

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TOPSOE, INC.,
Petitioner,

v.

CASALE SA,
Patent Owner.

Case No. IPR2025-01455

Patent 11,286,168

PETITIONER'S OPPOSITION TO PATENT OWNER'S
DISCRETIONARY DENIAL BRIEF

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I. INTRODUCTION

Topsoe, Inc. f/k/a Haldor Topsoe Inc. (“Petitioner”) filed two inter partes review petitions against the same claims of the ’168 patent on the same day, ranking IPR2025-01454 first and this petition, IPR2025-01455, second. Consistent with the Trial Practice Guide’s direction for parallel petitions, Petitioner provided the required ranking and justification and, critically, in view of recent guidance from the Director, now stipulates that only one petition should be instituted. If the Director institutes IPR2025-01454, Petitioner requests non-institution of this second-ranked petition. The Director should reach this petition only if the first-ranked petition is not instituted on the merits. This case therefore presents no risk of dual proceedings and imposes no incremental burden on either the Board or Patent Owner.

Patent Owner’s reliance on the phrase “repeat challenges weigh against institution” misapplies PTAB guidance directed to serial, follow-on filings, not to parallel petitions filed together with ranking and a limiting stipulation. Once that error is corrected, and Petitioner’s one-petition commitment is credited, the multiple-petition concern is moot. The remaining discretionary considerations point in one direction. If the Director reaches this petition, it would be the first third-party challenge to the validity of any ’168 Patent claim under §§ 102 and 103, and no claims have been the subject of prior adjudication. The primary reference in the petition—*Terrien*—was not before the Office during prior examinations. A

secondary reference—*Licht*—was before the Office, however the petition demonstrates material examiner error tied to the Office’s stated reasons for allowance. There is no parallel validity trial and no trial date in the co-pending district court action, which is limited to unfair competition and unenforceability, and Petitioner has provided a broad *Sotera*-style stipulation that forecloses any future overlap on invalidity.

For these reasons, Petitioner respectfully requests that the Director decline to exercise discretion to deny and refer the petition to the Board for a merits-based institution decision if, and only if, IPR2025-01454 is not instituted on the merits. If IPR2025-01454 is instituted, Petitioner requests non-institution here as moot, consistent with its stipulation and the Trial Practice Guide’s emphasis on efficiency and fairness in managing parallel petitions.

II. PATENT OWNER’S ARGUMENTS FAIL TO COMPEL DISCRETIONARY DENIAL

A. Patent Owner Misapplies “Repeat Challenges”

Patent Owner’s contention that “repeat challenges weigh against institution” is misplaced here. The “repeat challenges” formulation grew out of the Board’s serial, follow-on petition doctrine, which addresses road-mapping and tactical do-overs after a prior petition and Board feedback. *See General Plastic Indus. Co. v. Canon Kabushiki Kaisha*, IPR2016-01357, Paper 19 at 15-19 (PTAB Sept. 6, 2017); Consolidated Trial Practice Guide at 56. In contrast, this case involves two

parallel petitions filed on the same day, ranked pursuant to the Consolidated Trial Practice Guide. Treating this parallel filing as a “repeat challenge” collapses two distinct strands of PTAB guidance, improperly importing *General Plastic* concerns into consideration of parallel petitions.

The Guide expressly recognizes that, although one petition is sufficient in most situations, multiple petitions may be appropriate in defined circumstances and, if filed, must be ranked and justified so the Board can manage any incremental burden. Petitioner complied with that framework; Paper 2 ranks IPR2025-01454 first and this case second, explaining the material differences between them. More importantly, Petitioner now stipulates that only one petition should be instituted and that this second-ranked petition should be considered only if IPR2025-01454 is not instituted. That commitment removes the very burden and fairness concerns the parallel-petition guidance addresses.

Patent Owner’s authorities do not compel a different outcome. Decisions invoking “repeat challenges” to deny a second petition turn on incremental burdens where two petitions would move forward in parallel or where the petitioner offered no limiting commitment. Here, by contrast, Petitioner’s one-petition stipulation moots any risk of dual proceedings and ensures there will be no duplication of effort for the Board or Patent Owner. With that risk eliminated, the Board’s holistic assessment should look to the remaining considerations the Guide and Director

decisions emphasize—efficiency, fairness, and the integrity of the system. Those considerations do not support denial here, particularly given that there is no parallel §§ 102/103 validity trial, no trial date, and, if the Board reaches this petition, it will be the only third-party validity challenge proceeding.

Framed correctly, the question is not whether two petitions should proceed; they will not. The question is whether, if the first-ranked petition is not instituted, this second-ranked petition should be considered on its own terms. The answer is yes. Once the misapplication of “repeat challenges” is put aside and Petitioner’s stipulation is credited, and the analysis properly turns to the other discretionary factors addressed below.

B. The PTAB Has Never Previously Adjudicated Patentability

Patent Owner asserts that “the PTAB has already adjudicated the Patentability of the Challenged Claims of the ’168 Patent.” DDR at 9. This is not true. While this argument appears to be based on the Examiner’s allowance following the reexamination that was initiated in response to Patent Owner’s own request for supplemental examination, the Examiner is not “the PTAB,” nor is a Patent Owner initiated reexamination a prior adjudication of invalidity either under the factors identified in the Office’s March 26, 2025 Workload Management Memorandum or under the Proposed Rules.

Patent Owner cites no authority supporting the notion that Patent Owner initiated reexamination is a prior adjudication. As an initial matter, reexaminations are *ex parte*, non-adversarial proceedings. *See, e.g.*, MPEP 2209 (explaining that reexamination is “similar to regular examination procedures in patent applications”). As such, a Patent Owner initiated reexamination is not a prior adjudication of invalidity within the meaning of the March 26 Memorandum, as the Examiner is neither the PTAB nor “another forum.” *See, e.g., Hulu LLC v. Piranha Media Distribution LLC*, IPR2024-01252, Paper 27 at 2-3 (PTAB Apr. 17, 2025) (addressing prior invalidity determination by a district court). Moreover, Patent Owner’s argument is inconsistent with the Proposed Rules, which expressly exempt Patent Owner initiated reexamination from the classes of validity determinations that could bar subsequent IPR challenges. *See* 90 Fed. Reg. 48341 (proposing change to 37 C.F.R. § 42.108(e)(5)).

Patent Owner speculates that if it had only known about the prior art asserted in the Petition, it could have submitted the art to the Examiner. DDR at 10. This argument again is meritless. It is Patent Owner who has the duty to disclose and should have searched for prior art. Furthermore, this argument presupposes that Patent Owner timely submitted the prior art of which it became aware, which is not the case. To the contrary, the record shows that Patent Owner delayed its submission of relevant prior art, strategically waiting several months and until

reexamination was nearly complete before submitting. EX1003, 1203-07. Even so, despite its strategic delay, Patent Owner still failed to disclose several references, including its own prior art referenced in inequitable conduct allegations, including the Patent Owner's work at the IFFCO plant and Patent Owner's Mega-Ammonia process and publications. *Id.*, 1140-41, 1154, 1162, 1203-07.

Accordingly, the Examiner's allowance following Patent Owner initiated reexamination does not favor discretionary denial.

C. Section 325 and *Advanced Bionics*: Prong 1 is Not Satisfied for the Primary Reference and Prong 2 Material Error Exists

Petitioner's primary reference, *Terrien*, was not presented to the Office during prosecution and Patent Owner does not argue that the *Terrien*-based Grounds 4 and 4A are subject to § 325(d). Discretionary denial under § 325(d) cannot apply to these grounds. Patent Owner is left to argue only that the grounds relying on *Licht* and *Price* are subject to § 325(d) discretionary denial. But Patent Owner's *Licht* and *Price* arguments collapse under scrutiny.

Section 325(d) is evaluated under the *Advanced Bionics* two-part framework, with the *Becton Dickinson* factors guiding the analysis. *Advanced Bionics, LLC v. MEDEL Elektromedizinische Geräte GmbH*, IPR2019-01469, Paper 6 at 8 (PTAB Feb. 13, 2020) (precedential). *Advanced Bionics* asks first whether "the same or substantially the same" art or arguments were previously presented, and only if that condition is met does it ask whether the Office erred in a

manner material to patentability. *Becton Dickinson* factors (a), (b), and (d) inform Prong 1, while factors (c), (e), and (f) inform Prong 2. As Director precedent clarifies, art listed on an IDS can satisfy Prong 1 for that art, but discretionary denial is unwarranted if the Office overlooked specific teachings that impact patentability, or otherwise erred materially, and that the petition’s evidentiary record warrants reconsideration. *See Advanced Bionics*, Paper 6 at 7-11; *Ecto World, LLC v. RAI Strategic Holdings, Inc.*, IPR2024-01280, Paper 13 at 3-6 (PTAB May 19, 2025) (precedential). Applying that framework here, *Price* does not satisfy Prong 1 because it was not listed on the IDS and is not cumulative of *Licht* under *Becton Dickinson* factors (a), (b), and (d). As to *Licht*—which was before the Office—the Petition identifies precisely the sort of overlooked teachings and misapprehensions that establish material error under Prong 2. Further in the alternative, even if *Price* were deemed cumulative of *Licht* (it is not), the Office still materially erred under Prong 2 by overlooking *Price*’s claim-relevant teachings.

1. Prong 1 is not met by *Price* because it is not cumulative of *Licht*

Patent Owner’s Prong 1 theory fails because *Price* and *Licht* are not “the same or substantially the same” within the meaning of *Advanced Bionics* and *Becton Dickinson*. The petition does not use *Price* redundantly; it uses *Price* to supply claim-material teachings that *Licht* does not disclose and that Petition relies

on to satisfy limitations and complete combinations. Most notably, the petition invokes *Price* for concrete ATR operating parameters and configurations that matter to the claim mapping, including autothermal reforming with low steam-to-carbon (S/C) ratios at or below 2—illustratively 0.6 and 0.9—which the petition ties to claim 19. Pet. 30-31. *Licht* contains no comparable disclosure of ATR $S/C \leq 2$, and Petition does not cite *Licht* for that limitation; it cites *Price* because *Price* adds what *Licht* lacks. *Id.*

Price is also relied upon for “further purification” and methanation sequencing that structures where the split occurs relative to final ammonia front-end treatments. The petition cites *Price*’s explicit statement that “methanation is used as the final treatment step” and that hydrogen destined for ammonia synthesis is further purified before nitrogen addition—disclosures the petition uses for claims 2 and 5, and to confirm that the split precedes methanation and nitrogen addition for claim 6. Pet. 26–29. *Licht* does not explicitly supply these same final-treatment teachings for an ammonia line, and the petition’s reliance on *Price* for these points underscores that *Price* contributes something materially different from *Licht* under *Becton Dickinson* factors (a) and (b). Pet. 26-29.

Price further discloses post-PSA hydrogen purity that, as the petition explains, inherently captures CO₂ limits at or below the claimed ceiling, supporting claim 7 in a manner not found in *Licht*. *Price* teaches a hydrogen

product “greater than 99% pure” after PSA, and the Petition explains that a >99% hydrogen stream necessarily caps all non-H₂ gas, including CO₂, below 10,000 vppm and makes obvious concentrations at or below 1,000 vppm. Pet. 29-30. The petition expressly invokes *Price*, not *Licht*, for this ppm-level showing because *Price*’s PSA disclosure provides the purity logic the claims implicate. See Pet. 29-30.

Finally, the petition relies on *Price* to confirm ammonia-integration intent and the manner of integrating the split hydrogen stream into ammonia synthesis, including direct hydrogen supply and sequencing of methanation and nitrogen addition. These are not background generalities; the petition repeatedly deploys *Price* to bridge specific claim elements where *Licht* does not, including in Grounds 4B and 5. Pet. 25–29, 40–50. Taken together, the petition’s targeted reliance on *Price* to teach $S/C \leq 2$ at ATR, “further purification” and methanation sequence, ppm-level CO₂ implications of PSA purity, and ammonia-integration steps demonstrates that *Price* is not cumulative of *Licht*. Under *Becton Dickinson* factors (a), (b), and (d), *Price* adds materially different disclosures that the petition uses to meet claim limitations and complete obviousness combinations. *Advanced Bionics* Prong 1 is therefore not satisfied as to *Price*. See *Advanced Bionics*, Paper 6 at 7-11; *Becton, Dickinson*, Paper 8 at 17-18.

2. The Office materially erred in evaluating *Licht*; and alternatively, even if *Price* satisfied Prong 1, the Office materially erred as to *Price*-specific teachings

For the grounds based on *Licht*, the reference that was before the Office, the petition identifies material errors under Prong 2 that warrant institution. Pet. at 41-43. *Advanced Bionics* explains that material error includes misapprehending or overlooking specific teachings of the art that impact patentability, and *Ecto World* clarifies that a petitioner must explain that error with reference to *Becton*, *Dickinson* factors (c), (e), and (f). See *Advanced Bionics*, Paper 6 at 6 n.9, 9-11; *Ecto World*, Paper 13 at 3-6. Here, the reexamination history shows that allowance turned on a perceived distinction in the conversion section—an ATR downstream of a prereformer “without a primary reformer therebetween”—rather than any supposed novelty in splitting and fuel use. EX1003 at 359. The petition demonstrates that the Office never substantively evaluated obvious ATR-only or ATR-downstream configurations and parameters in view of the state of the art, and that it did not grapple with the specific teachings the petition advances to complete the combinations. See Pet. 2-3, 14-18, 25-32, 40-50.

First, the Office overlooked how a person of ordinary skill would have read *Licht*’s oxygen secondary reformer in the context of well-established ATR configurations and the obviousness of eliminating a primary steam reformer. Dr. Ritter explains that prereforming in front-ends feeding an ATR was commonplace

and that ATR systems were known to operate at low S/C, with or without an intervening primary reformer. EX1005 ¶¶ 48-49. The petition shows that, once the correct context is applied, *Licht*'s disclosures render the asserted conversion configurations at least obvious, particularly when combined with references that teach ATR front-ends and parameters. Pet. 40-50. The failure to evaluate *Licht* in that obviousness context is a material error because it bears directly on the distinction that drove allowance.

Second, the Office did not evaluate the combinations and specific teachings that Petition marshals to meet the downstream limitations. The petition relies on *Price*—not *Licht*—for the methanation-as-final-step disclosure, “further purification” before ammonia synthesis, and $S/C \leq 2$ at ATR, which petition uses to map claims 2, 5, 6, 7, and 19. Pet. 44-47, 50 . It was a material error to allow claims without addressing how these specific teachings, in combination with *Licht*, close the purported gaps on which allowance rested. Under *Becton Dickinson* factor (f), the robust evidentiary record in the petition warrants reconsideration. Pet. 40-50.

Third, to the extent Patent Owner suggests that Petitioner “admits” *Licht* lacks certain features, that underscores material error rather than negates it. The petition is explicit that it turns to other prior art to supply missing limitations and parameters, and that the Office did not address those combinations. That is

precisely the *Advanced Bionics* paradigm: when the Office allowed claims without engaging the specific, claim-impacting teachings that petition now sets forth, material error is established. *See Advanced Bionics*, Paper 6 at 6 n.9, 9-11; *Ecto World*, Paper 13 at 3-6.

Alternatively, even if *Price* were deemed to satisfy Prong 1 as being cumulative of *Licht* (it is not), the Office still materially erred by overlooking *Price*'s different and claim-relevant teachings. Assuming, arguendo, cumulativeness, *Price*'s explicit methanation-as-final-step disclosure, "further purification" before ammonia, PSA-level hydrogen purity that implies ppm-level CO₂ ceilings, and $ATR\ S/C \leq 2$ are each teachings that the petition uses to satisfy specific claim limitations not addressed in the Office's allowance rationale. The failure to account for those teachings constitutes material error under *Becton Dickinson* factors (c), (e), and (f). *See Ecto World*, Paper 13 at 3-6; *Advanced Bionics*, Paper 6 at 6 n.9, 9-11.

In short, Patent Owner cannot satisfy Prong 1 as to *Price* because *Price* adds materially different disclosures that petition relies upon to meet claim limitations and complete combinations. And even where Prong 1 is satisfied for *Licht* (and, arguendo, for *Price*), Petitioner has demonstrated material error under Prong 2. The petition pinpoints the overlooked teachings and misapprehensions that matter to patentability, thereby defeating discretionary denial under § 325(d).

D. *Fintiv* Considerations Confirm Institution

Patent Owner argues that a *Fintiv* analysis based on the district court inequitable conduct case “provides an independent basis to deny institution.” DDR at 15-20. Again, Patent Owner is wrong.

Patent Owner cites no decision extending a *Fintiv* analysis to a district court litigation in which validity under 35 U.S.C. §§ 102 or 103 is not at issue, but rather the only issue being litigated is whether Patent Owner committed inequitable conduct in procuring issuance of the '168 patent. There is good reason for the lack of such a decision—given that a *Fintiv* analysis is driven by concern over duplication of effort between proceedings, it would make little sense to apply a *Fintiv* analysis to a district court litigation in which validity under 35 U.S.C. §§ 102 or 103 is not at issue. For example, as discussed above, the Proposed Rules limit denying institution of IPR in view of a parallel district court litigation to only those district court litigations in which a trial of an invalidity challenge to the patent under 35 U.S.C. §§ 102 or 103 is more likely than not to occur prior to the due date for the final written decision. *See* 90 Fed. Reg. 48341 (Proposed Rule 42.108(f)). As discussed above, here, given that invalidity under 35 U.S.C. §§ 102 or 103 is not currently at issue, there is virtually no risk of a trial on invalidity in the district court inequitable conduct case occurring prior to the due date for the

final written decision. *See* DDR at 6 (“Patent Owner has not asserted any claims against Petitioner in litigation”).

Even if a *Fintiv* analysis were extended to the district court inequitable conduct litigation (it should not be), the *Fintiv* factors strongly weigh against exercising discretion to deny. First, as Patent Owner admits, no trial date has been set in the district court litigation, which weighs against discretionary denial. DDR at 17. Second, although Patent Owner asserts that the parties have invested substantial resources in the district court litigation, Patent Owner fails to identify any overlapping issues apart from the need to construe the claims. DDR at 18-19. The lack of overlapping issues strongly weighs against discretionary denial.

Furthermore, despite invalidity under 35 U.S.C. §§ 102 or 103 not being at issue, Patent Owner argues that Topsoe not having submitted a stipulation weighs strongly in favor of discretionary denial. DDR at 18-19. Patent Owner is wrong. Nevertheless, to put the issue to rest and eliminate any theoretical concerns of possible overlap between this IPR and the district court unenforceability litigation, Topsoe hereby stipulates that, if this IPR proceeding is instituted, Topsoe will not pursue in any district court litigation or ITC proceeding any invalidity ground that was raised or reasonably could have been raised in this IPR. Accordingly, Topsoe’s stipulation eliminates any theoretical concerns of possible overlap

between this IPR and the district court unenforceability litigation, which strongly weighs against discretionary denial.

III. ADDITIONAL CONSIDERATIONS FAVOR REFERRAL

A. The Merits of The Petition Are Strong and Use of Expert Testimony Is Appropriate

The petition presents a straightforward, element-by-element mapping that demonstrates a reasonable likelihood of prevailing on at least one challenged claim, independent of any discretionary considerations. The core limitations that drove allowance are addressed head-on in the prior art the petition advances, most notably *Terrien*. The petition shows, with record pinpoints, that *Terrien* discloses hydrogen generation in a configuration employing an autothermal reformer and a prereformer without an intervening primary reformer, and that it teaches splitting a hydrogen-rich, CO₂-depleted stream and recycling a portion as fuel to the relevant process equipment. Those disclosures align directly with the claim language and the examiner's stated reasons for allowance in both original prosecution and reexamination. On this record, the intrinsic strength of the prior art disclosures, as charted in the petition, is more than sufficient to clear the institution threshold.

The expert declaration is used for the limited and proper purpose of explaining how a person of ordinary skill in the art would understand the teachings of the patents and printed publications, and to address motivation to combine and reasonable expectation of success under *KSR*. The declaration ties each opinion to

specific passages in the prior art and to the technical context of syngas production, ATR-based hydrogen plants, membrane separations, and heat-integration practices. For example, the declaration explains, with citations to *Terrien*, why an H₂-rich, CO₂-depleted stream identified as “fuel” in the art would be understood by a skilled artisan to be delivered to fired heaters or burners in the conversion section and feed-gas producing unit, and why splitting such a stream into substantially identical portions is both disclosed and technically routine. *See, e.g.*, EX1005 ¶¶ 99-105, 125-126, 133, 144-46. It likewise explains, again with record support, that ATR units downstream of prereformers are deployed without a primary reformer in between in conventional plant configurations, which speaks directly to the amendment that drove reexamination allowance. *Id.*; *see also id.* ¶¶ 45-49. These are quintessential subjects for expert explication and do not substitute expert say-so for missing disclosures.

Patent Owner’s “overreliance” critique does not identify a single limitation that exists only in the expert’s testimony rather than in the prior art. That omission is dispositive at this stage. DDR at 8. The petition’s grounds rest on patents and printed publications and details where each claim element is found. The expert does not fill gaps; the expert elucidates what the references say, how a skilled artisan would read them, and why a skilled artisan would have been motivated to implement the claimed configuration with a reasonable expectation of success.

Those are the very topics on which the Board has long permitted expert assistance, (see Consolidated Trial Practice Guide at 35), and they are necessary in a chemical process case like this one to connect disclosures about stream compositions, reactor sequencing, and thermal integration to the claim language through the lens of ordinary skill.

Nor do Patent Owner's other merit-adjacent points undermine institution.¹ The motivation rationales are grounded in the art's explicit energy-integration teachings and the recognized process benefits of using a hydrogen-rich permeate as internal fuel, not in hindsight of the claims. The combinations are technically compatible, they do not run afoul of any teaching away, and the declaration explains why implementing them would have been within the routine skill of the art. Even if some portions of the declaration were discounted, the prior art disclosures the petition details would still establish a reasonable likelihood of

¹ Patent Owner appears to incorporate by reference a claim construction argument from its discretionary denial brief in the parallel -1454 proceeding in an improper attempt to circumvent page limits. To the extent the Director is willing to consider Patent Owner's incorporated-by-reference arguments, Petitioner refers the Director to its response to those arguments contained in its -1454 response brief.

prevailing, which confirms that the petition's merits are strong and that the expert testimony is being used appropriately to aid, not replace, the Board's analysis.

B. The Absence of Settled Expectations Favors Institution

The timing of this challenge strongly favors institution because the '168 Patent is at an early stage of its life and Patent Owner has not developed settled expectations that would justify discretionary denial. The patent issued on March 29, 2022. After Patent Owner's supplemental examination led to an *ex parte* reexamination, the Office issued a reexamination certificate on July 16, 2024. Petitioner filed its petitions on August 22, 2025, less than three and a half years after initial issuance and just over a year after the reexamination certificate. On this chronology, the petition is an early, first-in-time third-party challenge to patentability under §§ 102 and 103, not a late-stage attempt to unsettle long-held rights.

Recent Director decisions consistently recognize that patent owners do not have strong settled expectations for recently issued patents and that early posture favors institution. *See Embody, Inc. v. Lifenet Health*, IPR2025-00248, Paper 13 at 2-3 (PTAB June 26, 2025) ("One of the challenged patents has not been in force for a significant period of time (issued in 2022) and the other patent is a parent of the first. Accordingly, Patent Owner has not developed strong settled expectations that favor discretionary denial as to the first patent, and it is an efficient use of

Board resources to address the related patent.”); *Samsung Elecs. Co. v. Wilus Inst. of Standards & Tech. Inc.*, IPR2025-00935, Paper 12 at 2 (Sep. 26, 2025)

(declining discretionary denial when “the challenged patents have not been in force for a significant period of time (issued in 2021 and 2023), and, accordingly, Patent Owner has not developed strong settled expectations that favor discretionary denial as to these patents”); *TankLogix, LLC v. SitePro, Inc.*, IPR2025-00647, Paper 10 at 2-3 (PTAB July 31, 2025) (patents issued between 2019 and 2023 had “not been in force for a significant amount of time” so “Patent Owner [had] not developed strong settled expectations”); *Berkshire Hathaway Energy Co. v. Birchtech Corp.*, IPR2025-00274, Paper 23 at 2-3 (Director July 2, 2025) (same for patents that “issued in 2019 and 2020”).

Accordingly, the absence of any settled expectations for Patent Owner that the ’168 Patent would not be challenged strongly favors institution.

IV. CONCLUSION

Patent Owner has not shown that any relevant factor favors discretionary denial. Accordingly, to the extent IPR2025-01454 is not instituted, upon review of discretionary considerations, Topsoe respectfully requests that the Director institute this IPR.

Dated: December 1, 2025

Respectfully submitted,

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CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6(e)(4), the undersigned certifies that on December 1, 2025 a complete and entire copy of this Petitioner's Opposition to Patent Owner's Discretionary Denial Brief was served by electronic means on the counsel identified below:

Case Collard (collard.case@dorsey.com)

Dated: December 1, 2025

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