy of an undergraduate thesis, was publicly accessible to persons of skill who would have located a digital copy of the paper “by keyword searching internet search engines” prior to the critical date of the ’515 Patent. Pet., 7-9; EX1003, ¶¶25, 66-68. Petitioners support this claim with testimony and documents provided by June Munford (“Munford”), a librarian, who opines that (1) Trevarthen was uploaded to the University of Wollongong’s institutional repository “Research Online” prior to the critical date, and (2) documents uploaded to this repository were “usually available on Google the following day,” and therefore locatable via a Google search query. Pet., 7-9; EX1031, ¶¶16-20.

Petitioners, however, fail to show accessibility by a preponderance of the evidence for at least two reasons. First, the materials Munford relies on *do not* show that Trevarthen would have been “available,” *i.e.*, meaningfully indexed and accessible, on Google as of the critical date. At best, they show that the University gave Google access to items in the repository at some point. But as Meredith Knoff (“Knoff”), a university librarian with experience conducting academic research across interdisciplinary resources, testified, giving Google access to a

webpage or document does not mean that it was in fact indexed or findable through Google, especially at the relevant time. EX2011, ¶¶23-28.

The second reason to discount Munford’s testimony is that her argument depends on taking as true statements in an article describing the University’s intended practice, and not actual, affirmative evidence that these practices were followed with respect to Trevarthen, or any other undergraduate student thesis. This flaw is fatal where both Bowser and Knoff were unable to locate Trevarthen in a date-limited search with the keywords Petitioners identify. EX2009, ¶¶90-105; EX2011, ¶¶32-39.

A. Standard for Public Accessibility

For an electronic reference to qualify as prior art, the reference must be “publicly accessible” before the critical date of the challenged patent. *Acceleration Bay, LLC v. Activision Blizzard Inc.*, 908 F.3d 765, 772 (Fed. Cir. 2018). Public accessibility requires that the reference is “meaningfully indexed” such that it is locatable by a person of ordinary skill in the art exercising reasonable diligence. *Id.* at 772-73; *see also Blue Calypso, LLC v. Groupon, Inc.*, 815 F.3d 1331, 1349-50 (Fed. Cir. 2016) (finding electronic reference not publicly accessible with no evidence a search engine query would have led to the reference).

Public accessibility of an electronic reference requires more than technical accessibility. *Acceleration Bay*, 908 F.3d at 773. Mere existence of the reference

on the Internet is not sufficient. *See, e.g., id.* (finding article available on university technical library website not publicly accessible); *Blue Calypso*, 815 F.3d at 1349 (finding graduate student report available on personal webpage not publicly accessible); *First Solar Inc. v. Rovshan Sade*, IPR2023-00827, Paper 13 at 18-19 (P.T.A.B. Nov. 16, 2023) (finding installation guide available on company website not publicly accessible). Ultimately, the petitioner bears the burden of establishing that an electronic reference constitutes prior art at all times. *See Acceleration Bay*, 908 F.3d at 772; *see also Blue Calypso*, 815 F.3d at 1350 (“[Petitioner] argues that an internet search engine would have been able to locate the report. But that argument does not allow us to automatically infer that [the] webpage was ‘indexed...(through search engines or otherwise)’ and thus locatable by a search engine.”).

B. Trevarthen Was Not Publicly Accessible Before September 15, 2009

At institution, the Board credited Petitioners with arguing that the mere inclusion of Trevarthen in the Research Online repository rendered the reference publicly accessible, but Petitioners do not (and cannot) make that argument. The Petition is silent with respect to the existence of any search functionality built into the Research Online platform, let alone whether such functionality would be effective or what searches would lead to Trevarthen. More definitively, Petitioners do not allege that a POSA would be independently aware of Research Online—a

prerequisite to finding Trevvarthen accessible via Research Online. Instead, Petitioners contend that Trevvarthen was publicly accessible because, and only because, materials in the Research Online repository were accessible via an internet search. See Pet., 7-9. As discussed below, however, at most, Petitioners' evidence demonstrates technical accessibility, which does not qualify Trevvarthen as prior art.

1. *Petitioners Fail to Demonstrate How a Person of Skill Exercising Reasonable Diligence Would Locate Trevvarthen*

Petitioners' argument hinges on the ability of a POSA to locate Trevvarthen through a search engine query, yet Petitioners do not provide any evidence that Trevvarthen was indexed by a search engine, let alone whether Trevvarthen was *meaningfully indexed* so a POSA would find it with reasonable diligence.

Petitioners rely on Munford's testimony that, because Trevvarthen was available on Research Online prior to September 15, 2008, it would have been locatable to interested parties by keyword searching on a search engine. EX1031, 4, 8-9. But Munford's testimony fails to establish that Trevvarthen was indexed or that Trevvarthen was locatable with reasonable diligence.

a) Petitioners Offer No Evidence of Indexing

Munford's conclusory assertion that Trevvarthen "would have been located and indexed by Google" is without evidentiary support. Munford, who has no experience with or personal knowledge regarding the University of Wollongong or

its Research Online repository, relies only on an article stating that the University's typical practice is to make a digital copy from Research Online "available" via a search engine. EX1031, 6-8 (citing EX1031, Appendix IA01); EX2011, ¶¶13-17; EX2009, ¶110. As an initial matter, the Board should discount Munford's ultimate opinion of accessibility because it depends entirely on taking the University's description of its preferred practice as "fact." While the Rules of Evidence permit experts to rely on hearsay, expert testimony should be given little to no weight where it simply adopts the statements of others and presents them as opinion. *See Wi-LAN Inc. v. Sharp Elecs. Corp.*, 992 F.3d 1366, 1374–75 (Fed. Cir. 2021) (affirming rejection of expert testimony that merely repeated content of source materials without providing additional analysis); *Cardiovascular Systems, Inc. v. Shockwave Medical, Inc.*, IPR2019-00405, Paper 99 at 53-58, 82 (P.T.A.B. Feb. 2, 2023) (ascribing little probative weight to expert testimony relying on truth of statements from authors who had not been established to have relevant knowledge or lack of bias). And at no point do Munford or Petitioners provide proof that Research Online actually follows such repository practices for undergraduate theses, nor do they provide any proof as to how, when, or if Trevarthen became "available" via a search engine.

Moreover, Munford's assumption that Trevarthen became "available" the day after it was uploaded to Research Online runs contrary to Google's indexing

capabilities at the time. As Knoff testified, adding a reference to a university open access repository like Research Online merely provides permission for Google to index the reference, it does not guarantee indexing by Google or any other search engine. EX2011, ¶¶18-25. Particularly prior to September 2008, an undergraduate thesis on a university repository may not have been indexed at all unless a web crawler was sent directly to the webpage. EX2011, ¶25. Thus, without direct support showing that Trevarthen was indexed and available on Google prior to September 15, 2008, Petitioners cannot rely on the assumption that Research Online references are “usually available” the next day to demonstrate public accessibility.

b) Locating Trevarthen Would Have Required More Than “Reasonable Diligence”

Even assuming that the electronic copy of Trevarthen was “available” on Google or other commercial search engines, Petitioners offer no affirmative evidence that such indexing was sufficient to allow an interested party to locate the reference with reasonable diligence. Munford summarily concludes that a POSA would find Trevarthen on a search engine by “entering terms found in the full text of Trevarthen,” but provides no evidence to support such a conclusion. EX1031, 8. Munford did not conduct any keyword searches, identify any search terms that would successfully locate Trevarthen, or otherwise verify the steps an interested party would take to find Trevarthen on a commercial search engine prior to

September 15, 2008. Without any additional expertise or personal knowledge regarding an online search that would lead to Trevarthen, Munford's declaration cannot carry Petitioners' burden to prove that Trevarthen was sufficiently indexed to be locatable by a POSA with reasonable diligence. *See MHL Custom, Inc. v. Waydoo USA, Inc.*, No. CV 21-0091-RGA, 2023 WL 5748755, at *4 (D. Del. Sept. 6, 2023) (noting that expert testimony regarding availability on Google only supports technical accessibility where expert did not perform a Google search and did not know what a sufficient Google search would have been); *see also* EX2011, ¶¶26-28.

In contrast to Munford, Patent Owner's experts *did* attempt to recreate the suggested search on Google, but neither could locate Trevarthen. EX2009, ¶¶90-105; EX2011, ¶¶32-39. For example, Bowser performed Google searches, limiting the date range to before September 15, 2009, and using the search terms Petitioners contend a POSA would have used. EX2009, ¶¶90-105; EX1031, 8. By limiting the date range in this way, Bowser's search returned results that Google identified as most relevant to that time period. EX2011, ¶33. Based on this searching, the various combinations of search terms either returned very few results—none of which were Trevarthen—or tens of thousands to tens of millions of results. EX2009, ¶¶92-95. Trevarthen still did not populate as a search result when Bowser added “trevarthen” to the search terms. EX2009, ¶¶96-101. Knoff confirmed

Bowser’s results with even more targeted searches for the keywords between January 1, 2006 and September 15, 2009—the relevant time period in which Petitioners allege Trevarthen would have been available on Google—and could not locate Trevarthen. EX2011, ¶¶34-48. According to Knoff, this inability to locate Trevarthen by recreating a POSA’s search engine query demonstrates that Trevarthen would not have been locatable before the critical date. EX2011, ¶¶33-40.

Even if Trevarthen was technically “on” Google, its absence from search results means that Trevarthen would not have been located with reasonable diligence. Google’s indexing of a reference has no impact on its findability. EX2011, ¶¶26-27. Instead, findability via Google relies entirely on Google’s relevance algorithm, which takes into consideration the number of citations and variety of locations where the reference appears. *Id.* For “grey literature” such as an uncited undergraduate thesis, however, Google search results deprioritize such references, making them notoriously difficult to locate. EX2011, ¶28. Moreover, individuals conducting research have a finite amount of search persistence, which invariably restricts web research to the first few pages of search results. EX2011, ¶¶29-31; *see also Acceleration Bay*, 908 F.3d 765 at 773 (recognizing that “skimming through potentially hundreds of titles” would require more than reasonable diligence). Given that Trevarthen only existed on Research Online and

either did not populate at all or not in the first twenty-five pages of results from any combination of the suggested search terms, a POSA would have needed in depth knowledge of discovery tools or independent awareness of Research Online to locate Trevarthen. EX2011, ¶¶31, 39-40. Thus, a POSA would not have located Trevarthen on a search engine with reasonable diligence.

Finally, contrary to the Board's initial interpretation of Petitioners' argument, Petitioners do not allege that a POSA would have found Trevarthen using any search functionality within Research Online. Petitioners make no showing as to any indexing or searching capabilities of Research Online, nor do they address whether a POSA would have been "independently aware" of Research Online. *Kingston Tech. Co., Inc. v. Memory Techs., LLC*, IPR2019-00654, Paper 9 at 21-22 ("[C]onspicuously absent is Petitioner's explanation of how an interested and ordinarily skilled person would have arrive at the homepage of [the reference's] website."); EX2009, ¶¶107-116. Petitioners' failure to even suggest that a POSA would have used the Research Online tool necessarily limits Petitioners to their sole argument that Trevarthen was locatable via keyword searching on the internet, which as discussed above, Petitioners failed to demonstrate.

2. *Petitioners Improperly Conflate Technical Accessibility with Public Accessibility*

The Board seemingly credited Trevarthen's existence on Research Online and the "associated download statistics" as evidence that Trevarthen was accessible

prior to the critical date. But such a conclusion relies on the flawed assumptions that the download counts are reliable, and the downloads resulted from individuals who located Trevarthen via a Google search. This is both inaccurate and not how Petitioners rely on such evidence. Petitioners' purported evidence regarding Trevarthen's existence on Research Online demonstrates no more than technical accessibility of Trevarthen on Research Online, which critically is not the same as public accessibility. *See Acceleration Bay*, 908 F.3d at 773. For the same reason, Petitioners' additional evidence—archived Wayback Machine copies of Trevarthen on Research Online (EX1030, EXSA-B) and a citation in an International Search Report conducted for a New Zealand-based international patent application (EXS1028-29)—also fails to establish that Trevarthen was locatable via an internet search engine by a POSA exercising reasonable diligence.

a) Wayback Machine Archives Only Demonstrate Technical Accessibility

Petitioners offer Wayback Machine archives of Trevarthen on Research Online to “confirm[] the public accessibility [of] the Trevarthen thesis,” but this exact evidence was recently rejected by the Board as merely showing that a reference was “technically accessible” online. *First Solar*, IPR2023-00827, Paper 13 at 18. In fact, Petitioners provide a nearly verbatim affidavit from Nathaniel E. Frank-White (“the White Affidavit”) (EX1030), a Records Request Processor at the Internet Archive, to the one the Board rejected in *First Solar*. *Id.* at 14-18. In that

case, the Board determined that the White Affidavit only established that the webpage existed, not whether “a query of a search engine before the critical date, using any combination of search words, [] would have led to [the reference] appearing in the search results.” *See id.* But as explained above, Petitioners only allege that a POSA would have found Trevarthen by keyword searching on an internet search engine. The Wayback Machine archives thus only serve to establish that Trevarthen technically existed on the Research Online repository, not that it was publicly accessible. *See Samsung Elecs.*, 929 F.3d at 1369.

Petitioners also improperly attempt to equate downloads of Trevarthen to public accessibility, which once again confuses technical accessibility for public accessibility. *See MHL Custom*, 2023 WL 5748755, at *3-4 (finding sufficient evidence to support jury finding of no public accessibility despite online downloads of reference prior to critical date). The Petition provides no evidence regarding how many unique individuals downloaded the reference, who those individuals are, how those individuals located the reference, or whether the download count is reliable. Petitioners likewise fail to show that the alleged downloads resulted from an interested person who located Trevarthen via a search engine. Indeed, download counts tracked by institutional repositories are known to be unreliable, and even if they were reliable, all downloads could have resulted from Research Online directly, which has no bearing on Trevarthen’s findability on

Google. EX2011, ¶21; EX2009, ¶110. Thus, without any evidence of how an interested person would find Trevvarthen in the first instance, any alleged downloads from Research Online cannot meet Petitioners heavy evidentiary burden in showing public accessibility.

b) The International Search Report Has No Bearing on a POSA's Reasonable Search

Petitioners' final attempt to "corroborate[]" public accessibility with a single citation in an International Search Report fails for the same reasons. Petitioners submit an International Search Report, conducted by the Australian Patent Office on behalf of a New Zealand applicant, to "confirm" that a POSA "searching publicly available databases using keywords" would have found Trevvarthen. Pet., 9; EXS1028-29. Yet as Patent Owner's experts show, Petitioners' conclusory assertion that a POSA would have located Trevvarthen via an internet search engine is inaccurate. EX2011, ¶¶32-39; EX2009, ¶¶90-105. Petitioners thus cannot "corroborate[]" what they failed to establish in the first instance.

Even so, the International Search Report cannot overcome Bowser's demonstration that a POSA would not have located Trevvarthen as Petitioners suggest. The Australian Patent Office examiner seemingly consulted several databases, including the "internet," but contrary to the Institution Decision's assumption that the examiner identified Trevvarthen using an internet search, the search report does not specify which database or search terms, if any, actually led

the examiner to Trevarthen, nor does it specify the effort required to find Trevarthen. *See* EX1028, 1. By making this assumption, the Board places undue emphasis on *Valve Corp. v. Ironburg Inventions Ltd.*, which has no application to the facts here. In *Valve*, the Court noted that an examiner’s ability to access a reference was probative of public accessibility where the examiner had located the reference through a “brief” internet search. 8 F.4th 1364, 1373–76 (Fed. Cir. 2021) (determining the reference to be prior art in view of “overwhelming evidence,” including that the inventor himself facilitated the publication of the reference to promote his business to the general public). Here, Petitioners provide no evidence or argument that the Australian examiner located Trevarthen with an internet search engine, let alone whether such a search was “brief.” Without any evidence showing that the examiner found Trevarthen with reasonable diligence, the International Search Report cannot independently establish Trevarthen’s public accessibility. And because Petitioners failed to allege that a POSA would look to any resource other than an “internet search engine,” the International Search Report likewise cannot “corroborate[]” Trevarthen’s alleged public accessibility. Instead, in direct contradiction to Petitioners’ alleged evidence, Bowser and Knoff followed the steps Petitioners suggested a POSA would take and could not find Trevarthen. EX2009, ¶¶90-105; EX2011, ¶¶32-39. Petitioners therefore fail to

establish that Trevarthen was publicly accessible prior to the critical date, and Grounds 1-3 should be denied.

VI. GROUND 1, 2, AND 3 – PETITIONERS FAIL TO SHOW THAT TREVARTHEN ANTICIPATES OR RENDERS THE CHALLENGED CLAIMS OBVIOUS

As explained in Section V, Grounds 1–3 fail because Petitioners fail to establish by a preponderance of evidence that Trevarthen is prior art. But even if the Board does not reject the Grounds on that basis, Petitioners nonetheless fail to establish that Trevarthen discloses each and every element in the claimed method, arranged as claimed, and also fails to explain how Trevarthen would have been modified to achieve the invention.

A. Ground 1 — Petitioners Fail to Show That Trevarthen Alone Anticipates or Renders Obvious Claims 1–2

1. *Petitioners Fail to Show That Trevarthen Anticipates Claims 1 and 2*

Petitioners do not take a position on whether Trevarthen anticipates or renders obvious claims 1 and 2. Instead, their “anticipation and obviousness challenges are grouped together under Ground 1.” Pet., 7. In doing so, Petitioners give short shrift to the requirements for establishing both anticipation and obviousness, failing to establish either one by a preponderance of the evidence.

As the Board recognized in the Institution Decision, anticipation is not satisfied simply because aspects of the claimed invention merely appear in the four

corners of the same reference. *See* Paper 16, 46 (inviting parties to brief the application of *In re Arkley*, 455 F.2d 586, 587 (C.C.P.A. 1972)). In *Arkley*, the Court reversed a Patent Office rejection based on anticipation because the reference did not “clearly and unequivocally disclose the claimed compound or direct those skilled in the art to the compound without any need for picking, choosing, and combining various disclosures not directly related to each other by the teachings of the cited reference.” 455 F.2d at 587. Here, Trevarthen does not clearly and unequivocally disclose any system arranged as claimed, forcing Petitioners to pick, choose, and combine various discussions—*i.e.*, from Trevarthen’s background section, its study of the “Cochrane Dairy,” and various aspects of a proposed “theoretical framework”—that are not directly related to one another.

The Board observed, without taking a position, that anticipation “is not an ‘ipsissimis verbis’ test” and that “a reference can anticipate a claim even if it ‘d[oes] not expressly spell out’ all the limitations arranged or combined as in the claim, if a person of skill in the art, reading the reference, would ‘at once envisage’ the claimed arrangement or combination.” Pet. 46 (citing *In re Bond*, 910 F.2d 831, 832 (Fed. Cir. 1990); *Kennametal, Inc. v. Ingersoll Cutting Tool Co.*, 780 F.3d 1376, 1381 (Fed. Cir. 2015); *In re Petering*, 301 F.2d 676, 681 (C.C.P.A. 1962)).

However, a POSA would not “at once envisage” the claimed arrangement by reading Trevarthen, and Petitioners made no such argument.

Instead of making that argument, Petitioners treat each claim limitation in isolation, relying on unrelated teachings from Trevarthen without addressing whether a POSA would “at once envisage” a combination of those teachings in a single integrated system arranged as claimed. For example, in attempting to identify a “computer” connected to “an RFID device reader” for element 1[A], Petitioners rely on “two computer screens,” a “reader,” and a “software application” used at the Cochrane Dairy farm. Pet., 12 (citing EX1005, 77, 78, 92-93). For the “RFID device implanted in an animal” in element 1[B], Petitioners cite Trevarthen’s background “Literature Review” where he discusses an unspecified “bolus” and an “RFID microchip,” without explaining why a POSA would envision those components in conjunction with the Cochrane Dairy software. Pet., 13 (citing EX1005, 20, 22, 24-25). For element 1[C], Petitioners rely on a portion of Trevarthen’s “theoretical framework” in which he discusses “identifying every cow with RFID tags.” Pet. 13. Again, they say nothing about whether a POSA would envision using the computer or software from Cochrane Dairy, or the microchip or bolus from his Literature Review, in this framework. Furthermore, in attempting to show that Trevarthen generates a “logical value” by incorporating “milk production” information into a “logical expression” as

required in element 1[G], Petitioners cite to a single disparate teaching of a hypothetical “milk meter” system that allegedly can “alert the operators to check [a] cow” when fluctuations in milk production are identified. Pet., 20 (citing EX1005, 115). In doing so, they fail to argue that a POSA would “at once envisage” this milk meter system in a combination with the above components from Cochrane Dairy and Trevarthen’s Literature Review.

Bowser analyzed the Trevarthen reference and concluded that a POSA would not “at once envisage” the claimed arrangement based on a reading of that reference. As Bowser testifies, a POSA would understand Trevarthen’s boluses, microchips, computers at Cochrane Dairy, and milk meter systems that Petitioners rely as independent systems and components that are not used in the same animal tracking method. For example, the “computers” at the Cochrane Dairy run a specific herd management software, “Dairy 2000.” See EX2009, ¶118-124 (citing EX1005, 92–93). That software was “tailored to suit[] the data storage and herd management needs of the dairy industry,” and a POSA would not understand Trevarthen to be teaching the use of the milk meter system from page 115 with that software. EX2009, ¶124 (testifying that Trevarthen provides no basis for to envision the Cochrane’s software as identifying fluctuations or “alert[ing] the operators to check [a] cow”). Similarly, a POSA would not envision using Trevarthen’s discrete teachings of “microchips” at either the Cochrane Dairy or in

a system that employs “milk meters.” Cochrane Dairy explicitly uses “ear tags” for animal identification, and a POSA would have no reason to envision the use of temperature-sensing microchips in their place. EX2009, ¶124. Indeed, Trevarthen never even refers to a cow’s temperature in its discussion of Cochrane Dairy. EX2009, ¶124 (citing EX1005, 69-99). Moreover, in Trevarthen’s hypothetical system where “milk meters” allegedly identify “any problems that may arise in the herd (such as illness),” a POSA would not envision using temperature-sensing microchips to identify problems with the cows because that function, according to Trevarthen, is already performed by the milk meters. EX2009, ¶124 (citing EX1005, 115).

2. All Challenged Claims: “Connecting a Computer to an RFID Device Reader”

In the Institution Decision, the Board credited Petitioners for showing that “Trevarthen teaches or suggests connecting a computer to an RFID device reader” because “Trevarthen discloses, *in the Cochrane dairy*, that ‘[a]s each cow passes through the RFID reader, their individual information is displayed on the two computer screens located in the dairy.’” Paper 16, 33 (citing EX1005, 78) (emphasis added). This is a prime example of Petitioners’ improper mixing and matching of disparate teachings in Trevarthen without supplying a reason to combine them. Cochrane Dairy—an actual farm in Pyree, Australia (EX1005, 69)—is indisputably a separate system from those discussed in Trevarthen’s

“theoretical framework” that Petitioners rely on for other claim elements. *See, e.g.*, Pet., 13 (relying on alleged under-the-skin “microchip” and bolus for element 1[B] when Cochrane Dairy employs ear tags), 14 (relying on alleged “RFID reader” discussed in one of Trevarthen’s theoretical systems for element 1[C]), 15-21 (relying on alleged “milk meters,” “data bases,” and “alerts” in various theoretical systems for elements 1[D]-1[G]). Indeed, even *within* Petitioners’ discussion of element 1[A], they rely on disparate teachings of the “computer screens” at Cochrane Dairy and “computer network devices” from a theoretical “future” system. Pet. 12-13. But Petitioners fail to acknowledge that such disclosures are disparate teachings, let alone provide a reason to combine them to arrive at the claims. EX2009, ¶¶125-128.

Trevarthen’s discussion of “mainstream computer network devices” that may be linked to “RFID readers” in the future also cannot separately disclose or render obvious element 1[A] because Trevarthen never explains how such devices were part of any method, let alone one arranged as claimed. Pet., 12. In the passage relied on by Petitioners, Trevarthen states, “[i]deally, farmers will be utilising wireless networks in future arrangements” to potentially “enable an array of devices” such as “mainstream computer network devices” to “provide the vital links to dairy farm devices, such as RFID readers.” *See* EX1005, 104; Pet. 12. Petitioners fail to take the required steps of explaining what methods would be

modified to incorporate such “future arrangements” and why or how a POSA would pursue such a modification. *See Star Sci.*, 655 F.3d at 1376. Likewise, Petitioners never connect the “mainstream computer network devices” they rely on here relate to the “said computer” recited in elements 1[D] and 1[E]. EX2009, ¶129; Pet., 12-17.

3. *All Challenged Claims: “Reading an RFID Device Implanted in an Animal”*

Ground 1 also fails because Petitioners do not establish that Trevarthen discloses or renders obvious “reading an RFID device implanted in an animal with said RFID device reader” as claimed. *See* Pet., 13 (discussing claim element 1[B]). Petitioners rely on Trevarthen’s references to the “Bio-thermo RFID” and other unspecified boluses as disclosing “an RFID device implanted in an animal.” Yet as Bowser explains, the Bio-thermo RFID is not yet applicable to livestock, and therefore could not render obvious the use of “an RFID device implanted in an animal” in a method arranged as claimed. EX2009, ¶131 (explaining Trevarthen itself noted that the device was still “being investigated” and that POSAs had concerns with implanted RFID devices). Similarly, neither Petitioners nor their proffered expert provide any explanation to support how or why the general existence of “boluses” establishes that a POSA would have utilized an RFID device implanted in an animal to perform the claimed method. EX2009, ¶¶132-33.

B. Ground 2 — Petitioners Fail to Show That Trevarthen and Brune Render Obvious Claims 3–4

1. Ground 2 Fails for Similar Reasons as Ground 1

Ground 2 challenges claims 3–4 and fails for the same reasons as Ground 1. First, Ground 2 relies on Trevarthen as a primary reference, which Petitioners have failed to establish as prior art. *See* §V. Second, Petitioners have failed to show that Ground 2 renders claims 3–4 obvious for the same reasons discussed in Section VI.A; *see also* EX2009, ¶134. Claims 3–4 depend from claim 1, and therefore require the same elements that Petitioners failed to establish in Ground 1. But Petitioners do not rely on Brune to address any of the missing elements Patent Owner has identified, or otherwise contend that Brune addresses any of Trevarthen’s deficiencies. Instead, Petitioners rely on Brune solely for its purported disclosure of “retrieving an amount of date-time information from said plurality of RFID devices implanted in said plurality of animals” as recited in claim 3. *See* EX2009, ¶67. Therefore, Ground 2 necessarily falls with Ground 1 and should be dismissed.

2. Claims 3 and 4: Retrieving “Date-Time Information” from “RFID Devices”

Ground 2 independently fails because Petitioners do not provide a reason to combine Trevarthen and Brune to “retrieving an amount of date-time information from said plurality of RFID devices” as required by claims 3 and 4. While a

combination of retrieving some date-time information from both an RFID device and reader could potentially satisfy the limitation, Petitioners admit that Trevarthen does not disclose this limitation, as instead of retrieving *any* date-time information from “RFID devices” as claimed, Trevarthen retrieves *all* of its data from an “RFID reader.” Pet. 24. Petitioners therefore rely on Brune’s alleged disclosure of an RFID device that provides all of the date-time information to supply this limitation. *Id.*, 22-25.

The only reason Petitioners give for incorporating Brune’s time-stamping technique into Trevarthen’s system is an alleged “importance of time-stamping to Trevarthen,” but this has no merit because Trevarthen already has a time-stamping technique that the experts agree works better for his proposed systems. *See id.*, 24. And there would have been no reason to swap Brune’s device-based time stamping technique with Trevarthen’s RFID reader-based technique because they “independently accomplish similar functions.” *See Kinetic Concepts, Inc. v. Smith & Nephew, Inc.*, 688 F.3d 1342, 1369 (Fed. Cir. 2012); EX2009, ¶¶137-38.

In fact, there were specific reasons *not* to swap Brune’s technique for Trevarthen’s. As Petitioners’ expert testified, “there is actually a reason that you want to get the date-time information from the RFID reader instead of the RFID device.” EX2010, 150:2-7; *see also id.* at 152:10-14 (“So at the time of the invention, there would’ve been reasons why a person of skill would’ve wanted to

use the RFID reader to acquire the time stamp; right? A There would've been reasons, yes.”). According to Brown-Brandl, “if every [RFID] device has its own date-time, date-time chips tend to – to not clock time at the same rate,” which “can add up over time.” *Id.*, 150:8-11. But “if you are reading the time-date at the reader, you know that that time stamp is the same time stamp regardless of animal.” *Id.*, 150:12-21 (testifying that such technique can be “very useful” for time-stamping). In fact, in systems like Trevarthen’s where measurements are read “as the cow enters a milking parlor,” the “time-date stamp would be *ideal* to be read at the reader.” *Id.*, 152:4-9 (emphasis added). Bowser similarly testified that POSAs would not have seen a reason to modify Trevarthen to incorporate Brune’s time-stamping technique in view of Trevarthen’s own method of time-stamping. EX2009, ¶136.

Petitioners also cannot establish obviousness via their single unsupported statement that “it would have been *obvious to try* having the RFID device time-stamp the retrieved information rather than the RFID reader.” Pet., 32 (emphasis added). Establishing the “obvious to try” rationale requires showing that “there is a design need or market pressure to solve a problem” and that “there are a finite number of identified, predictable solutions.” *See Uber Techs., Inc. v. X One, Inc.*, 957 F.3d 1334, 1338–1339 (Fed. Cir 2020) (quoting *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007)). Petitioners do not address those requirements at all.

Nor could they have. Nothing in the asserted art suggests a “design need,” “market pressure,” or “problem” that would prompt a POSA to try Brune’s time-stamping method in Trevarthen. EX2009, ¶¶137-38. To the contrary, as explained above, POSAs would have considered the RFID reader-based method preferable in Trevarthen’s system. As Bowser further testifies, the system with the device-based timers is more complex and more prone to failure due to issues such as limited battery life, unsynchronized timers, and the need to communicate with the reader. *Id.* The same issues do not exist for the reader-based system because it requires no battery, and the time is uniform in the system due to relying on a centralized time. *Id.* Moreover, POSAs would not have been aware of only a “finite” number of solutions, as there are various means of time-stamping, such as using “computer software, approximation, photo gates, load cells, image analysis, manual recording, and the milk meters.” *Id.*

Petitioners’ single conclusory statement that “Trevarthen discloses including GPS, which provides date-time information” also cannot support obviousness. *See* Pet. 24-25. Petitioners fail to explain how including GPS entails “retrieving an amount of date-time information from said plurality of RFID devices” or otherwise renders it obvious. Pet., 32-33; EX2009, ¶139. They merely cite to their expert and an exhibit without any further discussion, which is an improper incorporation-by-reference.

3. ***Claim 4: Retrieving “Sensed Animal Information” from “RFID Devices”***

a) Retrieving “Sensed Animal Information” from a Plurality of Implanted “RFID Devices” Was Not Obvious

Petitioners also fail to establish that Trevarthen discloses or renders obvious any animal tracking method that incorporates implanted RFID devices that provide “sensed animal information.” Nor can they. The only temperature-sensing RFID device that Trevarthen refers to is the “bio-thermo RFID microchip,” which is “injected into the animal (under the skin).” EX1005, 24. Trevarthen is explicit that such devices were not commercially available or suitable for livestock—there were not even “price estimates available for microchips as none have been approved to date.” EX1005, 22 (emphasis added). Trevarthen further states that, while it may be “possible to incorporate temperature sensing abilities into RFID microchips” in other applications, that practice had not yet been “extended to the livestock industry.” *Id.*, 121, 123 (noting it was “being investigated”); EX2009, ¶142-144.

Even today, Brown-Brandl is unfamiliar with under-the-skin microchips and identified several reasons why POSAs would not have used them for livestock. She admitted that she does not have “experience or expertise with under-the-skin temperature sensors” and is “not familiar with any systems that use under-the-skin temperature sensors.” EX2010, 61:22-63:7. One reason for that is because under-

the-skin sensors “involve a surgery” and do not “minimize the stress on the animals.” *Id.*, 63:8-18. Additionally, POSAs would have been “concerned” that the sensed temperature “could change depending on where [the microchip] is located” on the cow. *Id.*, 64:7-65:1. That is difficult to account for because the sensors are susceptible to “migrating.” *Id.*, 65:2-9 (“[I]f you put it in one place, it might not have stayed in one place.”). Patent Owner’s expert agrees that there are reasons why Trevarthen’s microchip was not commercially available and would not be used in an animal management system. Patent Owner’s expert agrees that there are reasons why Trevarthen’s microchip was not commercially available and would not be used in an animal management system. EX2009, ¶145-147 (testifying that under-the-skin microchips can cause tissue damage and subject to that could hinder under-the-skin sensor functionality and impact measurements).

Implicitly acknowledging that Trevarthen fails to disclose a system capable of retrieving “sensed” data, Petitioners refer to unspecified “numerous prior art references” and cite a conclusory paragraph from its expert’s declaration to suggest it would have been obvious. *See* Pet., 25 (citing EX1003, ¶128). But there is no support for Petitioners’ suggestion. Brown-Brandl merely refers back to “background” references, none of which are relied on for Ground 2. *See* EX1003, ¶¶36-42. This is an impermissible attempt to incorporate additional arguments and prior art into the Petition by reference. *See* 37 C.F.R. §42.6(a)(3); §42.22.

In any event, Brown-Brandl’s cited references show that temperature-sensing RFID devices were uncommon and that POSAs would not have used them in herd management systems. Bewley, for example, acknowledged that his devices were subject to “measurement error” and that “[a]dditional research is needed to evaluate the feasibility of these technologies.” EX1015, 4671–72. Hicks described “implanting a sensor” as “invasive” and “complicated” and suggested further research to determine if they can be used to measure temperature. EX1016, 434. In a paper by Brown-Brandl, she concludes that “before this system can be used in a commercial livestock setting several changes need to be made.” EX1020, 13. The remaining cited references contain similar statements that would have discouraged a POSA from using the device. *See, e.g.*, EX1021, 11 (“[T]he efficiency of the bolus needs to be improved.”); EX1017, 63 (describing a “beta test” with an under-the-skin microchip). As Bowser explains, such statements demonstrate that implanted devices were uncommon at the time of the invention, and POSAs would not have had reason to modify Trevarthen to incorporate them. EX2009, ¶148.

Petitioners’ reliance on the ’515 Patent’s discussion of “BetaTHERM Sensors” is classic hindsight bias that cannot support obviousness. *See* Pet., 25. The patent explains that the sensor could be used in a particular “bolus” configuration for measuring certain “physiological characteristics of an animal.”

EX1001, 10:16-54. It never suggests that the disclosed configuration was known before the invention. EX2009, ¶149. Petitioners are using the patent's disclosure of the invention to reconstruct the claims, which is improper. *See In re Gorman*, 933 F.2d 982, 987 (Fed. Cir. 1991).

b) Incorporating “Milk Production” and “Sensed Animal Information” into an Integrated Animal Tracking Method Was Not Obvious

POSAs would have understood claim 4 to require that the retrieved “sensed animal information” must be inserted into a “logical expression” as part of the same animal tracking method that incorporates “milk” information into a logical expression in claim 1. As Bowser testifies, POSAs would have that understanding because the purpose of retrieving sensed information in such a method is to incorporate it into the logical expression to obtain a logical value. EX2009, ¶151-152. In any event, Trevarthen does not disclose any system that incorporated both “sensed” information (*e.g.*, temperature) along with “milk” information into a single method. Rather, its discussions of milk production and temperature-sensing devices reflect disparate teachings without providing a reason to combine them, as required under *In re Stepan Co.*, 868 F.3d 1342, 1346 n.1 (Fed. Cir. 2017).

(1) *Trevarthen's References to Milk Production and Temperature Sensing Involve Disparate Teachings*

Trevarthen's only references to milk production occur in three discussions of “milk meters,” which are completely disconnected from any discussion of

retrieving “sensed” information, such as temperature. First, Petitioners discuss “milk meters” as a potential future improvement at Cochrane Dairy, which was one of the two “case studies” from Trevarthen’s thesis before he proposes his own “theoretical framework.” See EX2009, ¶¶48-53. Petitioners quote Trevarthen’s statement that “a cow producing significantly less milk than her calculated average may be suffering from an illness” to suggest that Trevarthen’s system included a “logical expression” based on milk production to detect illness. See Pet., 18-19 (citing Trevarthen, 98). But that statement was referring to the Cochrane’s potential “implementation of milking meters for every milking bail” at their farm—a system unrelated to RFID technology, let alone one that employs temperature monitoring. Trevarthen, 98; EX2009, ¶¶154-156. And even if the milking meters were implemented at Cochrane Dairy, there is no teaching or suggestion to implement them as claimed. The Cochranes employed basic ear tags without sensors, and there is no reason or motivation to combine them with an RFID device that “sensed animal information.” See, e.g., Trevarthen, 69 (“All cows in the [Cochrane’s] herd have an NLIS-compliant RFID tag attached to their right ear.”); EX2009, ¶157. As Bowser explains, a basic “ear tag” is a plastic device, often around the size of a credit card, that pierces and fastens to an animal’s ear. EX2009, ¶157. A POSA would have understood that these basic ear tags could include a low frequency RFID transponder to provide identification

information on the animal, which was typically gathered at the entrance of a barn or milking parlor. *Id.*; Trevarthen, 3, 20, 25-26, 69-70. Basic ear tags like those employed at Cochrane Farm could not have been used to achieve the claims. For example, they are attached to the ear on the outside of the animal, are not implanted “in an animal,” and do not “sense[] animal information.” EX2009, ¶157.

Second, Petitioners refer to Trevarthen’s discussion of recognizing “patterns in the [milk] production of each cow,” which is also unrelated to Trevarthen’s discussion of temperature monitoring. *See* Pet., 18 (citing Trevarthen, 109). There, Trevarthen was merely speculating about possible future capabilities of “Automated Feed-Dropping Control Units (Feed Bins)” in which milking meters are combined with automatic feed bins. Trevarthen, 108-109, §6.3.3; EX2009, ¶158-160. Trevarthen never suggested that the combination of feed bins and milking meters could or should be incorporated into a system that incorporates sensed temperature data from an RFID device. EX2009, ¶161. Moreover, Trevarthen admits that combining feed bins and milking meters was “[b]eyond their current abilities.” Trevarthen, 109. Thus, even if the disclosure somehow related to a logical expression, there would have been no reasonable expectation of success in incorporating the disclosure into a method arranged as claimed. EX2009, ¶161; *see also Star Sci., Inc. v. R.J. Reynolds Tobacco Co.*, 655 F.3d

1364, 1376 (Fed. Cir. 2011) (holding that a “speculative” disclosure of what “might” or “may” be achieved “does not sufficiently direct or instruct” a POSA).

Third, Petitioners rely on a short, conclusory assertion in Trevarthen’s theoretical framework that “milk meters” can “aid to identify any problems that may arise in the herd (such as illness).” EX1005, 115; *see* Pet. 18. But as with the other disclosures Petitioners rely on, the short statement does not say anything about whether the milk information is stored, whether the system makes any calculations based on a logical expression, whether the milk meters are used as part of an overall system incorporating implanted RFID devices that sense animal information as claimed, or even how a POSA might implement or integrate the milk meters into the system. EX2009, ¶¶162-165. At best, Trevarthen is speculating as to what data “might” or “may” be desirable to a farmer, which is insufficient to establish obviousness. *See Star Sci.*, 655 F.3d at, 1376.

Trevarthen’s brief discussions of temperature-sensing, which Petitioners rely on for claim 4, are separate and unrelated to any of the foregoing discussions of milk meters. *See* Pet. 25-26. In a background section, Trevarthen first mentions a “relatively new bio-thermo RFID microchip” that is “injected into the animal (under the skin)” to allegedly “provide temperature readings when interrogated by an RFID receiver/scanner.” EX1005, 24. In a later discussion of the potential use of such devices in his hypothetical framework, Trevarthen acknowledges that they

are not part of any actual system—let alone in combination with milk meters—because the technology has not yet been “extended to the livestock industry.” EX1005, 121; *see also id.* at 122-123 (describing hypothetical “approaches” to using temperature sensors). In short, Trevarthen’s temperature monitoring and milk production discussions refer to different systems and there is no suggestion to use them together.

(2) *Petitioners Fail to Establish a Reason to Combine Trevarthen’s Disparate Teachings*

As the Board recognized in the Institution Decision, relying on disparate teachings from a single reference requires establishing a reason to combine those teachings as well as a reasonable expectation of success in making the proposed combination, which Petitioners have failed to do here. *See* Paper 16, 41 (citing *Stepan*, 868 F.3d at 1346 n.1). For claim 4, Petitioners purport to show only that “Trevarthen discloses retrieving sensed animal temperature from an RFID device coupled to a temperature sensor.” Pet., 25. In other words, they fail to even acknowledge that Trevarthen’s teachings of milk production and temperature-sensing are disparate, let alone provide a reason to combine them, even though claim 4 requires a single method that incorporates both milk information and sensed animal information.

Although Petitioners did not make this argument with respect to claim 4, in its analysis of the “milk production” limitation in claim 1, the Board credited

Petitioners with identifying “detect[ing] illness in livestock” as a “motivation to combine Trevarthen’s separate disclosures” relating to “milk meters” with other “enhancements and ideas which could be considered as future additions to further add value.” Paper 16, 41 (citing Pet. 17-19). One such alleged enhancement or idea noted by the Board was Trevarthen’s purported “temperature monitoring.” *Id.* However, illness detection would not have provided a reason to incorporate Trevarthen’s milk production teachings with its separate discussion of temperature-sensing.

Petitioners’ own art demonstrates why “illness detection” would not have supplied a reason to incorporate Trevarthen’s milk production and temperature sensing into a single method. In their discussion of claim 1, Petitioners argue, incorrectly, that “it was well known to use milk production (yield) information, ***among other information***, as logical variables input into a logical expression to detect illness or oestrus in a cow.” Pet. 19 (emphasis added). However, the only reference they discuss to support that contention—a theoretical model described in “de Mol”—showed that the combination of milk production and “other information” (including temperature) would not have successfully detected illness.

Critically, de Mol expressly cautions against using his theoretical model—which included temperature and milk production as variables—in any “practical application” because it generates too many “false positive alerts.” EX1033, 184

(suggesting “additional research” to reduce false positives); EX2009, ¶¶167-169. According to Bowser, the number of false positives generated by de Mol’s model rendered it unsuitable in an animal tracking method that requires “obtaining a logical value relating to said animal.” For instance, in the context of dairy cows, each time an illness alert is issued, the farmer would need to isolate the cow to a hospital pen and take her milk out of production until she is diagnosed by a veterinarian. EX2009, ¶¶170-172. As Bowser testified, and Brown-Brandl confirmed, false positive alerts would cost the farmer time, money, and loss of production, defeating the purpose of having alerts in a practical application such as an animal tracking method. *Id.*; EX2010, 145:11-13 (“If a system puts out too many alerts, it becomes an obsolete system. Producers aren’t going to pay attention to it.”). Therefore, de Mol cannot possibly supply a reason to combine Trevarthen’s milk production and sensed temperature for purposes of improving illness detection because de Mol was incapable of reliably detecting illness when using milk production and temperature. Petitioners do not supply any other possible reason to make such a combination in Ground 1.

C. Ground 3 — Petitioners Fail to Show That Trevarthen and Rollins Render Obvious Claims 15–25

Ground 3, which challenges claims 15–25, also fails for the same reasons as Ground 1. Ground 3 again relies on Trevarthen as a primary reference, which Petitioners have not demonstrated qualified as prior art. *See* §V. Also, because

claims 15–25 depend from claim 1, Petitioners have failed to show that Ground 3 renders claims 15–25 obvious for the same reasons as Ground 1. Petitioners only provide Rollins to address dependent limitations found in claims 15–25 and do not use it to cure any deficiencies identified in Ground 1. *See* Pet., 28–35; *see also* EX2009, ¶77. Namely, Petitioners rely on Rollins for its purported disclosures of various components related to claims 15–24, such as a “server device,” “networks,” a “client device,” “computer-executable instructions,” “personal digital assistants,” “cellular phones,” and an “RFID reader that is portable.” *Id.*; *see also* EX2009, ¶173. Accordingly, Ground 3 does not establish that claims 15–25 are obvious.

VII. GROUNDS 4, 5, AND 6 – PETITIONERS FAIL TO SHOW THAT THE LAITINEN COMBINATIONS RENDER THE CHALLENGED CLAIMS OBVIOUS

Laitinen, a patent titled “Surveillance System for Animals,” describes a “surveillance system” for governments and other interest groups to monitor multiple animal herds at a “global level.” EX1006, Abstract; EX2009, ¶¶54-66. Laitinen’s surveillance system requires three levels, the lowest of which is the “pico level,” relied on by Petitioners. EX1006, 3:28-29. There are two distinct pico level devices described in Laitinen, one that is “external” and one that is “implanted inside the animal’s tissue (100b).” *Id.*, 5:38-43. Only the “external” Laitinen device, which fails to meet the “implanted in an animal limitation,” can

sense an animal's body temperature, movements, or location. *Id.*, 5:44-49.

Petitioners' rely solely on Laitinen's "external" device. In fact, Petitioners' obviousness arguments require the external device because the purported motivation turns on measuring "body temperature and movement" in connection with assessing "heat control." *Id.*, 8:5-15. Petitioners do not argue that a POSA would modify the external device to be "implanted in an animal," nor explain how a POSA could successfully achieve that modification. For this and the reasons provided below, Laitinen fails to render all Challenged Claims obvious

A. Ground 4 — Petitioners Fail to Show That Laitinen, Buchanan, and Liao Render Obvious Claims 1–2

1. *All Challenged Claims: Incorporating "an Amount of Milk Production Information or an Amount of Days Milked" Into a "Logical Expression"*

Petitioners contend that the claims require converting "an amount of milk production information or an amount of days milked" into "logical variables" that are inserted into a "logical expression." Pet. 46-47; *see also id.*, 17. But neither of Petitioners' alleged "logical expressions" would have included such information. Petitioners identify two alleged "logical expressions" in Laitinen, neither of which include "an amount of milk production or a number of days in milk." Petitioners incorrectly contend that Laitinen teaches (1) a "logical expression" in the form of a system that purportedly monitors heat based on temperature and movement measurements and (2) a mathematical function implemented at the "global level"

that assesses the efficacy of animal medication. As explained below, even if the foregoing amount to “logical expressions,” a POSA would have had no reason to modify them to include the recited milk information. EX2009, ¶175.

a) No Reason to Modify Laitinen’s “Heat Monitoring” System to Incorporate Milk Information

Petitioners contend that “Laitinen discloses a first logical expression to determine if a cow is in heat” based on a heat monitoring system that fails to incorporate “an amount of milk production or a number of days in milk” as claimed. See Pet., 47 (citing EX1005, 8:5-15); EX2009, ¶175. Acknowledging that the system does not use the claimed milk information, Petitioners cite Liao’s “peak milk yield” parameter. But Petitioners fail to identify a valid reason to modify Laitinen to incorporate that parameter. To support this combination, Petitioners rely on Brown-Brandl’s testimony that a POSA would have modified Laitinen “to include milk production information . . . to improve its accuracy and reliability at determining whether a cow is in heat.” EX1003, ¶161. But this opinion is premised on a flawed reading of Liao.

Contrary to Brown-Brandl’s declaration, Liao does not teach that milk production is also useful for determining whether a cow *is in heat* and ready for artificial insemination.” *Id.* (citing EX1010, 9:34-10:15, 12:3-15) (emphasis added); see EX2009, ¶¶68-76. Instead, as Brown-Brandl admitted in her deposition, Liao uses milk yield solely as an *input* to make an “insemination

decision,” which is different from detecting heat. EX2010, 175:11-176:2, 181:14-182:14; EX2009, ¶177. And both Liao and Petitioners’ expert acknowledge cases where an animal should not be inseminated when it *is* in heat, as well as where an animal should be inseminated when it *is not* in heat. EX1010, 10 (chart); EX2010, 181:18-182:14. Therefore, it does not follow that Liao’s peak yield and DIM parameters are “useful” for detecting heat, let alone that they would improve the “accuracy and reliability” in doing so. EX2009, ¶179.

In crediting Petitioners’ obviousness argument, the Board appears to have misapprehended Liao’s disclosure as teaching “logical expressions for determining whether cows are *in heat*.” Paper 16, 57 (emphasis added). But Liao does not explain where its “heat” input comes from or what variables, if any, are used to determine heat. EX2010, 183:14-21 (testifying that Liao does not “talk about specific places or sensors [its input data] needs to come from”), 222:21-223:15 (“verifying” that “Liao doesn’t specifically describe a sensor that would detect a heat detection status”). Presumably, the Board’s misunderstanding is based on its determination that Liao uses “heat” as “an input parameter in a logical expression, along with milk production, for making insemination decisions.” Paper 16, 58. But, as noted above, making insemination decisions and detecting whether a cow is in heat are different determinations that require different inputs. Moreover, Liao never suggests that milk production improves the “accuracy and reliability of

insemination decisions, let alone heat detection as Petitioners contend. EX2009, ¶179. Petitioners' expert admits that Liao does not "provide any reason why [its] particular input parameters were chosen." EX2010, 177:8-12. Accordingly, Liao's use of milk production to make insemination decisions cannot possibly motivate a POSA to incorporate that parameter into Laitinen's purported heat detection system.

Liao provides additional reasons why a POSA would not use milk yield in Laitinen's heat monitoring system. Laitinen's heat monitoring system uses a so-called "alarm limit," which is a type of "Boolean" equation that assesses whether measurements have reached a set point. EX2009, ¶176. Liao explains that an "insemination decision," in contrast, relies on many factors, and "often the farmer himself/herself is not explicitly aware of exactly which these factors are, or how they influence the insemination decision." EX1010, 1:21-25. Liao further states, "[d]airy farm management decision-making is generally a complex task, which is difficult to model mathematically with a satisfying degree of accuracy." *Id.*, 1:13-15. Thus, "it may be practically impossible to formulate a Boolean, or other mathematical model, for the decision process." *Id.*, 1:25-27; *see also* EX2010, 169:3-8 (Petitioners' expert testifying that Liao is a "reliable source of information" and that she would have not "have any reason to doubt any of the assertion in Liao"). These statements would have discouraged a POSA from

combining Liao's parameters into Laitinen's Boolean "alarm limit." EX2009, ¶¶176-183.

b) No Reason to Modify Laitinen's "Inverse Function" to Incorporate Milk Information

Petitioners' alternative argument that POSAs would have modified Laitinen's alleged "logical expression $x=f^{-1}(y,z)$ " to incorporate milk production also fails because a POSA would have had no reason to use that information in Laitinen's specific function. EX2009, ¶184. The alleged logical expression is a type of "inverse function" that selects a "medical treatment" by identifying prior treatments that produced desirable effects on certain parameters, none of which are "milk production." EX2009, ¶¶184-87; EX1006, 7:35-37. During an initial "educational phase," the inverse function determines how the parameters respond to treatment by comparing them before and after the treatment is administered. EX2009, ¶187. For example, the function could compare temperature before and after a treatment to determine if it was reduced. *Id.* Once the function is "educated," it can select an appropriate treatment based on an animal's current physiological parameters. *Id.* Essentially, the inverse function predicts how the current parameters will respond to various treatments based on how the same parameters responded to treatments in the past, and then selects a treatment that responded favorably. *Id.* Laitinen never suggests using milk production as a parameter.

Because Laitinen fails to disclose or suggest using “milk production” as a parameter in its inverse function, Petitioners contend that a POSA would have modified it to include that information. *See* Pet. 47-50. However, a POSA could not have done that because the necessary milk production data would not have existed. EX2009, ¶188. The education phase of the function requires input data before and after medication is administered. *Id.* But, when a cow is given medication, its milk is typically withdrawn from production. *Id.*; EX2010, 78:7-80:2 (testifying that a cow’s milk is “withdrawn” if “treated with certain medications”). When that occurs, no “milk production” data is measured. *Id.* Milk production data simply could not be available when needed in Laitinen’s particular function.

Even if the data were available, a POSA would not understand milk production to “improve the reliability” of Laitinen’s inverse function. *See* Pet. 48. For input data to be reliable in the inverse function, there must be a consistent cause-and-effect relationship between the data and the medication in order to signal a medication as “effective.” EX2009, ¶189. That is not the case with milk production, where effective medication can cause milk production to increase, decrease, or stay the same, so there is no reliable cause-and-effect relationship for the function to identify. *Id.* (testifying that milk production provides a “poor

learning signal,” which can “degrade performance” in an inverse function).

Moreover, POSAs do not base the effectiveness of treatment on milk production because it is not a direct indicator of a cow’s current health status. *Id.*, ¶190. The inverse function has nothing to “learn” about a treatment’s effectiveness based on milk production. *See id.*

For similar reasons, Petitioners’ assertion that POSAs “were aware that lowered milk production was also an indicator of illness” has no bearing on whether milk production data would have been incorporated into Laitinen’s inverse function. *See* Pet. 48. Even if lowered milk production could potentially indicate an illness, the fact that it does not consistently or predictably respond to medication renders it unreliable and useless in Laitinen’s function. EX2009, ¶¶190-191.

Petitioners also suggest that merging temperature and milk production in an unspecified “logical expression” would increase its ability to distinguish between illnesses and other issues, such as estrus—but any such benefit would not supply a reason to incorporate milk production into Laitinen’s inverse function. *See* Pet. 48-49. Specifically, Petitioners posit that POSAs would have known that “combining temperature and milk production as input variables [in]to a logical expression” would render it “more effective at determining whether temperature and milk production anomalies were indicators of illness, oestrus, or caused by some other issue.” *Id.* Laitinen’s inverse function has a different goal and operates on a

fundamentally different principle than whatever “expression” Petitioners are referring to. EX2009, ¶192. Petitioners’ unspecified expression attempts to assess the likelihood of illness versus other issues, using combinations of temperature and milk production fluctuations. *See* Pet. 48-49 (contending that “a temperature above the upper limit combined with decreased milk production would tend to indicate illness is highly likely”). Meanwhile, Laitinen’s inverse function analyzes an animal’s past responses to medications to suggest a treatment for current conditions. It is not trying to discern the meaning of “temperature and milk production anomalies.”

Moreover, the record does not support that combining temperature and milk production into a logical expression was known prior to the invention to aid in distinguishing between illness and other issues. Petitioners’ expert relies on van den Berg as the only alleged support for that proposition, setting out its purported teaching of combining temperature and milk yield to achieve “higher accuracy” in determining illness in the following heavily modified quote:

For example, van den Berg et al. (Ex 1023) expressly teaches that “one or more of the parameters [including temperature and milk yield] may be combined ... to achieve **higher accuracy**” in determining whether an animal is ill or in heat.

EX1003, ¶165 (citing EX1023, 4:12-22) (brackets, ellipses, and emphasis in original); *see also* EX2009, ¶¶193-197. In the unmodified quote from van den

Berg, however, it is clear that there is no “express teaching” that temperature and milk yield should be combined to more accurately distinguish between illness and heat:

One or more of the parameters may be combined with the dead time and analyzed by a computer. In doing so, to achieve a higher accuracy, especially the temperatures of each of the flows of milk from the various teats can be determined.

EX1023, 4:20-25. As Brown-Brandl admitted in her deposition, van den Berg was actually describing a way to achieve a higher accuracy in measuring the temperature of a flow of milk. EX2010, 201:15-20 (“[Q] So in that specific sentence that starts with ‘In doing so,’ van den Berg is explaining a way that one could achieve a **higher accuracy of a temperature measurement**; yes or no? A Yes, I believe that is correct.”) (emphasis added).

In any event, when van den Berg refers to identifying “heat or illness,” he is not explaining how to distinguish between heat and illness. In the passage cited by Brown-Brandl, van den Berg states that “a more reliable indication signal of **heat or illness** is obtainable from parameters including one or more of the following,” and then he lists several parameters. EX1023, 4:13-19 (emphasis added).

However, van den Berg does not suggest that any of the listed parameters be combined to distinguish between heat and illness. Rather, he posits that the parameters may distinguish between (a) animals that are in heat or ill from (b)

animals that are neither in heat nor ill. EX2009, ¶198; EX1023, 4:19-21 (“These parameters for ill or estrous animals are different from those for healthy and non-estrous animals.”).

Moreover, van den Berg does not use a cow’s sensed temperature or milk yield in any of his purported techniques for detecting illness, so he cannot provide any motivation to use those parameters in an expression. Rather than sensing a cow’s body temperature, van den Berg uses “the temperature of a *milk flow*,” which is not interchangeable with body temperature. EX2009, ¶199; EX1023, 4:13-21. And in his only description of illness detection specifically, van den Berg purports to use milk temperature and “***electrical conductivity*** of the milk flow” to detect mastitis. EX1023, 4:29-34 (emphasis added); EX2009, ¶199. The proposed combinations of unclaimed variables in van den Berg cannot possibly supply a motivation to combine the disparate teachings of Trevvarthen to arrive at the claims.

Petitioners also fail to establish a reasonable expectation of success in modifying Laitinen’s inverse function to arrive at the claims. Contrary to Petitioners’ assertion, de Mol cannot demonstrate that “there was a high probability of success” in “[m]odifying Laitinen’s logical expressions, or creating a new one, to include both temperature and the stored milk production information for the detection of oestrus or illness” or that such modification involved “known techniques.” See Pet. 49-50. As discussed above in Section VI.B.3(b)(2), de Mol

provides reasons why POSAs would not have successfully incorporated his model in any “practical application,” such as the claimed herd management system, due to “the number of false positive alerts” it generated. *See* EX1033, 184; EX2009, ¶199. And even if POSAs successfully incorporated de Mol’s model into Laitinen’s inverse function, they would not arrive at the claims because de Mol uses *milk* temperature, not sensed temperature, in his models. *See* §VI.B.3(b)(2) above. As explained above and in Bowser’s declaration, those two parameters are not interchangeable, particularly for detecting illnesses. *Id.*; EX2009, ¶199.

c) Laitinen’s Alleged “Logical Expressions” Would Not Have Generated a “Logical Value” as Claimed

As explained above, POSAs would not have used the inputs in Liao’s “insemination decision” to detect heat, and thus there would have been no reason to modify Laitinen’s first alleged logical expression to include Liao’s milk information. However, even if a POSA were to create such an expression, it could not be “solved to obtain a value indicating whether an animal is *in heat* and ready for artificial insemination,” as Petitioners contend. *See* Pet. 50 (emphasis added). As Bowser testified, milk yield is independent of heat, and thus any threshold based on those values would not indicate of heat. EX2009, ¶200; *see* §VII.A.1(a). Accordingly, if those values were somehow incorporated into Laitinen’s heat monitoring application along with temperature, the application would not solve for

the logical value of whether the animal is in heat, and therefore would not obtain a logical value as claimed.

Similarly, POSAs would not have had reason to input milk yield into Laitinen's "inverse function," but if they did, it could not be solved to "indicate whether an animal is ill and to identify appropriate medical treatment." See Pet. 59. As Bowser testified, milk yield does not follow a consistent or predictable pattern in response to medication in animals. EX2009, ¶201; see §VII.A.1(b) above. Therefore, incorporating milk yield into a logical expression like Laitinen's would introduce noise and render the system incapable of identifying the appropriate treatment or whether the animal was ill. EX2009, ¶201. In other words, Petitioners' alleged second logical expression would not obtain a "logical value" as claimed.

2. *All Challenged Claims: "Reading an RFID Device Implanted in an Animal"*

a) Petitioners Do Not Identify "an RFID Device Implanted in an Animal"

Petitioners fail to identify "an RFID device implanted in an animal," as recited in element 1[B], and every other Challenged Claim. For that element, Petitioners rely solely on Laitinen's description of a "[s]ensor unit." See Pet., 42 (citing EX1006, 3:53-57, 5:38-42). In the Institution Decision, the Board credited Petitioners' expert with identifying an "implanted sensor," but that "sensor" is

explicitly separate from the pico level RFID devices that Petitioners rely on. Paper 16, 50 (“We are persuaded, for the purposes of institution, by this testimony, given the disclosure of Laitinen’s implanted *sensor*.”) (emphasis added). In the passage cited by the Board and Petitioners, Laitinen explains that the “pico level device is attached permanently to, *e.g.*, the animal’s ear after its birth” and that the “[s]ensor unit” is separate and can be “read/transcribed by the pico level equipment.” EX1006, 3:28–62; EX2009, ¶¶202-04. Simply put, the sensor unit cannot serve as the claimed RFID device.

b) Petitioners’ Alleged “Logical Expressions” Require Temperature Readings and Thus Use Laitinen’s External Pico Level Device

Although Petitioners do not identify either device as the alleged implanted RFID device, the Board further credits Laitinen as teaching “a specific embodiment with two different pico level devices including an external device for measuring temperature and an internal device for surveilling the animal’s heart.” Paper 16, 50 (citing EX1005, 5:44–53). But that only highlights the fact Laitinen teaches two distinct RFID devices—one external and one internal—that acquire distinct measurements. EX2009, ¶205. And the two alleged “logical expressions” that Petitioners identify require the *external* pico level device because it measures temperature.

In attempting to construct a logical expression that includes the claimed “milk” information, Petitioners rely on Laitinen’s purported “heat” monitoring application and so-called “inverse function,” both of which use an animal’s “temperature” as an input variable. *See* Pet., 47–50. Petitioners’ obviousness arguments for both of these alleged expressions hinge on the use of temperature data. EX1006, 8:5-11 (describing use of temperature in “heat control” application); EX2010, 164:6-11 (testifying that Laitinen “is using temperature as an input to his [inverse] function”). That is, Laitinen fails to disclose the recited “milk” information, but, according to Petitioners, POSAs would have combined Laitinen’s temperature data with the milk information described in Liao. Pet., 47 (“[T]he POSA would have been motivated to modify Laitinen’s logical expression, or create a new expression, and insert milk production information as logical variables, ***along with the temperature***, to improve accuracy and reliability at determining whether a cow is in heat.”) (emphasis added); *id.*, 47–48 (“Indeed, it was well-known in the art that temperature correlated with animal illness.”); *see also* EX2009, ¶206.

Laitinen unequivocally states that temperature is measured with the external device, and the external device only. The internal device only purportedly measures “the animal’s heart rate,” “its muscular tension or level of fatigue,” and “oxygen saturation”—none of which Petitioners rely on for disclosure or

obviousness rationale. EX1006, 5:44–49. The “external device,” on the other hand, can “measure the animal’s body temperature.” EX1006, 5:50–55; *see also id.*, Fig. 2 (depicting “external” device with “temperature” and “movement” inputs); EX2009, ¶¶206-07.

This distinction between external and internal devices is important, as POSAs at the time would have had no reason to use Laitinen’s internal devices to measure temperature. EX2009, ¶¶208-10. As Bowser explains, POSAs considered internal devices located “inside the animal’s tissue,” such as those discussed in Laitinen, to be potentially harmful to animals. EX2009, ¶210. For example, POSAs understood them to “cause tissue damage, possible infection, discomfort, and animal welfare issues.” *Id.*; EX1006, 5:40-43. Moreover, POSAs were concerned such devices were potentially unreliable for livestock applications because the animals, such as cattle, were known to “roll on the ground,” “immerse themselves in water” and perform other activities that impacted measurements. EX2009, ¶210 (noting further that POSAs would not have had reason to use such devices with a reasonable expectation of success because POSAs believed that “a sensor located in the same part of the body may not register uniformly from cow-to-cow”). In view of Laitinen’s express disclosure and general knowledge in the field, POSAs would have had no reason to use Laitinen’s “internal device” for reading temperatures.

In short, Petitioners’ proposed combinations—which require temperature data in a logical expression—necessarily fail to include the requisite “RFID device implanted in an animal.” Petitioners therefore fail to show that Laitinen discloses or renders obvious claim 1.

3. “*Retrieving an Amount of Animal Identification*”

Petitioners also fail to identify the performance of “retrieving an amount of animal identification information from said RFID device implanted in an animal,” as recited in element 1[C]. The entirety of Petitioners’ argument for that element is as follows:

Laitinen discloses this element. Laitinen describes its system as “a system of individual animal identification.” Laitinen, 2:47-48; *see also id.* 6:2-4 (“Each surveillance device includes a personalized identifier for the correct identification of the animal in question.”). Laitinen explains that its “pico level device is attached permanently to [an animal], and it functions like [a] conventional identification tool.” Laitinen, 3:28-35; *see also id.*, 3:53-57; Brown-Brandl, ¶¶151-152.

Pet., 43 (emphases removed). The Board credited Laitinen as teaching that “the pico level device generally functions like a conventional identification tool and includes additional components, such as an RF transmitter/receiver.” Paper 16, 51. However, that does not address Petitioners’ failure to even contend that the alleged functionality would include the method step of “retrieving an amount of animal

identification information from said RFID device implanted in an animal” as claimed. EX2009, ¶¶212-13. Nor do they contend that the performance of such step would have been implicit or obvious.

B. Ground 5 — Petitioners Fail to Show That Laitinen, Buchanan, Liao, and Brune Render Obvious Claims 3–4

Ground 5 challenges claims 3-4 based on Laitinen, Buchanan, Liao, and Brune and fails for the same reasons as Ground 4. *See* §VII.A. Claims 3-4 depend from claim 1 and thus include the same claim elements, including those that Petitioners failed to show were disclosed or rendered obvious in Ground 4. *See also* EX2009, ¶214. Moreover, Petitioners do not rely on Brune to address any of the deficiencies discussed in Section VII.A. Rather, they rely on Brune for its alleged disclosure of “retrieving an amount of date-time information from said plurality of RFID devices implanted in said plurality of animals” for claim 3, and argue that Laitinen’s system (with the deficiencies discussed above) would have been modified to retrieve date-time information from the bolus. Pet. 52-53.

Petitioners also fail to establish that claim 4 is disclosed or rendered obvious by Laitinen for additional reasons. Claim 4 requires “retrieving an amount of sensed animal information from said plurality of RFID devices implanted in said plurality of animals.” However, as in claim 1, Petitioners only identify the “[s]ensor unit” described in Laitinen, which allegedly uses “GPS,” but the sensor unit is not an “RFID device.” Pet. 54; *see* §VI.B.2. And to suggest that the *pico*

level device “senses” temperature, Petitioners cite Laitinen’s statement that “[t]o monitor the animal’s heat with a pico level device, **body temperature** and movement are usually measured.” Pet. 54 (emphasis in original). But Laitinen expressly states that temperatures is measured with an external device. EX1006, 5:44-49, Fig. 2; EX2009, ¶215. Petitioners therefore fail to identify any RFID device that is implanted in an animal and retrieves sensed information.

C. Ground 6 — Petitioners Fail to Show That Laitinen, Buchanan, Liao, and Rollins Render Obvious Claims 15–25

Ground 6 challenges claims 15–25 based on Laitinen, Buchanan, Liao, and Rollins and fails for the same reasons as Ground 4. *See* §VII.A. Claims 15–25 depend from claim 1 and thus include the same claim elements, including those that Petitioners failed to show were disclosed or rendered obvious in Ground 4. EX2009, ¶216. Moreover, Petitioners do not rely on Rollins to address any of the deficiencies discussed in §VII.A. Instead, they rely on Rollins for claims 15–24, specifically for its discussions of components such as “server device,” “networks,” a “client device,” “computer-executable instructions,” “personal digital assistants,” “cellular phones,” an “RFID reader that is portable.” *Id.*

Additionally, Petitioners fail to even attempt to provide a reason why a POSA would have used an “RFID device” that is “part of a bolus ingested by a bovine animal,” as required by claim 25. Petitioners acknowledge that Laitinen fails to disclose a bolus and argue that “[u]sing boluses as RFID implants was well

known by 2008, and the art contained numerous examples of such devices.” *See* Pet., 61. But they do not cite a single reference or any expert testimony to support that statement. The only citation in Petitioners’ entire discussion of claim 25 is to allegedly support that “a bolus, by definition, is implanted in a cow by ingestion, with a rumen bolus implanted in the cow’s first stomach compartment.” *Id.* (citing EX1003, ¶194). But the cited paragraph from Brown-Brandl’s declaration fails to provide any reason to use a bolus in Laitinen, either. It simply refers back to her definition of “rumen,” parrots Petitioners’ arguments, and makes the conclusory assertion that “[i]t would have been routine for the POSA to have implemented Laitinen’s system with an ingested bolus RFID device . . . [t]hus, claim 25 is rendered obvious by the cited art.” *See* EX1003, ¶194. But there is no “cited art,” and Petitioners’ and their expert’s conclusory assertions cannot establish that using a “bolus” in the claimed method would have been obvious.

VIII. CONCLUSION

Petitioners have not established by a preponderance of the evidence that any Challenged Claim of the ’515 Patent is unpatentable. Patent Owner therefore requests that the Board uphold the patentability of each claim.

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that a copy of the foregoing ST Reproductive Technologies, LLC's Patent Owner Response was served on counsel of record on February 14, 2025 by filing this document through the Patent Trial and Appeal Case Tracking System (P-TACTS), as well as delivering a copy via electronic mail to counsel of record for the Petitioners at the following addresses:

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CERTIFICATE OF COMPLIANCE PURSUANT TO 37 C.F.R. §42.24

This paper complies with the type-volume limitation of 37 C.F.R. §42.24. The paper contains 13,847 words, excluding the parts of the paper exempted by §42.24(a).

This paper also complies with the typeface requirements of 37 C.F.R. §42.6(a)(ii) and the type style requirements of §42.6(a)(iii)&(iv).

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