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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ENERCOP SAND SOLUTIONS INC.
Petitioner

v.

SPECIALIZED DESANDERS INC.
Patent Owner

Inter Partes Review No. 2018-01748
U.S. Patent No. 8,945,256

**PATENT OWNER'S PRELIMINARY RESPONSE
TO PETITION FOR *INTER PARTES* REVIEW**

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I. INTRODUCTION

Patent Owner Specialized Desanders Inc. (“SDI”) submits this Preliminary Response to the Petition for *Inter Partes* Review (the “Petition”) filed by Enercorp Sand Solutions Inc. (“Petitioner”) regarding U.S. Patent No. 8,945,256 (“the ‘256 Patent”). SDI respectfully requests that the Board deny the Petition.

Petitioner falls well short of meeting its burden of demonstrating substantial likelihood of invalidity for any of its grounds. **First**, the prior art that Petitioner relies on for its obviousness combinations is not analogous art. **Second**, even if the art were analogous, the asserted combinations do not disclose all of the limitations of the ‘256 Patent. **Third**, even if the asserted combinations disclosed all of the limitations, albeit in different contexts, Petitioner fails to provide any persuasive motivation to combine these disparate references in a manner that results in the challenged claims. Each of these deficiencies alone is enough to independently deny the Petition; taken together the Petition falls well short of establishing a likelihood that any claim of the ‘256 Patent is invalid. The Petition should be denied.

The ‘256 Patent is directed to “a desanding system for receiving a gas stream containing entrained liquid and particulates,” using “a vessel elongated along a longitudinal axis” that is “inclined from a horizontal at a non-zero inclination angle” with a “gas/liquid interface formed at the fluid outlet.” Petitioner’s obviousness combinations rely heavily on two references, “Davis” (Ground 1) and “the Data

Book” (Ground 2). Davis is a theoretical research paper, and the portion relied on by Petitioner deals with the settling of particles in a liquid using a vertically inclined tube, such as *settling blood cells out of blood plasma in a test tube*. The Data Book is an engineering reference book, and the chapter relied on by Petitioner discusses fluid flow and piping. Neither of these references are analogous to the ‘256 Patent based on prevailing Federal Circuit case law, as discussed further below.

The Petition also fails to establish that any Ground invalidates any asserted claim. Although Petitioner relies on different secondary obviousness references, both Ground 1 and Ground 2 are exactly the same, relying only on SDI’s previous patent, “Hemstock,” to disclose any limitation of any claim of the ‘256 Patent, and not relying on either secondary reference to disclose any limitation of the 256 Patent.¹ Yet Petitioner concedes that Hemstock does not include all of the limitations of the ‘256 Patent, including (1) “said vessel being inclined from a horizontal at a non-zero inclination angle at all times during operation such that the fluid outlet is lower than the fluid inlet,” (2) “a gas/liquid interface formed at the fluid outlet,” and

¹ Grounds 3 and 4 are directed to dependent claims only, relying on Grounds 1 and 2 for the related independent claims.

(3) “the freeboard portion having a freeboard cross-sectional area which diminishes along the inclined vessel from the fluid inlet to the fluid outlet.”

Even were the Board to ignore the missing limitations, Petitioner fails to demonstrate that a POSITA would be motivated to combine Hemstock with, or modify Hemstock based on, the teachings of Davis or the Data Book. Rather than arguing that Davis actually discloses the limitations missing from Hemstock in Ground 1, Petitioner asserts that a POSITA would be motivated to simply “tilt” the desander disclosed in Hemstock to result exactly in the claims of the ‘256 Patent simply because Davis discloses a tilted tube. Similarly, in Ground 2, Petitioner argues that a POSITA would have been motivated to tilt the desander disclosed in Hemstock to result exactly in the claims of the ‘256 Patent simply because the Data Book discloses an inclined pipe. Both of Petitioner’s obviousness theories fail on numerous fronts. The Board should deny the Petition.

II. THE ‘256 PATENT

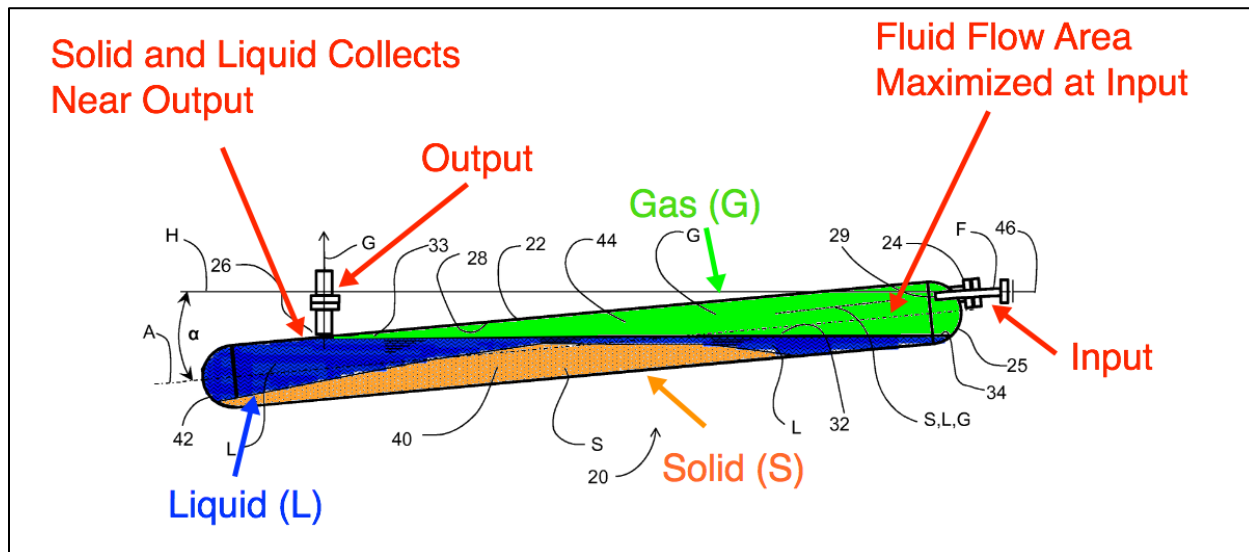
The ‘256 Patent is directed to “a system and apparatus for the removal of particulates, such as sand, from fluid streams² produced from a well, while minimizing abrasion of the involved equipment.” Ex. 1001 1:5-8. As the ‘256 Patent explains, production from oil wells often contains sand, and this sand, in combination with the high velocity fluid flow of the oil and gas, can cause multitudes of problems for downstream oil and gas gathering systems and refining facilities, including most importantly erosion. Such erosion can lead to high-pressure release of oil and gas into the environment, damaging the environment and causing expensive cleanup costs. Ex. 1001 1:12-39. The desander of the ‘256 Patent is described as being placed adjacent to a well’s wellhead, and is meant to be used prior to other oil and gas systems, such as piping, separators, valves, chokes, and downstream equipment. Ex. 1001 2:33-36. SDI provided one solution to this problem in 2004, when its Canadian Patent 2,433,741 issued, disclosing a horizontal

² The ‘256 Patent clarifies that “fluid stream F typically comprises a variety of phases including gas G, some liquid L and entrained particulates such as sand S.” See Ex. 1001 4:4-6.

desander placed immediately adjacent an oil well. Ex. 1001 2:7-29. This patent, and its U.S. counterpart Hemstock (Ex. 1004), provided the novel solution of a desander making use of a horizontal, elongated vessel with an inlet at one end and an outlet at the other end. *Id.* Hemstock relied on, among other things, slowing down the velocity of the fluid flow enough to allow sand to fall out by the effects of gravity. *Id.* This process relied on having the fluid flow enter an upper portion of the vessel that has a larger cross-sectional area larger than the inlet piping, slowing down the fluid enough for sand to fall out of the stream. *Id.* This sand collects in a lower portion, or belly portion of the vessel, while the gas remains in a freeboard portion. *Id.* In order to maintain the larger cross-sectional area of the freeboard portion, Hemstock relied on a downcomer flow barrier. *Id.*

The '256 Patent improves upon Hemstock in a number of important ways. **First**, the '256 Patent teaches the novel idea to maintain the cross sectional area of the freeboard portion by angling the vessel downward. Ex. 1001 2:40-47. This tilting of the vessel maximizes the cross-sectional area, because all of the solid and liquid that falls out of the fluid flow is collected in the belly portion of the vessel, which is located away from the inlet due to the vessel tilt, as is shown in Figure 2. Ex. 1001 4:21-23, Fig. 2 (*see* annotated figure below). The maximized cross-sectional area results in a fluid flow with improved slow down, allowing for more efficient removal of sand and liquid. Ex. 1001 4:23-26. The tilting also allows the

entire area of the vessel beyond the outlet to be used for collection of solids and liquids that fall out of the fluid flow, minimizing the area required for the freeboard portion, and thus improving the amount of solid and liquid that can be stored in the vessel. Ex. 1001 5:31-36.



Annotated Cover Figure of The '256 Patent

Second, the '256 Patent provides the benefit of having the interface between the freeboard portion and the belly portion be located at the “fluid outlet” to the vessel. This allows useful liquid oil, which fell out of the fluid flow, to be re-entrained with the gas in the freeboard portion, allowing increased efficiency of output flow while also improving solid removal. Ex. 1001 4:65-5:5.

III. CLAIM CONSTRUCTION

Because there are other reasons to deny institution, as explained herein, the Board need not address the constructions that Petitioner proposes at this time. *See*,

e.g., *TRW Auto. US LLC, v. Magna Elecs. Inc.*, IPR2014-00296, Paper 15 at 11 (P.T.A.B. Jul. 3, 2014) (stating that “for the purposes of this [institution] decision, we need not construe expressly any of the terms in the challenged claims.”). While the parties agree on the construction for “freeboard portion,” SDI disagrees that “replaceable” should be given any special meaning, including any reference to “without requiring welded modifications to the pressure vessel.” Instead, SDI proposes that “replaceable” be construed as “removable,” and reserves the right to present further arguments on this construction if necessary.

IV. THE PETITION FAILS TO SHOW A REASONABLE LIKELIHOOD THAT ANY CLAIM OF THE ‘256 PATENT IS UNPATENTABLE

Petitioner proposes four grounds of unpatentability:

Ground 1 Petitioner asserts that claims 1-7, 9-11, 13 and 16 are obvious over U.S. Patent No. 6,983,852 to Hemstock (“Hemstock”) (Ex. 1004) in view of a journal article entitled “Sedimentation of Noncolloidal Particles at Low Reynolds Numbers” by Robert H. Davis, *et al.* (“Davis”) (Ex. 1005);

Ground 2 Petitioner asserts that claims 1-13 and 16 are obvious over Hemstock in view of the Engineering Data Book (“Data Book”) (Ex. 1008);

Ground 3 Petitioner asserts that claims 8, 12, 14 and 15 are obvious over Hemstock in view of Davis and U.S. Patent No. 1,485,234 (1922) (“Miller”) (Ex. 1007);

Ground 4 Petitioner asserts that claims 14 and 15 are obvious over Hemstock in view of the Data Book and Miller.

Pet. at 2-3.

Ground 3 is to dependent claims 8, 12, 14, and 15 only, and relies on Ground 1 (Davis) for its allegations as to independent claim 1 on which these claims depend. Pet. 3, 52-53.

Ground 4 is to dependent claims 14 and 15 only, and relies on Ground 2 (the Data Book) for its allegations as to independent claim 1 on which these claims depend. Pet. 3, 55-56.

Because Petitioner fails to show a reasonable likelihood that claims 1-16 of the ‘256 Patent are unpatentable, the Board should deny *inter partes* review for all challenged claims.

A. Petitioner’s Prior Art Is Nonanalogous

Each of Petitioner’s asserted grounds relies on a combination that includes art that is too remote and unrelated to be treated as prior art, such that under the appropriate legal standard the art should not be considered “analogous” for the purposes of this Petition. Specifically, each asserted Ground relies on either Davis

or the Data Book, and neither reference is: (1) from the same field of endeavor as the '256 patent, or (2) reasonably pertinent to the particular problem with which the inventor was involved. *In re Deminski*, 796 F.2d 436, 442 (Fed. Cir. 1986).

1. Legal Standard

Earlier this year, the Federal Circuit summarized the law applicable to nonanalogous art as follows:

To determine if a prior art reference is analogous, we consider “(1) whether the art is from the same field of endeavor, regardless of the problem addressed, and (2) if the reference is not within the field of the inventor's endeavor, whether the reference still is reasonably pertinent to the particular problem with which the inventor is involved.” *In re Clay*, 966 F.2d 656, 659 (Fed. Cir. 1992). “A reference is reasonably pertinent if, even though it may be in a different field from that of the inventor’s endeavor, it is one which, because of the matter with which it deals, logically would have commended itself to an inventor’s attention in considering his problem.” *Id.*

The facts of *In re Clay* are illustrative. In that case, both the patented invention and the prior art reference related to the **petroleum industry**, and both taught using a gel. *Id.* at 657–58. We found that they were not directed to the same field of endeavor because the two inventions were used in very different environments (one, the extraction of crude petroleum, and the

other, the storage of refined liquid hydrocarbons). *Id.* at 659–60.

We also found that the reference was not reasonably pertinent to the problem the inventor was trying to solve, because they explicitly were intended to solve different problems.

Smith & Nephew, Inc. v. Hologic, Inc., 721 Fed. Appx. 943, 949 (Fed. Cir. 2018) (emphasis added). Importantly, as explained further below, the Federal Circuit cited and discussed the *In re Clay* case, which coincidentally related to the petroleum industry. In that case, even though both the patented invention and prior art were both from the petroleum industry in general, the Federal Circuit found the prior art “nonanalogous” because they “were used in very different environments.” *Smith and Nephew*, 721 Fed. Appx. at 949 (discussing *In re Clay* 966 F.2d at 659-60). As explained further below, Davis and the Data Book are much farther from being “analogous” than the examples rejected by the court in *In re Clay*. For example, Davis is a scholarly paper analyzing equations for rates of solids settling out of suspension, such as blood in test tubes. Petitioner’s “analogous” argument as to Davis relies on a tangential statement in the paper’s introduction that states that settling occurs in the “petroleum industry.”³ Similarly, the Data Book is an

³ This single introductory phrase is the only reference to the “petroleum industry” in the entire 30-page Davis article.

engineer's reference book that contains two discrete sections: one relating to generic separator phase vessels, and another relating to pumping liquids through pipelines. Petitioner's "analogous" argument as to the Data Book is that separation vessels are generally used in the petroleum industry. Neither of these references should be considered "analogous," such that Petitioner cannot rely on them as prior art.

2. The '256 Patent

As explained above, the field of endeavor of the '256 Patent is presented in the section titled "Field of the Invention," namely "the removal of particulates, such as sand, from fluid streams produced from a well, while minimizing abrasion of the involved equipment." Ex. 1001 1:3-8. Petitioner concedes this point. Pet. 10. Petitioner's expert generally agrees, stating "The '256 Patent is concerned with the control and separation of solids from oil and gas well production streams." Ex. 1002 ¶ 43. Dr. Simpson acknowledges that this field of endeavor is "a specific application of the broader technological field of phase separation." *Id.* Also as explained above, the '256 Patent explains two problems it was trying to solve, "improve the ease with which the vessel can be cleaned and further improvement in separation efficiency." Ex. 1001 2:22-26. Petitioner and its expert also concede this point. Pet. 12; Ex. 1002 ¶ 80.

3. Davis Is Nonanalogous to the ‘256 Patent

Petitioner’s allegations do not support a finding that Davis is analogous art. Indeed, a significant portion of Davis is directed to theoretical equations of settling rates of solids in suspension. Ex. 1005 at 1-16. Most of the remainder of the article is related to theory and experiments for different kinds of flow. Ex. 1005 at 19-30. Davis contains no disclosure regarding how its theoretical or experimental results are intended to be applied, much less whether they are applicable to devices such as the desander described in Hemstock. Petitioner’s reliance on a single page, which describes a more efficient way to settle solids in narrow channels, such as blood in a test tube, cannot support a finding that Davis is analogous art. Pet. 24; Ex. 1005 at 17.

Different Field of Endeavor

Petitioner’s arguments regarding field of endeavor fail under the Federal Circuit’s holding in *In re Clay*. The ‘256 Patent and Davis are directed towards two different fields of endeavor—the ‘256 Patent toward removing particles, such as

sand, from fluid streams produced from a well,⁴ and Davis toward general phase separation such as blood settling in a test tube. In fact, Petitioner does not argue that Davis deals with either sand or fluid streams produced from a well at all, because Davis contains no such disclosure given that it largely focuses on theoretical and experimental principles. Ex. 1005. Instead, Petitioner concedes that Davis is in the generic field of “phase separation.” Pet. 24. Thus, even taking Petitioner’s allegations as true, Davis is not in the same field of endeavor as the ‘256 Patent.

Petitioner does not rely on the specific field of endeavor of the ‘256 Patent, and instead identifies what it calls a “general field of endeavor.” Pet. 23. Although Petitioner first identifies the ‘256 Patent’s field of endeavor, “the removal of particulates from fluid streams produced from a well” (Pet. 23), Petitioner instead relies a more general field for its analogous art analysis, which it argues is “phase separation and related equipment.” Pet. 23. Petitioner then argues that Davis is in the ‘256 Patent’s general field of endeavor because Davis teaches one type of phase separation, “sedimentation.” Pet. 24. Petitioner further argues that Davis teaches

⁴ The ‘256 Patent explains a fluid stream produced from a well is at very high pressure, and that “typical pressure of the fluid stream F is about 7000kPa (1015 psia).” Ex. 1001 6:61-62.

that “sedimentation” is commonly used in the chemical and petroleum industries. *Id.* Although Petitioner does not rely on its Expert to support this proposition, Dr. Simpson provides the same analysis—that Davis “relates to the separation of solids from liquids via enhanced sedimentation.” Ex. 1002 ¶ 83.

These allegations are no better, and in fact much worse, than the facts of *In re Clay*. In that case the Federal Circuit found that allegations that two inventions both relate to the same general field, the “petroleum industry,” and both made use of a similar application, using a gel in the petroleum industry, were insufficient to find that the art was “analogous.” *In re Clay*, 966 F.2d at 658-60. The Court instead looked at the *specific* field of endeavor of both references—“the use of a gel in unconfined and irregular volumes within generally underground natural oil-bearing formations to channel flow in a desired direction” for the patent at issue, and “the storage of refined liquid hydrocarbons” for the alleged prior art. *Id.* Here, Davis’ field is not even in the petroleum industry, it just discusses a physical process—sedimentation—in which it describes the petroleum industry as one of a number of possible applications. Even taking Petitioner’s allegation as true (which it is not), simply alleging that both references are in the petroleum industry and related to using sedimentation is insufficient to establish that Davis is “analogous” art. Like the court in *In re Clay*, the Board should find these facts insufficient to show that Davis is in the same field of endeavor as the ‘256 Patent.

Not Related to the Particular Problem

Petitioner's arguments regarding whether Davis is reasonably pertinent to the particular problem with which the inventor was involved also fail. Davis is not reasonably related to the particular problems that Petitioner concedes the inventor of the '256 Patent was trying to solve: improving the ease of cleaning a desander, or improving separation efficiency of sand from a flow stream. Pet. 23-24. Petitioner argues only that Davis teaches a method that can reduce settling times for solids settling out of liquids, relying on different fluid mechanics at low flow rates. Pet. 24. Petitioner's expert concludes the same, citing page 17 of Davis. Ex. 1002 ¶ 83. Neither Petitioner nor its expert provide any argument for why a paper relating to the removal of corpuscles from blood in a test tube would logically commend itself to an inventor's attention when attempting to improve the separation of sand from an oil stream. See Ex. 1005 at 17 (explaining that an example of this "enhanced sedimentation" is "when ... blood is put to stand in narrow tubes, the corpuscles sediment a good deal faster if the tube is inclined than when it is vertical."). Indeed, the problems are much farther apart than those in *In re Clay*, where the claimed invention related to storage of oil, and the prior art related to extraction of oil, and were not found to be reasonably pertinent to the problem the inventor was trying to solve. *In re Clay*, 966 F.2d at 659-60 ("Syndansk is faced with the problem of recovering oil from rock [...]. Such a problem is not reasonably pertinent to the

particular problem with which Clay was involved—preventing loss of stored product to tank dead volume while preventing contamination of such product.”).

Thus, the Board should find that Petitioner has failed to demonstrate that Davis is analogous art, and thus cannot be used in an obviousness combination. *In re Clay*, 966 F.2d at 660 (“Since Sydansk is non-analogous art, the rejection over Hetherington in view of Sydansk cannot be sustained.”); *Smith & Nephew*, 721 Fed. Appx. at 949 (“Because Galloway is not analogous prior art, the Board erred by affirming Rejections 5 and 8.”). Because Petitioner’s Ground 1 relies on the combination of Hemstock and Davis (Pet. 47), Ground 3 relies on the combination of Hemstock, Davis and Miller (Pet. 52), and Ground 4 relies on the combination of Hemstock, Miller, and either Davis or the Data Book (Pet. 55), the Board should therefore deny institution of Grounds 1, 3 and 4. *10x Genomics, Inc. v. Bio-Rad Laboratories, Inc.*, IPR2018-00708, Paper 7 at 20-21 (P.T.A.B. Aug. 28, 2018) (denying institution after finding no prima facie case of obviousness, holding: “Because Mullen is not analogous art, Petitioner does not persuasively show that a person of ordinary skill in the art would have combined Mullen with SCC-700.”).

4. The Data Book is Nonanalogous to the ‘256 Patent

Petitioner’s allegations also do not support finding that the Data Book is analogous art. The Data Book is an engineering data book published by the Gas Processors Suppliers Association, which Petitioner states “provides basic instruction

regarding the design of many types of separation vessels.” Ex. 1008 at 1. Petitioner includes two unrelated sections of the Data Book in its Exhibit 1008: Section 7, titled “Separators and Filters” (Ex. 1008 at 3) and Section 17, titled “Fluid Flow and Piping” (Ex. 1008 at 21). Although the Data Book consists of two separate sections, Petitioner lumps them together in its analogous art section, and argues in two conclusory sentences that the entire exhibit is analogous. Pet. 24.

Different Field of Endeavor

Petitioner again improperly relies on the “general field of endeavor” of the Data Book when performing its analogous art analysis, contrary to the holding of *In re Clay*. 966 F.2d at 659-60. Here, Petitioner does not argue that the Data Book is in the specific field of endeavor of the ‘256 Patent: removing particles, such as sand, from fluid streams produced from a well. Pet. 24. Instead, Petitioner argues that the Data Book is in the “general field” of “separation vessels.” Pet. 24. Not only is this not sufficient to show that the Data Book is analogous under *In re Clay*, but it is also in a different general field of endeavor than the one identified in Davis: “sedimentation.” See Section IV.A.3, *supra*.

Petitioner’s expert does not alleviate the problem. Dr. Simpson opines that the Data Book is related to “the separation of gases, liquids and solids, including streams containing hydrocarbons such a well production streams.” Ex. 1002 ¶ 85. In support of this statement, Dr. Simpson cobbles together citations from both

sections of the Data Book. Ex. 1002 ¶ 85 (citing pages 3-17, and 41-42). First, Dr. Simpson cites Section 7 of the Data Book, relating to generic “Separators and Filters.” Ex. 1008 at 3-17. But the only mention of separating solids from “hydrocarbons” in this section is in relation to filtering, not separation vessels. Ex. 1008 at 16 (“Other uses include the filtration of solids and liquids from hydrocarbon vapors and the filtration of solids from air intakes of engines and turbine combustion chambers.”). This cursory reference to hydrocarbon vapors is clearly not referring to oil from a well production stream, and the entirety of this section contains no reference at all to streams containing hydrocarbons, well production streams, the petroleum industry, or desanding. Pages 41-42, meanwhile, are from Section 17 of the Data Book, relating to “Fluid Flow and Piping.” Ex. 1008 at 41-42. This Section contains no mention at all of hydrocarbons or the separation of solids from a fluid flow, much less desanding. Ex. 1008 at 41-42. Dr. Simpson’s citations do not support his opinion that the Data Book generally relates to “the separation of gases, liquids and solids, including streams containing hydrocarbons such a well production streams.” See Ex. 1002 ¶ 85. Therefore, the Data Book is not in the same field of endeavor as the ‘256 Patent.

Not Related to the Particular Problem

Petitioner’s arguments regarding whether the Data Book is reasonably pertinent to the particular problem with which the inventor was involved also fail.

Petitioner does not argue that the Data Book is directed to the same problems that the inventor of the '256 Patent was trying to solve: either improving the ease of cleaning a desander, or improving separation efficiency of sand from a flow stream. Pet. 24. Indeed, Petitioner does not allege that the Data Book is trying to solve any problem, nor could it—the Data Book is not trying to solve any problem; it is simply, as Petitioner acknowledges, “a well-known general reference publication.” Pet. 28.

Thus, the Board should find that Petitioner has failed to demonstrate that the Data Book is analogous art, and thus cannot be used in an obviousness combination. *In re Clay*, 966 F.2d at 660; *Smith & Nephew*, 721 Fed. Appx. at 949. Because Petitioner’s Grounds 2 relies on the combination of Hemstock and the Data Book (Pet. 47), and Ground 4 relies on the combination of Hemstock, Miller, and either Davis or the Data Book (Pet. 55) the Board should therefore deny institution of Grounds 2 and 4. *10x Genomics*, IPR2018-00708, Paper 7 at 20-21.

B. Petitioner Fails to Identify Its Proposed Combination with Clarity

The Petition is also fundamentally defective because it does not state with clarity what it alleges is its particular basis for Grounds 1 and 2, and by implication, Grounds 3 and 4.⁵ *See Harmonic Inc. v. Avid Tech, Inc.*, 815 F.3d 1356, 1363 (Fed.

⁵ *See* p. 8, *supra*.

Cir. 2016) (“In an IPR, the Petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.”).

The Petition opens with single-sentence statements of Petitioner’s alleged grounds. Pet. 2-3. Here, Petitioner states that Ground 1 is based on the theory that the claims are “obvious in view of *the combination* of Hemstock and Davis” and Ground 2 is based on the theory that the claims are “obvious in view of *the combination* of Hemstock and the Data Book.” Pet. 2-3 (emphasis added).

The Petition goes on to provide (across 18 pages) an element-by-element examination of all of Petitioner’s Prior Art, entitled “The Prior Art References Teach All Elements of the Challenged Claims.” Pet. 30-47. In this section, Petitioner lists every single element of the challenged claims, and provides a hodgepodge of citations to one or more of Hemstock, Davis, the Data Book, and Miller for each limitation. *Id.* Petitioner provides no argument or explanation for how the various elements of Hemstock, Davis, the Data Book and Miller are meant to be combined, and whether it is alleging one or more combinations or subset of combinations. For example, for claim element 1.2, Petitioner provides explanations for what each of Hemstock, Davis, and the Data Book allegedly disclose or teach. Pet. 32-33. The problem, of course, is that Petitioner does not indicate which disclosure it relies on for its proposed combinations (i.e., Hemstock alone, Davis alone, the Data Book alone, or some combination of these). Pet. 32-33. The same is true for every other

limitation and claim in this 18-page section of the Petition. Pet. 30-47. And to make the point more clearly, carried to its logical conclusion for claim 1, given that it has 10 different elements (1.0 – 1.9), this section of the Petition would theoretically allow for a total of 1152 different combinations of Hemstock, Davis, the Data Book and Miller.⁶

Petitioner again asserts that its Grounds rely on some unidentified **combination** of Hemstock and either Davis or the Data Book in section VI.C.2 of the Petition (spanning pp. 47-60), titled “Explanation of Asserted Grounds and Rationales Supporting a Conclusion of Obviousness.” Pet. 47 (“The first two grounds are the **combination** of Hemstock and either Davis (Ground 1) or the Data Book (Ground 2) . . . As shown in Section VI.C.1, Hemstock and Davis, or Hemstock and the Data Book, **collectively** possess every single element of the Base Claims.”) (emphasis added); *see also* 1002 ¶¶ 151-56.

Notably, in the above discussion, Petitioner does not identify any specific combination of Hemstock and either Davis or the Data Book it alleges meets the claim limitations of the ‘256 Patent. Instead, the punch line comes in the very last sentence of the introduction to Section IV.C.2 on page 48: “Hemstock discloses

⁶ $2 \times 3 \times 3 \times 2 \times 2 \times 2 \times 1 \times 2 \times 2 \times 2 = 1152$.

every element of the Base Claims except for the inclination of the vessel required by elements 1.2 and 9.2.” Pet. 48. Whether this statement is meant to convey some combination of Hemstock and either Davis or the Data Book is left unsaid in the 13-page Section. Moreover, Petitioner never actually provides any motivation to combine Hemstock with either Davis or the Data book, as explained further below.

Instead, Petitioner, in a sub-section titled “Ground 1: A POSITA would have been motivated to modify Hemstock based on Davis,” sets forth an *entirely new obviousness theory* that is *not* based on a combination of prior art at all. Pet. 48. Here, Petitioner states “A POSITA would have been motivated to *modify* Hemstock by inclining the desander, based on Davis’s teaching that an inclined tube or channel would achieve more rapid separation between the solid and liquid phases.” *Id.* (emphasis added). Petitioner makes a very similar claim for Ground 2. Pet. 49-50 (“A POSITA would have been motivated to *modify* Hemstock by inclining the desander, based on the Data Book’s teaching that an inclined device is desirable for absorbing the fluctuating liquid inlet flow rates through liquid level fluctuation.”) (emphasis added). Thus, despite alleging that its obviousness theories were based on a combination of prior art references for the first 47 pages of the Petition, Petitioner appears to switch obviousness theories mid-stream and alleges obviousness based on modifying Hemstock. As explained further below, Petitioner never actually provides any description or analysis of what this “modified

Hemstock” would look like or consist of, other than a vague statement that it would be “inclined.” Pet. 48, 49.

In light of the above, Petitioner leaves both SDI and the Board to guess what its particular obviousness theory entails for Grounds 1 and 2, and does not provide anywhere close to a complete obviousness theory for either Ground. As explained above, its Combination Theory lacks a proposed combination, and its Modification of Hemstock Theory lacks a specific modified version of Hemstock. For these independent reasons, the Petition should be denied in its entirety. *Adidas AG v. Nike, Inc.*, IPR2016-00921, Paper 6 at 21-22 (P.T.A.B. Aug. 21, 2016) (denying institution where the Board was “left to guess what limitations Petitioner seeks to supply from the teachings of each of [the asserted prior art] references.”).

Out of an abundance of caution, SDI addresses below why Petitioner fails under both a Combination Theory and a Modification Theory.

V. GROUND 1: CLAIMS 1-7, 9-11, 13 AND 16 ARE NOT OBVIOUS OVER HEMSTOCK AND DAVIS

Petitioner asserts that claims 1-7, 9-11, 13 and 16 are obvious over Hemstock and Davis. Pet. 47-48. For the reasons set forth below, the Board should deny institution of Ground 1.

A. Claim 1 Is Not Obvious over Hemstock and Davis

Claim 1 recites:

[1.0]⁷ A desanding system for receiving a gas stream containing entrained liquid and particulates comprising:

[1.1] a vessel elongated along a longitudinal axis and having a fluid inlet adjacent a first end of the vessel and a fluid outlet spaced along the longitudinal axis from the fluid inlet towards a second end of the vessel,

[1.2] said vessel being inclined from a horizontal at a non-zero inclination angle at all times during operation such that the fluid outlet is lower than the fluid inlet,

[1.3] the fluid inlet discharging the gas stream into the vessel at an inlet velocity,

[1.4] the gas stream travelling down the inclined vessel to the fluid outlet

⁷ For simplicity, SDI adopts the limitation numbering set forth by Petitioner in the Petition.

[1.5] the vessel having: a gas/liquid interface formed at the fluid outlet having a belly storage portion formed there below and a freeboard portion formed adjacent an upper portion of the vessel above the interface,

[1.6] the freeboard portion having a freeboard cross-sectional area which diminishes along the inclined vessel from the fluid inlet to the fluid outlet; and

[1.7] the freeboard portion at the fluid inlet causing the gas stream to have a freeboard velocity adjacent the fluid inlet which is less than the velocity of the fluid in the inlet, wherein the freeboard velocity is such that the entrained liquids and particulates fall out of the gas stream and collect in the belly storage portion, and

[1.8] wherein a desanded gas/liquid stream flows out of the freeboard portion and out the fluid outlet, being free of a substantial portion of the particulates, and

[1.9] particulates accumulate in the belly portion for flowing downvessel towards said second end.

Claim 1 is not obvious over the combination of Hemstock and Davis for at least the following reasons (relating to limitations 1.2, 1.5 and 1.6, respectively):

- 1. Petitioner's proposed combination does not disclose "said vessel being inclined from a horizontal at a non-zero inclination angle at all times during operation such that the fluid outlet is lower than the fluid inlet" (limitation 1.2)**

Claim 1 recites "said vessel being *inclined from a horizontal* at a non-zero inclination angle at all times during operation such that *the fluid outlet is lower than*

the fluid inlet.” Ex. 1001 (emphasis added). The proposed combination and/or modification does not disclose that limitation.

a. Petitioner has not shown the Combination of Hemstock and Davis discloses a vessel “inclined from a horizontal”

Petitioner and its expert concede that Hemstock does not teach a vessel “inclined from a horizontal” as required by claim 1. Pet. 32 (“Hemstock teaches a horizontal (*non-inclined*) vessel”) (emphasis added); Ex. 1002 ¶ 94 (Hemstock teaches a horizontal, *non-inclined* vessel) (emphasis added); *see also* Pet. 48. Therefore, Petitioner has not shown that Hemstock teaches this limitation.

To the extent Petitioner is relying on a combination of Hemstock and Davis, Davis also does not teach a vessel that is “inclined from a horizontal.” Petitioner cites only page 17 as evidence that Davis discloses this limitation, but that page of Davis explains inclining a settler from a vertical, *not* from a horizontal as is required by the claim. Pet. 32-33; Ex. 1005 at 17 (“These settlers may be composed either of a narrow tube or channel *inclined from the vertical.*”) (emphasis added). Although Petitioner does not rely on its expert for this limitation, Dr. Simpson also cites only page 17 of Davis to support that the settler of Davis is “inclined,” and does not analyze whether Davis is inclined from the horizontal or the vertical, or why a settler inclined from the vertical could meet the claim limitation. Ex. 1002 ¶ 95. Therefore, Petitioner has not shown that Davis teaches this limitation.

Since neither Hemstock nor Davis disclose a vessel “inclined from a horizontal” as required by claim 1, Petitioner has failed to demonstrate that the combination of Hemstock and Davis disclose limitation 1.2.

b. Petitioner has not shown that Davis-Modified Hemstock discloses “the fluid outlet is lower than the fluid inlet”

No Express Disclosure

Petitioner does not allege that either Hemstock or Davis expressly disclose that if Hemstock were inclined based on Davis, its “fluid outlet would be lower than the fluid inlet,” as required by the claim. Pet. 32-33. Petitioner only alleges that a POSITA would understand this claim limitation would be met by an unmodified Hemstock. Pet. 32. As explained above, an unmodified Hemstock, alone or in combination with Davis, does not meet the claim limitation “inclined from a horizontal.” Therefore, Petitioner has failed to show that a modified Hemstock expressly discloses limitation 1.2.

No Inherent Disclosure

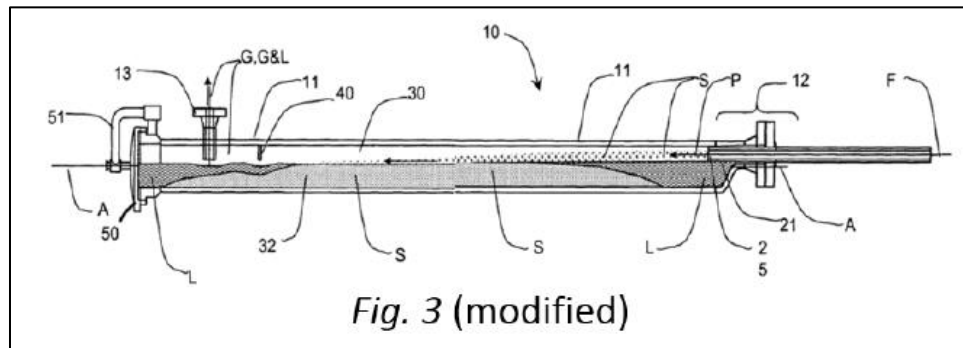
Petitioner includes only a single conclusory sentence regarding Hemstock modified based on Davis (“Davis-Modified Hemstock”): “if Hemstock were inclined, its fluid outlet would *necessarily* be lower than its fluid inlet.” Pet. 32 (emphasis added). As Petitioner is not relying on express disclosure in its prior art references, and is instead relying on what “necessarily” would occur, Petitioner must

rely on the doctrine of inherency to make its case, which requires that undisclosed features of the claim invention must be “necessarily present” or the “natural result” of an obviousness combination. *Par Pharma., Inc. v. TWI Pharms., Inc.*, 773 F.3d 1186, 1195-96 (Fed. Cir. 2014). The standard for showing inherency is high for an obviousness combination. *Id.* (“[a] party must [] meet a high standard in order to rely on inherency to establish the existence of a claim limitation in the prior art in an obviousness analysis”); *see also Sandoz Inc. v. EKR Therapeutics, LLC*, IPR2015-00007, Paper 20 at 10-13 (P.T.A.B. Apr. 24, 2015).

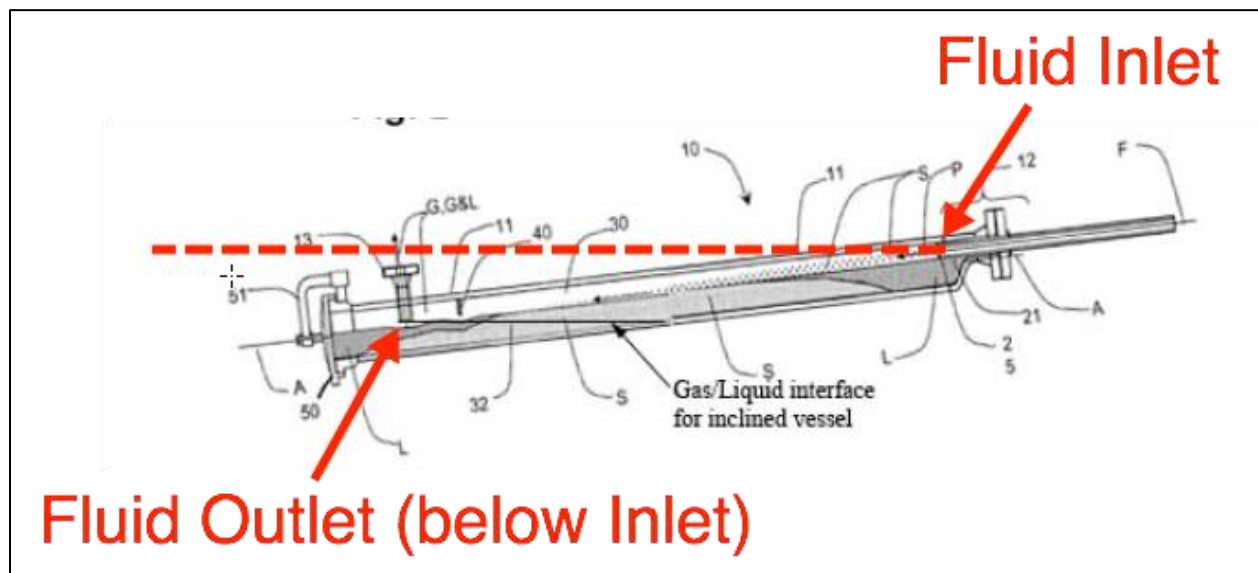
Petitioner has failed to show that modifying Hemstock by inclining the vessel based on Davis *necessarily results* in “the fluid outlet is lower than the fluid inlet,” and thus cannot show that this limitation is inherently disclosed by a modification. Petitioner relies solely on its expert for support of this argument. Pet. 32. Petitioner’s expert justifies his statement that “if Hemstock were inclined the fluid outlet would necessarily be lower than the fluid inlet” by providing an example of what a modified Hemstock would look like. Ex. 1002 ¶ 94. Dr. Simpson further elaborates that his modified Hemstock is “inclined at approximately the same angle as the vessel depicted in Figure 2 of the ‘256 Patent. Ex. 1002 ¶ 94. However, just because Dr. Simpson can imagine one example of an inclined Hemstock that meets the claim limitation does not mean that the claim limitation is “necessarily” met, as required under inherency law. Indeed, if Hemstock were inclined in the other

direction, its fluid outlet would be higher, and not lower, than its fluid inlet, and Davis discloses no preference for which direction its channel is inclined. Ex. 1005.

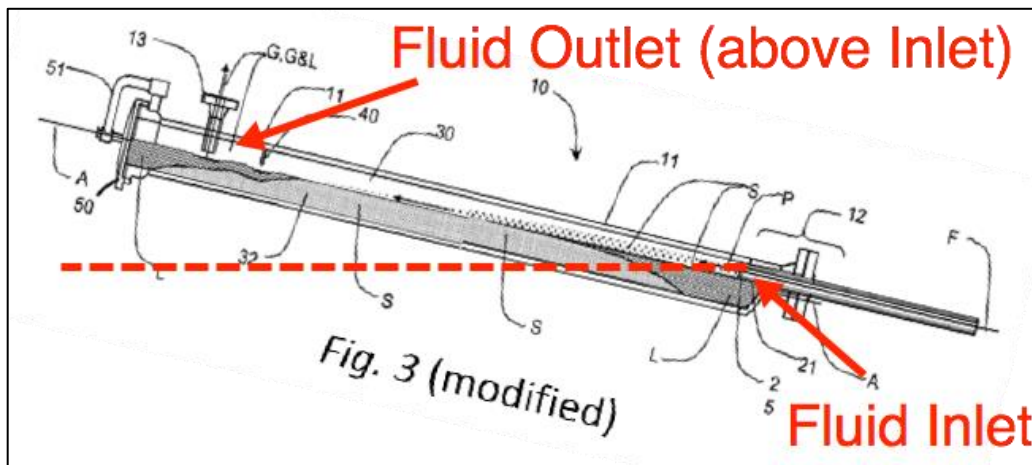
The annotated figures below demonstrate this point:



Dr. Simpson's Non-inclined Hemstock (Ex. 1002 ¶ 68)



Hemstock inclined counterclockwise (Dr. Simpson example, ¶ 94)



Hemstock inclined clockwise (fluid outlet above fluid inlet)

Neither Petitioner nor Dr. Simpson provide any explanation why Davis-Modified Hemstock would result in Hemstock being inclined in one direction or the other. Because simply inclining Hemstock does not necessarily result in the limitation “the fluid outlet is lower than the fluid inlet” being met, Petitioner has failed to show that Davis-Modified Hemstock inherently discloses limitation 1.2. Since Davis-Modified Hemstock does not expressly or inherently disclose “the fluid outlet is lower than the fluid inlet” as required by claim 1, Petitioner has failed to demonstrate that Davis-Modified Hemstock discloses limitation 1.2. *Qualtrics, LLC v. OpinionLab, Inc.*, 679 Fed. Appx. 1016, 1021 (Fed. Cir. 2017).

2. **Petitioner’s proposed combination does not disclose “the vessel having: a gas/liquid interface formed at the fluid outlet having a belly portion formed therebelow and a freeboard portion formed adjacent an upper portion of the vessel above the interface” (limitation 1.5)**

Claim 1 recites “the vessel having: *a gas/liquid interface formed at the fluid outlet* having a belly portion formed there below and a freeboard portion formed adjacent an upper portion of the vessel above the interface.” Ex. 1001 (emphasis added). The proposed combination and/or modification does not disclose that limitation.

- a. **Petitioner has not shown the Combination of Hemstock and Davis discloses a vessel having “a gas/liquid interface formed at the fluid outlet”**

Petitioner does not argue or provide any evidence that the alleged gas/liquid interface in Hemstock is “formed at the fluid outlet.” Pet. 34-35. Petitioner only argues that (1) there is a freeboard portion that is maintained using a depending flow barrier adjacent the vessel’s outlet, and (2) there exists a gas/liquid interface where the upper freeboard portion 30 and the belly portion 32 meet. *Id.* Petitioner provides no allegation as to where this gas/liquid interface is located, much less whether this interface is “formed at the fluid outlet” as required by the claim. *Id.* Petitioner relies solely on citations to Hemstock for this limitation, and does not cite its expert as support. *Id.* Nevertheless, Dr. Simpson simply copies the language of the Petition verbatim for this limitation as it relates to Hemstock, and therefore is entitled to little,

if any, weight. *See, e.g., Apple Inc., v. Uniloc Luxembourg S.A.*, IPR2017-02202, Paper 8 at 16-17 (P.T.A.B. May 1, 2018) (affording no weight to evidentiary support that consists “only of an unsupported verbatim statement in the Declaration” of an expert); *Subaru of America, Inc. v. Blitzsafe Texas, LLC*, IPR2018-00090, Paper 15 at 22-23 (P.T.A.B. Apr. 20, 2018) (same).

Neither Petitioner nor its expert provides any evidence regarding Davis for this claim limitation. Pet. 34-35; Ex. 1002 ¶¶ 102-104. Indeed, Davis does not disclose any “liquid/gas interface” or any “fluid outlet.” Ex. 1005.

Since neither Hemstock nor Davis disclose a “gas/liquid interface formed at the fluid outlet” as required by claim 1, Petitioner has failed to demonstrate that the combination of Hemstock and Davis disclose limitation 1.5.

b. Petitioner has not shown that Davis-Modified Hemstock discloses “a gas/liquid interface formed at the fluid outlet”

Petitioner provides no evidence or argument regarding its Davis-Modified Hemstock theory for limitation 1.5, including the portion of limitation 1.5 that reads “a gas/liquid interface formed at the fluid outlet.” Pet. 34-35. The Petition only includes descriptions of Hemstock (unmodified), and the Data Book (not asserted in Ground 1). Although Petitioner does not rely on its expert for this claim limitation (*see* Pet. 34-35), Dr. Simpson likewise does not provide any opinions or evidence regarding Davis-Modified Hemstock for limitation 1.5.

Since Petitioner does not allege that Davis-Modified Hemstock expressly or inherently discloses “the fluid outlet is lower than the fluid inlet” as required by claim 1, Petitioner has failed to demonstrate that Davis-Modified Hemstock discloses limitation 1.5.

3. Petitioner’s proposed combination does not disclose “the freeboard portion having a freeboard cross-sectional area which diminishes along the inclined vessel from the fluid inlet to the fluid outlet” (limitation 1.6)

Claim 1 recites “the freeboard portion having a freeboard cross-sectional area which *diminishes along the inclined vessel from the fluid inlet to the fluid outlet.*” Ex. 1001 (emphasis added). The proposed combination and/or modification does not disclose that limitation.

a. Petitioner has not shown the Combination of Hemstock and Davis discloses a freeboard cross-sectional area which “diminishes along the inclined vessel from the fluid inlet to the fluid outlet”

As described above in Section V(A)(1)(a), Petitioner concedes that Hemstock does not teach an “inclined vessel.” Thus, Hemstock cannot disclose “a freeboard cross-sectional area which diminishes along *the inclined vessel*” as required by claim 1.

Further, Petitioner concedes that Hemstock does not disclose that the cross-section of the freeboard portion “diminishes . . . from the fluid inlet to the fluid outlet,” as required by claim 1. Pet. 35. Instead, Petitioner admits that Hemstock

only suggests that the freeboard portion “has a smaller cross-sectional area at least one point between the fluid inlet and the fluid outlet.” Pet. 36. While Petitioner does not rely on its expert to support its analysis for this claim limitation, Dr. Simpson provides no further opinions or evidence regarding this claim limitation. Ex. 1002 ¶ 105. Thus, at best Petitioner has shown that the freeboard portion has a smaller cross-sectional area at a single point in the vessel, and not along the entire vessel from inlet to outlet (“diminishes . . . from the fluid inlet to the fluid outlet”) as required by claim 1.

Petitioner does not provide any evidence regarding Davis for this claim limitation. Pet. 35-36. Petitioner’s expert, Dr. Simpson, concedes that Davis does not teach a “freeboard portion,” because it does not disclose any gas region, and its “interface” is liquid and solid, not gas/liquid as required by the claim. Ex. 1002 ¶ 106; *see also* Pet. 19 (construing “freeboard portion” as “the ***substantially gas-filled portion*** of the desanding vessel ***above the gas/liquid interface.***”) (emphasis added).

Since neither Hemstock nor Davis disclose a vessel with a freeboard portion that “diminishes along the inclined vessel from the fluid inlet to the fluid outlet” as required by claim 1, Petitioner has failed to demonstrate that the combination of Hemstock and Davis disclose limitation 1.6.

- b. Petitioner has not shown that Davis-Modified Hemstock discloses a freeboard cross-sectional area which “diminishes along the inclined vessel from the fluid inlet to the fluid outlet”**

No Express Disclosure

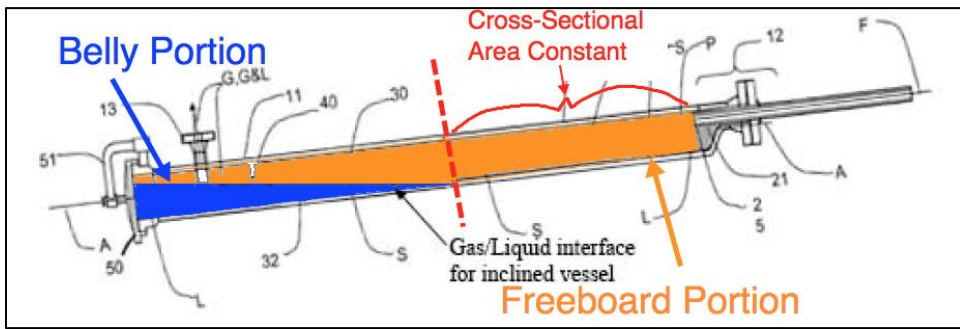
Neither Petitioner nor its expert present any evidence, opinions, or argument that Davis-Modified Hemstock expressly discloses a freeboard cross-sectional area that “diminishes along the inclined vessel from the fluid inlet to the fluid outlet” as required by limitation 1.6. Pet. 35-36; Ex. 1002 ¶ 105. Petitioner only argues “if Hemstock were inclined, the cross-sectional area of the freeboard portion would necessarily diminish along the vessel from the inlet to the outlet,” which requires an inherency analysis. Pet. 36; Ex. 1002 ¶ 43 (making the exact same statement); Section V(A)(1)(b) *supra*. Therefore, Petitioner has failed to show that Davis-Modified Hemstock expressly discloses limitation 1.6.

No Inherent Disclosure

As explained above with respect to limitation 1.2, in order to meet the high burden of showing an inherent feature in an obviousness combination, Petitioner must demonstrate that the undisclosed features of the claimed invention must be “necessarily present” or the “natural result” of that obviousness combination. Petitioner has failed to make that demonstration here.

Petitioner relies solely on its expert for this argument. Pet. 36. However, as referenced above, Dr. Simpson merely repeats the language of the Petition verbatim, and adds no opinions or facts to support this statement. Ex. 1002 ¶ 43. Therefore, Petitioner and its expert have failed to show that Davis-Modified Hemstock necessarily meets claim limitation 1.6.

Moreover, Dr. Simpson elsewhere in his declaration provides evidence that this claim limitation is **not** necessarily present in Davis-Modified Hemstock. In the only example Dr. Simpson provides of Davis-Modified Hemstock, he includes annotation of the “Gas/Liquid interface.” See Ex. 1002 ¶ 94. Although this placement of the Gas/Liquid interface is riddled with hindsight bias by angling it “at approximately the same angle as the vessel depicted in Figure 2 of the ‘256 Patent” (Ex. 1002 ¶ 94), it does provide an example of a modified Hemstock that does **not** have a freeboard cross-sectional area that “diminishes along the inclined vessel from the fluid inlet to the fluid outlet.” *Id.* Specifically, the annotated figure Dr. Simpson provides shows a freeboard cross-sectional area that remains constant for at least the first half of the vessel closest to the inlet, and only begins diminishing about half way down the vessel. A colored and further annotated reproduction of this figure is included below to help illustrate this point:



Annotated Version of Dr. Simpson's Modified Hemstock (Ex. 1002 ¶ 95)

Because the freeboard cross-sectional area remains constant from the fluid inlet until approximately half way down the vessel in Dr. Simpson's Davis-Modified Hemstock, he has provided evidence disproving that "if Hemstock were inclined, the cross-sectional area of the freeboard portion would necessarily diminish along the vessel *from the inlet to the outlet*." Pet. 36; Ex. 1002 ¶ 43. Thus, Petitioner has failed to show that Davis-Modified Hemstock inherently discloses limitation 1.6.

Since Davis-Modified Hemstock does not expressly or inherently disclose a freeboard cross-sectional area which “diminishes along the inclined vessel from the fluid inlet to the fluid outlet” as required by claim 1, Petitioner has failed to demonstrate that Davis-Modified Hemstock discloses limitation 1.6.

For all the foregoing reasons, Petitioner has failed to demonstrate that either the combination of Hemstock and Davis, or Davis-Modified Hemstock, discloses every limitation of claim 1 of the ‘256 Patent.

B. Independent Claim 9 Is Not Obvious over Hemstock and Davis

Petitioner does not provide separate analysis for independent claim 9, and instead relies exclusively on its previous discussion of various elements of claim 1, as well as discussion for claim 10, other than for the preamble language. Pet. 39-40. Petitioner does this despite different claim language between claim 1 and 9. Petitioner also does not identify, when it cites multiple claim limitations, which citation is meant to read on which portion of the asserted claim. For example, Petitioner's disclosure for limitation 9.2 reads, "*See Claims 1.2, 1.5, above and Claim 10 below.*" Petitioner leaves SDI and the Board guessing which part of claim limitation 9.2 is supported by its discussion of each of Claims 1.2, 1.5 and 10. Without such analysis, and without independent analysis of claim 9, if Petitioner's arguments fail with respect to the cited portions of claim 1, then Petitioner's arguments for claim 9 must also necessarily fail.

For claim limitation 9.2, Petitioner cites to claim limitations 1.2 and 1.5. Pet. 39. As explained above in Section V(A), Petitioner has failed to demonstrate that either the combination of Hemstock and Davis or Hemstock modified based on Davis discloses limitations 1.2 or 1.5 respectively. Therefore, Petitioner has failed to demonstrate that claim limitation 9.2 is disclosed either the combination of Hemstock and Davis, or by a modified Hemstock.

For claim limitation 9.4, Petitioner cites to claim limitation 1.5. Pet. 39. As explained above in Section V(A)(2), Petitioner has failed to demonstrate that either the combination of Hemstock and Davis or Davis-Modified Hemstock discloses limitation 1.5. Therefore, Petitioner has failed to demonstrate that claim limitation 9.4 is disclosed either the combination of Hemstock and Davis, or by Davis-Modified Hemstock.

Finally, Petitioner includes a statement for each limitation of claim 9, other than 9.2, that reads “The normal use and operation of Hemstock’s desander would necessarily and naturally result in the performance of this step.” Pet. 39-40. For each of these statements, Petitioner cites only to its expert. *Id.* Dr. Simpson, in turn, repeats this statement verbatim for each claim limitation, and does not provide any independent analysis or factual support for these statements. Ex. 1002 ¶¶ 118, 122, 124, 126, 128. An expert’s conclusory statement alone cannot support Petitioner’s apparent inherency argument for these claim limitations. *Wowza Media Sys., LLC v. Adobe Sys. Inc.*, IPR2013-00054, Paper 12 at 12 (P.T.A.B. Apr. 8, 2013) (finding that expert declaration which tracked and repeated arguments presented in the Petition was unhelpful and failed to support Petitioner’s assertions); *Kinetic Techs. v. Skyworks Solutions, Inc.*, IPR2014-00529, Paper 8 at 14 (P.T.A.B. Sept. 23, 2014) (“Expert testimony that does not disclose the

underlying facts or data on which the opinion is based is entitled to little or no weight. 37 C.F.R. § 42.65(a).”).

For all the foregoing reasons, Petitioner has failed to demonstrate that either the combination of Hemstock and Davis, or Davis-Modified Hemstock, discloses every limitation of claim 9 of the ‘256 Patent.

C. Claims 2-7, 10-11, 13 and 16 Are Not Obvious over Hemstock and Davis

Petitioner’s arguments as to claims 2-7, 10-11, 13 and 16 which all depend from claim 1 either directly or indirectly, each necessarily fail for the same reasons discussed above with respect to independent claim 1. See *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561, 1576, n.36 (Fed. Cir. 1987) (“Because [independent] claim 1 is not invalid, the presence of all its limitations in [dependent] claim 6 preserves the latter’s validity.”).

D. Petitioner Fails to Set Forth Any Persuasive Reason to Combine Hemstock and Davis or to Modify Hemstock

Petitioner’s obviousness challenge independently fails because Petitioner has not provided a reasoned basis for why a POSITA would have been motivated to combine Hemstock and Davis, why a POSITA would have been motivated to modify Hemstock, or why a POSITA would have had a reasonable expectation of success in doing either.

“[Obviousness] cannot be predicated on the mere identification . . . of individual components of claimed limitations. Rather, particular findings must be made as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed.” *In re Kotzab*, 217 F.3d 1365, 1371 (Fed. Cir. 2000). To this end, Petitioner must demonstrate that a POSITA (1) “would have been motivated to combine the teachings of the prior art references to achieve the claimed invention,” and (2) “would have had a reasonable expectation of success in doing so.” *Insite Vision Inc. v. Sandoz, Inc.*, 783 F.3d 853, 859 (Fed. Cir. 2015) (quoting *Procter & Gamble Co. v. Teva Pharm. USA, Inc.*, 566 F.3d 989, 994 (Fed. Cir. 2009)).

1. Petitioner Fails to Show a Motivation to Combine Hemstock and Davis or an Expectation of Success in Doing so

Nowhere in the Petition does the Petitioner provide any substantive evidence or argument on why a POSITA would be motivated to somehow combine Hemstock with Davis in any way. As explained above, Petitioner’s Ground 1 and 2 analysis begins with explaining that the “first two grounds are the combination of Hemstock and either Davis (Ground 1) or the Data Book (Ground 2).” Pet. 47. Petitioner also claims that the “differences between the [challenged claims] and either combination is such that the subject matter of each of these claims would have been obvious to a POSITA.” Pet. 47. Petitioner further states “Hemstock and Davis, or Hemstock and

the Data Book, collectively possess every single element of the Base Claims.” Pet. 47. Thus Petitioner discloses that its Ground 1 is based on the “combination” of Hemstock and Davis.

However, Petitioner’s motivation arguments have nothing to do with a combination of Hemstock and Davis, instead Petitioner focuses on modifying Hemstock “based on Davis’s teaching.” Pet. 48. Therefore, Petitioner’s obviousness theory based on a combination of Hemstock and Davis must fail. *See Johns Manville Corporation and Johns Manville v. Knauf Insulation, Inc. and Knauf Insulation SPRL*, IPR2018-00863, Paper 8 at p. 22 (P.T.A.B. Oct. 2, 2018) (finding no motivation to combine where “Petitioner does not expressly discuss whether a POSITA would have had a reason to combine the cited teachings of [the prior art]” while noting “It is not [the Board’s] role to scrutinize the Petition to locate such an argument.”). Likewise, Petitioner provides no substantive evidence or argument concerning whether a POSITA would have had reasonable expectation of success in combining elements of Hemstock with elements of Davis, which is a fatal defect. Pet. 51-52; *see Initiative for Medicines, Access & Knowledge (I-MAK) Inc. v. Gilead Pharmasset LLC*, IPR2018-00211, Paper 7 at 14 (P.T.A.B. Jun. 20, 2018) (denying institution on obviousness combination, stating “Petitioner has failed to show sufficiently whether or why a skilled artisan would have had a reasonable

expectation of success in combining the teachings of Legrand-Abravanel to achieve the invention of claim 1 of the '256 patent.”).

2. Petitioner Fails to Show a Motivation to Modify Hemstock Based on Davis or an Expectation of Success in Doing so

Petitioner’s motivation to modify Hemstock is based solely on a mischaracterization of Hemstock. Petitioner argues that a “POSITA, using the invention taught in Hemstock, would have desired more rapid sand settling in the liquid in order to prevent, to the maximum extent possible, re-entrainment of the solid particulates with tie liquid stream leaving via outlet 13.” Pet. 48. Petitioner cites only two pieces of evidence for this proposition, (1) its expert, Ex. 1002 ¶ 168, and (2) Hemstock, Ex. 1004 4:55-59. Neither citation provides support that a POSITA using Hemstock would desire to improve settling of sand in liquid.

First, Petitioner’s Expert does not provide any facts or arguments supporting Petitioner, instead he simply copies, virtually identically, the language of the Petition. *Compare* Pet. 47-48 *with* Ex. 1002 ¶¶ 166-169. Such expert testimony cannot provide a basis for a motivation to combine. *Wowza Media Sys., LLC v. Adobe Sys. Inc.*, IPR2013-00054, Paper 12 at 12 (P.T.A.B. Apr. 8, 2013) (finding that expert declaration which tracked and repeated arguments presented in the Petition was unhelpful and failed to support Petitioner’s assertions).

Second, Hemstock at column 4, lines 55-59 does not discuss any desire to increase the efficiency of sand settling in a liquid. Ex. 1004 4:55-59. The entirety of the cited passage reads “Typically, liquid L out of the fluid stream F accumulates in the belly portion 32 to a steady state level and then is re-entrained for discharge with fluids exiting the outlet 13 *without affecting the capability of the belly portion 32 to continue to accumulate particles S.*” Ex. 1004 4:55-59 (emphasis added). Thus Hemstock teaches that having the liquid be re-entrained for discharge does not affect the vessel’s ability to collect sand. This disclosure would not motivate a POSITA to search for methods for “more rapid sand settling in the liquid,” because it informs a POSITA that the vessel can collect sand whether or not liquid is being re-entrained for discharge. Petitioner’s citation to Hemstock simply does not support its motivation to modify argument.

Third, Petitioner’s reliance on *DyStar* is misplaced. Pet. 49. As the Federal Circuit later explained in *Arendi S.A.R.L. v. Apple Inc.*, the “common sense” approach to motivations to combine, such as the holding in *DyStar*, contains three important caveats, two of which are applicable here. 832 F.3d 1355, 1361 (Fed. Cir. 2016).

First, the court states, “common sense is typically invoked to provide a known *motivation to combine*, not to supply a missing claim limitation.” *Id.* (emphasis in original). The court further interprets *DyStar*, finding that it held a patent obvious

where “all claim limitations were found in a number of prior art references and a person of ordinary skill in the art would have combined the references to achieve a cheaper, faster, and more convenient process.” (quoting *DyStar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co.*, 464 F.3d 1356, 1367 (Fed. Cir. 2006)) (internal marks omitted). Here, as explained above, Petitioner is **not** arguing that Hemstock and Davis should be combined, it is arguing that Hemstock should be modified based on a teaching by Davis. Thus, this first caveat demonstrates that the holding of *DyStar* should not apply here.

Second, the court states that:

our cases repeatedly warn that references to “‘common sense’--whether to supply a motivation to combine or a missing limitation—cannot be used as a wholesale substitute for reasoned analysis and evidentiary support, especially when dealing with a limitation missing from the prior art references specified. Indeed, we stated that although there is no problem with using common sense without any specific hint or suggestion in a particular reference, the Board’s utter failure to explain the common knowledge and common sense on which it relied is problematic.”

Arendi, 832 F.3d 1355, 1362 (quoting *DyStar*). The Federal Circuit is exactly describing the situation here, where Petitioner makes a blanket statement that there is an implicit motivation, “simply improving particulate settling efficiency in the

prior art desander is sufficient as an implicit motivation to modify Hemstock,” and provides no reasoned analysis or evidentiary support to go with it. Pet. 49.

Finally, a POSITA would not have had a reasonable expectation of success in achieving the invention of the ‘256 Patent by relying on the teachings of Davis. As explained above, to the extent Davis teaches anything relevant to the ‘256 Patent, it teaches a “narrow tube or channel inclined from the vertical” (in applications far afield from the petroleum industry). Ex. 1005 at 17. Davis teaches why this inclination is effective, because “whereas particles can only settle onto the bottom in a channel with vertical walls, such particles can also settle onto the upward facing wall in a tilted channel.” Ex. 1005 at 17. Davis continues “Thus, one can interpret the increase in the settling rate as due to an increase in the surface area available for settling.” Ex. 1005 at 18. A POSITA, starting with Hemstock, would not be able to make use of this teaching. As explained above, Hemstock is a horizontal vessel, so Davis’s teaching regarding inclining a vertical vessel would not provide a POSITA with any ability to modify Hemstock. Ignoring that critical distinction, even if Davis were blindly followed, a POSITA would seek to increase the surface area of settling through inclination, but the surface of Hemstock used for settling is the bottom surface of an elongate vessel (*see* Hemstock Fig 3), and no second surface becomes available by inclining the vessel from the horizontal. Finally, Hemstock teaches that the mechanism that sand falls out of suspension is gravity, not, as Davis teaches,

“interaction with a surface area available for settling.” Ex. 1004 (“The particulates S are discharged horizontally from the nozzle 21 along path P, and as they fall from suspension, they adopt a downwardly curved trajectory under the influence of gravity.”). Therefore, Hemstock and Davis are not teaching the same physical processes for separation, and a POSITA would be unable to adopt the teachings of Davis to modify Hemstock.

Thus a person of ordinary skill at the time of the invention would not have been motivated to look to improve the settling efficiency of sand in liquid when using the Hemstock reference, and would not have a reasonable expectation of success in doing so based on the teachings of Davis.

For at least the foregoing reasons, the Petition fails to establish a reasonable likelihood of prevailing on Ground 1.

VI. GROUND 2: CLAIMS 1-13 AND 16 ARE NOT OBVIOUS OVER HEMSTOCK AND THE DATA BOOK

Petitioner asserts that claims 1-13 and 16 are obvious over Hemstock and the Data Book. Pet. 2-3. For the reasons set forth below, the Board should deny institution of Ground 2. For the most part, Petitioner’s arguments based on the Data Book are structured and set up in a way that track its very similar arguments based on Davis. As such, they suffer from the same defects discussed above in connection with Ground 1 and, therefore, the Petition should be denied for Ground 2 for

substantially similar reasons. In what follows, SDI fully addresses the arguments based on the Data Book (in a fashion and flow as to how they were handled in Ground 1 above).

A. Claim 1 Is Not Obvious over Hemstock and the Data Book

Claim 1 is not obvious over the combination of Hemstock and the Data Book for at least the following reasons:

- 1. Petitioner’s proposed combination does not disclose “said vessel being inclined from a horizontal at a non-zero inclination angle at all times during operation such that the fluid outlet is lower than the fluid inlet” (limitation 1.2)**

Claim 1 recites “said vessel being *inclined from a horizontal* at a non-zero inclination angle at all times during operation such that *the fluid outlet is lower than the fluid inlet.*” Ex. 1001 (emphasis added). The proposed combination and/or modification does not disclose that limitation.

- a. Petitioner has not shown the Combination of Hemstock and Davis discloses a “vessel inclined from a horizontal”**

As explained above in Section V(A)(1)(a), Petitioner concedes Hemstock does not disclose a “vessel inclined from a horizontal” as required by limitation 1.2, and therefore Petitioner has not shown that Hemstock teaches this limitation.

To the extent Petitioner is relying on a combination of Hemstock and the Data Book, the Data Book also does not teach a “vessel inclined from a horizontal.” Petitioner cites “slug catchers” discussed in the Data book, and specifically, slug

catchers “constructed of pipe” and a “multiple pipe (harp) slug catcher.” Pet. 33. However, the Data Book distinguishes between two types of “slug catchers”: “vessels” and “pipes.” Ex. 1008 at 3 (“A slug catcher may be a single large vessel *or* a manifolded system of pipes.”) (emphasis added). When the Data Book discusses slug catchers in the “vessel” implementation, in Section 7 Separators and Filters, it refers exclusively to “horizontal” or “vertical” vessels. *See* Ex. 1008 at 5 (in reference to “vertical separators,” “The ability to handle liquid slugs is typically obtained by increasing height”); Ex. 1008 at 7 (in reference to “horizontal separators,” “Increased slug capacity is obtained through shortened retention time and increased liquid level.”).

Petitioner instead relies on a completely different section of The Data Book, Section 17 Fluid Flow and Piping, which discusses “pipe” implementation slug catchers (*see* Ex. 1008 at 21). Pet. 33 (citing Fig. 17-21 of Ex. 1008 at 41). Here again the Data Book distinguishes between “vessel” slug catchers and “pipe” slug catchers, stating “Pipe type slug catchers are frequently less expensive than vessel type slug catchers of the same capacity due to thinner wall requirements of smaller diameter pipe.” Ex. 1008 at 41. It is only this pipe implementation that the Data Book depicts as “sloped.” Ex. 1008 at 41. Neither Petitioner nor its expert cite any evidence or argument that the pipe implementation of a slug catcher in the Data Book can be considered a “vessel,” and the Data Book teaches that the pipe

implementation is not a vessel. Therefore, Petitioner has not shown that the Data Book discloses a “vessel inclined from a horizontal.”

Since neither Hemstock nor the Data Book discloses a vessel “inclined from a horizontal” as required by claim 1, Petitioner has failed to demonstrate that the combination of Hemstock and the Data Book disclose limitation 1.2.

b. Petitioner has not shown that Data Book-Modified Hemstock discloses “the fluid outlet is lower than the fluid inlet”

No Express Disclosure

As explained above in Section V(A)(1)(b), Petitioner has failed to show that Hemstock modified to be inclined expressly discloses “the fluid outlet is lower than the fluid inlet,” a part of limitation 1.2. Therefore, Petitioner has failed to show that Hemstock modified to be inclined expressly discloses limitation 1.2.

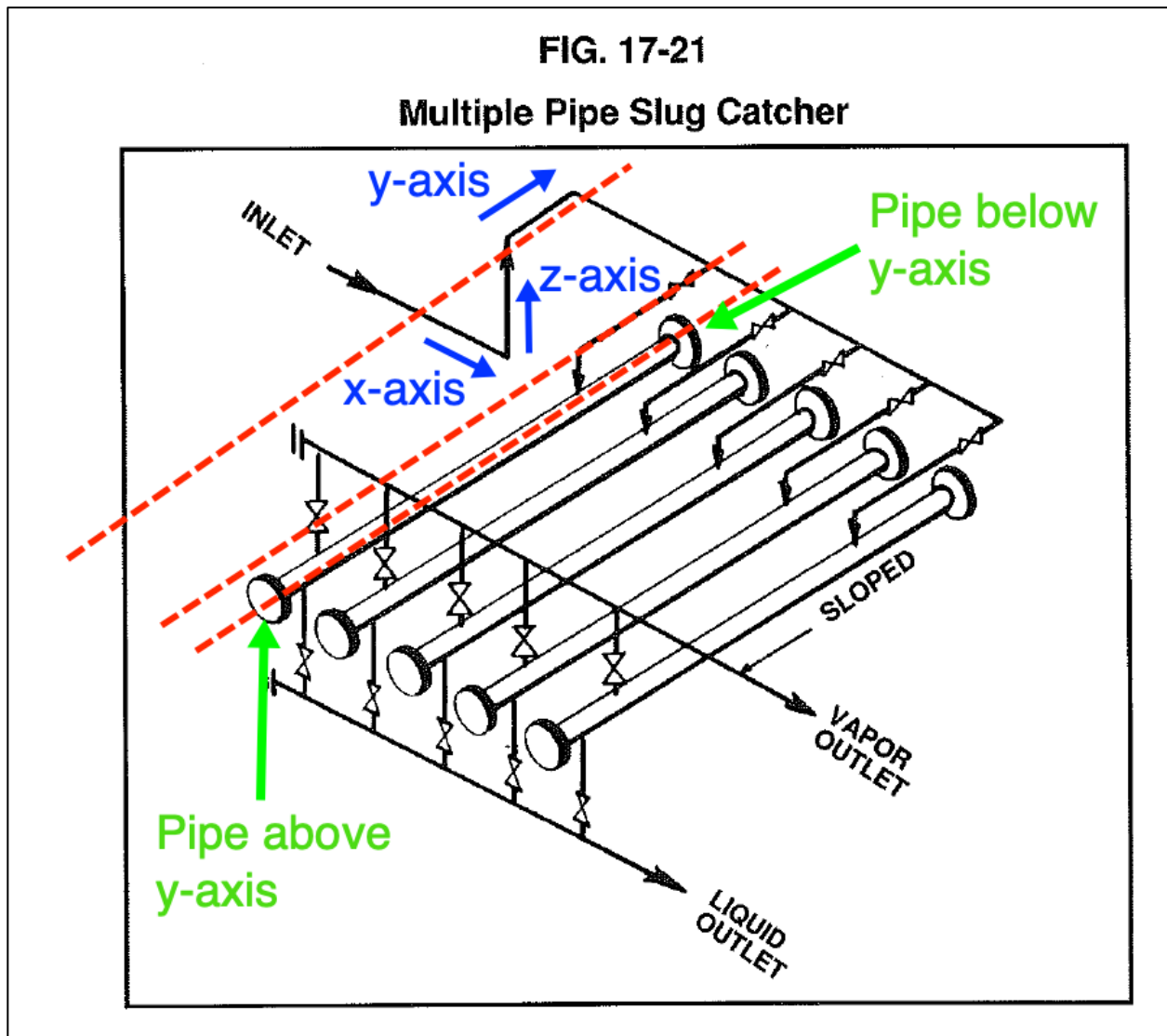
No Inherent Disclosure

Petitioner includes only a single conclusory sentence regarding Hemstock modified based on the Data Book (“Data Book-Modified Hemstock”): “if Hemstock were inclined, its fluid outlet would *necessarily* be lower than its fluid inlet.” Pet. 32 (emphasis added). As explained above, this type of statement requires Petitioner to rely on the doctrine of inherency, which requires that undisclosed features of the claim invention must be “necessarily present” or the “natural result” of an obviousness combination. *Par Pharma.*, 773 F.3d at 1195-96.

As explained above in Section V(A)(1)(b), inclining Hemstock does not necessarily result in “the fluid outlet is lower than the fluid inlet,” because if Hemstock were tilted in a clockwise direction, its fluid outlet would be higher than the fluid inlet. *See* Figures on pp. 29-30 *supra*.

Moreover, Petitioner concludes that, for the Data Book pipe slug catcher that it relies on, the “outlets are lower than the fluid inlet” (Pet. 33) based on its expert’s inexplicable conclusion that “due to the incline from inlet to outlet, the vapor and liquid outlets are necessarily lower than the fluid inlet” (Ex. 1002 ¶ 96). Common sense dictates that if a pipe is “inclined from inlet to outlet,” the outlet will be higher than the inlet, not lower. Indeed, the pipe slug catcher on which Petitioner relies is depicted as having an outlet that is higher than its inlet, and thus is a counterexample to Petitioner’s inherency argument.⁸ In the below annotated Figure 17-21 from the Data Book, axes can readily be determined from the direction of the “inlet” lines at the top of the figure, and have arbitrarily been designated as x-axis, y-axis, and z-axis:

⁸ Petitioner’s statement that “[b]oth of these outlets are lower than the fluid inlet” (Pet. 33) is unsupported by analysis or evidence.



Annotated Figure 17-21 from the Data Book (Ex. 1008 at 41)

Then, a red dashed line parallel to the y-axis was added to help clarify the perspective of the figure. Two additional red dashed lines were translated from this y-axis line, so that all three red-dashed lines are parallel in the annotated figure above. As can be seen, even by a layperson, the left side of the first pipe is above the y-axis line while the right side of the first pipe is below the y-axis line, as denoted by the green

arrows and labels. Thus, in this figure, the piping is angled such that the fluid outlet of the pipe is *higher* than the fluid inlet of the pipe. Therefore, if Hemstock were for some reason modified based on the teaching of pipe slug caters in the Data Book, then Hemstock would also be inclined so that the fluid outlet is higher than the fluid inlet, not “lower than the fluid inlet” as required by the claim. Petitioner therefore cannot show that Data Book-Modified Hemstock inherently discloses limitation 1.2.

Since Data Book-Modified Hemstock does not expressly or inherently disclose “the fluid outlet is lower than the fluid inlet” as required by claim 1, Petitioner has failed to demonstrate that Data Book-Modified Hemstock discloses limitation 1.2.

2. **Petitioner’s proposed combination does not disclose “the vessel having: a gas/liquid interface formed at the fluid outlet having a belly portion formed therebelow and a freeboard portion formed adjacent an upper portion of the vessel above the interface” (limitation 1.5)**

Claim 1 recites “the vessel having: *a gas/liquid interface formed at the fluid outlet* having a belly portion formed therebelow and a freeboard portion formed adjacent an upper portion of the vessel above the interface.” Ex. 1001 (emphasis added). The proposed combination and/or modification does not disclose that limitation.

a. Petitioner has not shown the Combination of Hemstock and the Data Book discloses a vessel having “a gas/liquid interface formed at the fluid outlet”

As explained above in Section V(A)(2)(a), Petitioner provides no evidence or argument that Hemstock discloses “a gas/liquid interface formed at the fluid outlet.”

Likewise, Petitioner provides no evidence or argument that the Data Book discloses “a gas/liquid interface formed at the fluid outlet.” Pet. 35. Petitioner only alleges that a gas/liquid interface exists, and takes no position on where such an interface is formed. *Id.*

Petitioner’s expert argues that a POSITA would have understood that a device such as the pipe slug catcher in the Data Book “necessarily has a gas/liquid interface which extends horizontally from the fluid outlet in the same manner as disclosed,” thus arguing that the Data Book inherently discloses this limitation. Ex. 1002 ¶ 104. However, Dr. Simpson immediately disproves his own statement, where he describes 3 “modes” of operation of such a slug catcher, two of which do not have a gas/liquid interface at the fluid outlet. *Id.* For example, in Dr. Simpson’s “mode 2,” which he calls “liquid starved,” Dr. Simpson testifies that “the liquid level falls below the outlet nozzle,” and therefore the gas/liquid interface is not at the outlet. Also, in Dr. Simpson’s “mode 3,” which he calls “liquid flooded,” Dr. Simpson testifies that “the gas/liquid interface rises to well above the outlet nozzle,” and

therefore the gas/liquid interface is again not at the outlet. Because Dr. Simpson provides two examples of the slug catcher in the Data Book not including the claim limitation, Petitioner's inherency argument must fail. *Par Pharma.*, 773 F.3d at 1195-96.

Since neither Hemstock nor the Data Book disclose "a gas/liquid interface formed at the fluid outlet" as required by claim 1, Petitioner has failed to demonstrate that the combination of Hemstock and the Data Book discloses limitation 1.5.

b. Petitioner has not shown that Data Book-Modified Hemstock discloses a vessel having "a gas/liquid interface formed at the fluid outlet"

Petitioner provides no evidence or argument regarding its Data Book-Modified Hemstock theory for limitation 1.5, including the portion of limitation 1.5 that reads "a gas/liquid interface formed at the fluid outlet." Pet. 34-35. The Petition only includes descriptions of Hemstock (unmodified), and the Data Book. Although Petitioner does not rely on its expert for this claim limitation (*see* Pet. 34-35), Dr. Simpson likewise does not provide any opinions or evidence regarding Data Book-Modified Hemstock for limitation 1.5 including the portion of limitation 1.5 that reads "a gas/liquid interface formed at the fluid outlet."

Since Petitioner does not even argue that Data Book-Modified Hemstock expressly or inherently discloses "a gas/liquid interface formed at the fluid outlet"

as required by claim 1, Petitioner has failed to demonstrate that Data Book-Modified Hemstock discloses limitation 1.5.

3. Petitioner’s proposed combination does not disclose “the freeboard portion having a freeboard cross-sectional area which diminishes along the inclined vessel from the fluid inlet to the fluid outlet” (limitation 1.6)

Claim 1 recites “the freeboard portion having a freeboard cross-sectional area which *diminishes along the inclined vessel from the fluid inlet to the fluid outlet.*” Ex. 1001 (emphasis added). The proposed combination and/or modification does not disclose that limitation.

a. Petitioner has not shown the Combination of Hemstock and the Data Book discloses a freeboard cross-sectional area which “diminishes along the inclined vessel from the fluid inlet to the fluid outlet”

As described above in Section V(A)(1)(a), Petitioner concedes that Hemstock does not teach an “inclined vessel.” Thus, Hemstock cannot disclose “a freeboard cross-sectional area which diminishes along *the inclined vessel*” as required by claim 1.

As further described above in Section V(A)(2)(a); Petitioner concedes that Hemstock does not disclose that the cross-section of the freeboard portion “diminishes...from the fluid inlet to the fluid outlet,” as required by claim 1. Pet. 35.

Petitioner does not provide any evidence or argument regarding the Data Book for limitation 1.6. Pet. 35-36. Petitioner does not rely on its expert for this limitation.

Pet. 35-36. Petitioner's expert opines that this claim limitation is "necessarily" met by the Data book, but this opinion appears to be based on the faulty assumption that the slug catcher in Figure 17-21 is sloped downward, when in fact it is sloped upward. *See* Section VI(A)(1)(b) and accompanying annotated Figure *supra*.

Since neither Hemstock nor the Data Book disclose a freeboard cross-sectional area which "diminishes along the inclined vessel from the fluid inlet to the fluid outlet" as required by claim 1, Petitioner has failed to demonstrate that the combination of Hemstock and the Data Book disclose limitation 1.6.

b. Petitioner has not shown that Data Book-Modified Hemstock discloses a freeboard cross-sectional area which "diminishes along the inclined vessel from the fluid inlet to the fluid outlet"

With respect to claim limitation 1.6, Petitioner does not analyze either Davis or the Data Book. Pet. 35-36. Instead, Petitioner simply asserts "[i]f Hemstock were inclined, the cross-sectional area of the freeboard portion would necessarily diminish along the vessel from the inlet to the outlet," without distinguishing between Davis-Modified Hemstock and Data Book-Modified Hemstock. Pet. 36. Therefore, for all the reasons discussed above in relation to Davis-Modified Hemstock (Section V(A)(3)(b) *supra*), Data Book-Modified Hemstock also does not disclose limitation 1.6.

For all the foregoing reasons, Petitioner has failed to demonstrate that either the combination of Hemstock and the Data Book, or Data Book-Modified Hemstock, discloses every limitation of claim 1 of the ‘256 Patent.

B. Claim 9 Is Not Obvious over Hemstock and the Data Book

Petitioner does not provide separate analysis for claim 9 in its Grounds 1 and 2. Pet. 48-50. Indeed, Petitioner does not mention the Data Book at all for claim 9. Pet. 48-50. Therefore, for all the reasons discussed in Section V(A) above, Petitioner has failed to demonstrate that either the combination of Hemstock and the Data Book, or Data Book-Modified Hemstock, discloses every limitation of claim 9 of the ‘256 Patent.

C. Claims 2-8, and 10-16 Are Not Obvious over Hemstock and the Data Book

Petitioner’s arguments as to claims 2-8, and 10-16 which all depend from claim 1, each necessarily fail for the same reasons discussed above with respect to independent claim 1. *See Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561, 1576 (Fed. Cir. 1987) (“Because [independent] claim 1 is not invalid, the presence of all its limitations in [dependent] claim 6 preserves the latter’s validity.”).

For at least the foregoing reasons, the Petition fails to establish a reasonable likelihood of prevailing on Ground 2.

D. Petitioner Fails to Set Forth Any Persuasive Reason to Combine Hemstock and the Data Book or to Modify Hemstock Based on the Data Book

Petitioner’s obviousness challenge independently fails because Petitioner has not provided a reasoned basis for why a POSITA would have been motivated to combine Hemstock and the Data Book, why a POSITA would have been motivated to modify Hemstock, or why a POSITA would have had a reasonable expectation of success in doing either.

“[Obviousness] cannot be predicated on the mere identification . . . of individual components of claimed limitations. Rather, particular findings must be made as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed.” *In re Kotzab*, 217 F.3d 1365, 1371 (Fed. Cir. 2000). To this end, Petitioner must demonstrate that a POSITA (1) “would have been motivated to combine the teachings of the prior art references to achieve the claimed invention,” and (2) “would have had a reasonable expectation of success in doing so.” *Insite Vision Inc. v. Sandoz, Inc.*, 783 F.3d 853, 859 (Fed. Cir. 2015) (*quoting Procter & Gamble Co. v. Teva Pharm. USA, Inc.*, 566 F.3d 989, 994 (Fed. Cir. 2009)).

1. Petitioner Fails to Show a Motivation to Combine Hemstock and the Data Book or an Expectation of Success in Doing so

Nowhere in the Petition does the Petitioner provide any evidence or argument that a POSITA would be motivated to combine Hemstock with the Data Book in any way. As explained above, Petitioner's Ground 1 and 2 analysis begins with explaining that the "first two grounds are the combination of Hemstock and either Davis (Ground 1) or the Data Book (Ground 2)." Pet. 47. Petitioner also claims that the "differences between the [challenged claims] and either combination is such that the subject matter of each of these claims would have been obvious to a POSITA." Petitioner further states "Hemstock and Davis, or Hemstock and the Data Book, collectively possess every single element of the Base Claims." Pet. 47. Thus Petitioner discloses that its Ground 2 is based on the "combination" of Hemstock and the Data Book.

However, Petitioner's motivation arguments have nothing to do with a combination of Hemstock and the Data Book, instead Petitioner focuses on modifying Hemstock "based on the Data Book's teaching." Pet. 50. Therefore, Petitioner's obviousness theory based on a combination of Hemstock and the Data Book must fail. *See Johns Manville Corporation*, IPR2018-00863, Paper 8 at p. 22 (finding no motivation to combine where "Petitioner does not expressly discuss whether a POSITA would have had a reason to combine the cited teachings of [the

prior art]” while noting “It is not [the Board’s] role to scrutinize the Petition to locate such an argument.”).

Likewise, Petitioner provides no evidence or argument concerning whether a POSITA would have had reasonable expectation of success in combining elements of Hemstock with elements of the Data Book, which is a fatal defect. Pet. 51-52; *see Initiative for Medicines*, IPR2018-00211, Paper 7 at 14 (P.T.A.B. Jun. 20, 2018) (denying institution on obviousness combination, stating “On this record, we find that Petitioner has failed to show sufficiently whether or why a skilled artisan would have had a reasonable expectation of success in combining the teachings of Legrand-Abravanel to achieve the invention of claim 1 of the ‘256 patent.”).

2. Petitioner Fails to Show a Motivation Modify Hemstock based on the Data Book or an Expectation of Success in Doing so

Petitioner’s motivation to modify Hemstock based on the Data Book depends on Petitioner mischaracterizing the Data Book. Petitioner argues that the Data Book teaches “an inclined device is desirable for absorbing the fluctuating liquid inlet flow rates through liquid level fluctuation.” Pet. 50. However, this is not the case for horizontal vessels, such as Hemstock. When discussing horizontal vessels like Hemstock, the Data Book teaches a different way of handling fluctuating liquid inlet flow rates, or “slugs”—decreasing the time the liquid remains in the vessel and increasing the liquid level in the vessel. Ex. 1008 at 7 (“Increased slug capacity is

obtained through shortened retention time and increased liquid level.”). Thus, a POSITA, when wanting to absorb slugs in a horizontal vessel, like Hemstock, would follow the teachings of the Data Book for a horizontal vessel and decrease the time the liquid remains in the level and/or increase the liquid level in the vessel, not incline the vessel. Petitioner also misleadingly relies on disclosure about pipe-type slug catchers, which the Data Book distinguishes from vessel-type slug catchers. Pet. 49 (citing Ex. 1008 at 41); Ex. 1008 at 3 (“A slug catcher may be a single large vessel *or* a manifolded system of pipes.”) (emphasis added); Ex. 1008 at 41 (“Pipe type slug catchers are frequently less expensive than vessel type slug catchers of the same capacity due to thinner wall requirements of smaller diameter pipe.”).

Additionally, Hemstock teaches away from using the type of horizontal slug catchers disclosed in the Data Book. The Data Book teaches three designs of separators, “Gas-Liquid separators” (Ex. 1008 at 9); “Filter Separators” which are described as “solid particles are filtered from the gas stream” (Ex. 1008 at 13); and “Liquid-Liquid separators” (Ex. 1008 at 13). A POSITA looking to modify Hemstock would be interested in the Filter Separator, since Hemstock is directed to removing sand from a fluid stream. Ex. 1001 1:5-7. In the filter separator discussion, the Data Book teaches using a fiber glass “filter pack” to remove particles from the liquid. Ex. 1008 at 13 (“The most common and efficient agglomerator is composed of a tubular fiber glass filter pack.... Small, dry solid

particles are retained in the filter elements and the liquid coalesces to form larger particles.”). However, Hemstock teaches away from using fiber mesh filters for removing sand from fluid streams. Ex. 1004 2:1-19 (“A common design is to have a number of fiber-mesh filter bags placed inside a pressure vessel. [...] In these cases, the fiber bags become a cause a [sic] pressure drop and often fail due to the liquid flow therethrough. Due to the high chance of failure, filter bags may not be trusted to remove particulates in critical applications or where the flow parameters of a well are unknown.”). Thus the Data Book is teaching a method for solid removal that Hemstock is attempting to overcome. Therefore a POSITA, given a reasonable understanding and plain reading of Hemstock, would have been actively discouraged from using the solid separator vessels taught by the Data Book. *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1327 (Fed. Cir. 2009). For these same reasons, a POSITA would not have a reasonable expectation of success in modifying Hemstock based on the Data Book.

VII. GROUNDS 3 AND 4: CLAIMS 8, 12, 14 AND 15 ARE NOT OBVIOUS OVER HEMSTOCK IN VIEW OF DAVIS AND MILLER OR HEMSTOCK IN VIEW OF THE DATA BOOK AND MILLER

Petitioner asserts that claims 8, 12, 14 and 15 are obvious over Hemstock, Davis and Miller (Ground 3), and Hemstock Davis and the Data Book (Ground 4). Pet. 3. Dependent claims 8, 12, 14 and 15 all depend from independent claim 1, either directly or indirectly. Ex. 1001. Petitioner does not allege that Miller cures

the above-described deficiencies of Hemstock and Davis (Ground 1) or Hemstock and the Data Book (Ground 2). Rather, Petitioner relies on Miller for disclosing certain limitations unique to each dependent claim. Pet. 44, 46. Thus, for at least the reasons discussed above with respect to Grounds 1 and 2, Petitioner has not demonstrated that there is a reasonable likelihood that dependent claims 8, 12, 14 and 15 would have been obvious in Grounds 3 and 4. *In re Fine*, 837 F.2d 1071, 1076 (Fed. Cir. 1988).

VIII. CONCLUSION

For the foregoing reasons, SDI respectfully requests that *inter partes* review is not instituted on any of the grounds in Petitioner's Petition.

RESPECTFULLY SUBMITTED,
RADULESCU LLP

Date: December 21, 2018

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CERTIFICATION UNDER 37 C.F.R. §42.24

The undersigned certifies that the foregoing **PATENT OWNER'S PRELIMINARY RESPONSE TO PETITION FOR *INTER PARTES* REVIEW** complies with the type-volume limitation in 37 C.F.R. § 42.24(b)(1). According to the word-processing system's word count, the brief contains 13,947 words, excluding the parts of the brief exempted by 37 C.F.R. § 42.24(a).

Date: December 21, 2018

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CERTIFICATE OF SERVICE

I hereby certify that on December 21, 2018, a copy of the foregoing:

**PATENT OWNER'S PRELIMINARY RESPONSE
TO PETITION FOR *INTER PARTES* REVIEW**

was served via email to counsel of record for Petitioner at the following:

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