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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 SUR-REPLY
TO PETITION FOR *INTER PARTES* REVIEW**

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I. INTRODUCTION

Petitioner's combination of Davis and Hemstock fails. Petitioner's alleged motivation to modify Hemstock based on Davis is to prevent additional sand from exiting the Hemstock vessel in order to prevent erosion. However, Hemstock discloses that it already removes sand sufficiently to prevent erosion. Moreover, Petitioner's expert admits that applying Davis to Hemstock *would not* prevent additional sand from exiting the Hemstock vessel. Thus, not only is there no motivation to modify Hemstock based on Davis, but also the proposed modification would not solve the problem identified.

Petitioner's combination of the Data Book and Hemstock also fails. Petitioner's alleged motivation to modify Hemstock based on the Data Book is to better handle the expected multiphase slug flow from oil and gas wells in Hemstock. However, Hemstock discloses that it has already solved the problem caused by slug flow, and further discloses that its embodiments can handle the expected multiphase flow from oil and gas wells. Moreover, application of the Data Book to Hemstock would result in the gas/liquid interface being positioned well below the fluid outlet, which does not meet Interface Limitations under either party's construction. Petitioner's argument to the contrary rests on applying a definition of "slug catcher" that Petitioner's expert concocted for the purposes of this IPR, and is contradicted by the express definition of "slug catcher" in the Data Book. Thus, not only is there

motivation to combine Hemstock and the Data Book, but also the proposed combination would not result in the claims of the '256 Patent.

For these, and all of the reasons discussed below and in the Patent Owner's Response, the Petition should be denied.

II. THE COMBINATION OF HEMSTOCK AND DAVIS DOES NOT RENDER OBVIOUS ANY ASSERTED CLAIM

A. Petitioner Has Not Shown a POSITA Would Be Motivated to Improve Hemstock based on Davis

Petitioner has failed to meet its burden to demonstrate by a preponderance of the evidence that a POSITA would have been motivated to modify Hemstock based on Davis. *In re Magnum Oil Tools Intl., Ltd.*, 829 F.3d 1364, 1381 (Fed. Cir. 2016) (holding motivation to combine and reasonable expectation of success are Petitioner's burden in an IPR).

Petitioner's sole motivation to modify Hemstock based on Davis—that a POSITA 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 the liquid stream leaving via outlet 13”—is contradicted by the record. Pet. 48. Petitioner's expert concedes that Hemstock teaches that further sand separation is not needed, and that his opinion regarding a motivation to modify Hemstock requires treating the clear disclosure of Hemstock as an “unsubstantiated claim.”

Q. All right. So after reading column 6 [of Hemstock], why would you still think more sand needs to be removed?

A. After reading column 6, I don't – after reading that sentence, if you could take it on face value, it doesn't. I don't believe you can take it on its face value.

[...]

Q. And so your opinion needs to ignore what that paragraph says.

A. It needs to treat that statement as an unsubstantiated claim.

Ex. 2008, 105:16-107:1. This opinion is based solely on Petitioner's "experience," and is unsupported by documents or citation to technical literature (Ex. 2008, 107:10-19), which is insufficient to contradict the clear teaching of Hemstock. *Ericsson Inc. v. Intell. Ventures I LLC*, 890 F.3d 1336, 1346 (Fed. Cir. 2018) ("To contradict a reference, an unsupported opinion is not substantial evidence.").

Further, as Mr. McGowen explained, Davis is not applicable to the turbulent flow regimes expected in Hemstock. Ex. 2001, ¶ 104. Although in Reply Petitioner argues for the first time that Davis is applicable to turbulent and laminar flow of liquids expected in Hemstock (again, based solely on the conclusory opinion of its expert (Reply 17)), Petitioner's expert concedes that his opinion is not based on any liquid flow in Davis. Ex. 2008, 138:13-15 ("Q. Is your obviousness opinion based on any liquid flow in Davis? Q. No.). Thus, the record is devoid of any evidence supporting that a POSITA would have been motivated to modify Hemstock based on Davis.

Finally, as explained in the next Section, Petitioner's expert admitted that applying Davis to Hemstock would not prevent additional sand from exiting the Hemstock vessel. That is, modifying Hemstock based on Davis would not solve the problem identified. As a result, separate and apart from a failure to demonstrate expectation of success, *see infra* Section II.B., there would be no motivation for a POSITA to make the modification in the first place.

B. Petitioner Failed to Analyze, Much Less Demonstrate, Expectation of Success

Petitioner fails to engage in any substantive analysis regarding whether the enhanced sedimentation described in Davis relating to suspensions in a stationary liquid would actually work in Hemstock involving turbulent flow and not involving a suspension. Pet. 51 (examining only whether a POSITA would be able to incline Hemstock). That is because it would not. Specifically, Petitioner's expert admitted during deposition that applying Davis to Hemstock *would not prevent any sand from getting to the outlet of Hemstock*. Ex. 2008, 162:9-13 ("Q. So by applying Davis to Hemstock, you are not preventing any sand from getting to the outlet. Is that right" A. That is right."). Thus, Petitioner cannot claim that a POSITA would reasonably expect to succeed modifying Hemstock based on Davis.

Tellingly, nowhere in either its Petition or its Reply does Petitioner ever mention the mechanism that Davis uses to enhance sedimentation, much less

whether it could be applied to Hemstock.¹ As Patent Owner's expert described in detail in his declaration, there are too many differences between Davis and Hemstock to even try this combination. Ex. 2001, ¶¶102-106. In Reply, Petitioner attempts to rebut Mr. McGowen's testimony, but it still does fails to address whether the teachings of Davis could actually be applied to Hemstock.

1. Mr. Simpson's Testimony Concerning Davis Regarding Applying Settling in Davis to Hemstock Is Not Credible

Mr. Simpson's Reply Declaration (Ex. 1006) identifies for the first time the particular sand he understood does not settle quickly enough and must be improved—"particulates striking the fluid outlet-flow barrier [which] would most probably fall into the liquid in the belly portion in the area immediately around the flow barrier—the very same liquid that could be re-entrained with the gas leaving the vessel." Ex. 1006, ¶27. However, when Mr. Simpson was asked to examine the flow characteristics of that sand, he was forced to concede that inclining Hemstock would not improve the settling of that sand. Ex. 2008, 293:15-19 ("Q. So you wouldn't expect inclining Hemstock to improve the sand that is falling in and

¹ Petitioner only focuses on whether a POSITA would be able to incline the Hemstock vessel, not on whether a POSITA could reasonably expect the enhanced sedimentation of Davis to succeed in Hemstock. Pet. 54.

becoming re-entrained, right? A. Correct.”).² Mr. Simpson’s testimony on cross examination concerning applying the settling mechanisms discussed in Davis to the sand in other portions of Hemstock makes clear that Davis could not improve sand settling in Hemstock, and that Mr. Simpson had not even considered whether it could be.

For example, Mr. Simpson first testified at deposition that his opinion encompassed sand in the Hemstock vessel that had already settled, became suspended again, and then resettled, and that Davis taught a mechanism for improving the settling of such sand:

Q. Does your opinion that Hemstock needs to be improved include sand which comes in the inlet, falls into the liquid portion

² Indeed, Mr. Simpson concedes that this sand will not reach the far wall of Hemstock (Ex. 2008, 293:6-14 (“Q. Right. So any sand that falls in the manner you’re describing above is going to get reentrained and go out the outlet; that’s what you’re saying here? A. It’s going to tend to do that, yes. Q. So it’s not going past the outlet to the far wall, right? A. Not that particular solid – that particular subset of the solids.”)), despite claiming that inclining Davis improves setting of sand in Hemstock against this far wall. Ex. 1006, ¶ 281.

of the belly, settles, becomes re-entrained in the liquid, and then needs to settle again?

A. Yes, it does. [...]

Q. In your opinion, does Davis teach that?

A. Yes.

Ex. 2008, 117:8-21. However, after being asked where Davis provides such a mechanism, Mr. Simpson admitted that it does not, and then changed his testimony to concede that his opinion does not include such sand:

Q. Although your opinion may include sand which has settled, becomes resuspended and settled again, Davis doesn't help you with improving that, right?

A. Okay. Not specifically, no, it does not.

Q. So your obviousness opinion is not talking about that settlement, right? Is that fair?

A. No, it is not

[...]

Q. You just testified that the sand which has settled, becomes resuspended and settles again is not part of your obviousness opinion. Are you saying it is again?

A. No, I'm not.

Ex. 2008, 121:16-122-3, 123:7-12.

Next, Mr. Simpson testified that Davis taught "how to improve the settling of sand which hasn't settled and an influx of liquid carries it somewhere else," such as sand near the fluid inlet of Hemstock. Ex. 2008, 133:10-14. But when asked to

identify where such disclosure was in Davis, Mr. Simpson conceded no such disclosure existed. Ex. 2008, 135:5-7 (“Where is liquid influx in Davis? A. There is not a liquid influx in Davis.”).

Finally, Mr. Simpson testified that in his opinion, Davis teaches that “it doesn’t matter what the state of the liquid is; as long as you’re inclining the vessel, you’re going to improve sedimentation.” Ex. 2008, 135:21-25. When asked where Davis provides such a sweeping generalization, Mr. Simpson testified that it could be found “all through” Davis. Ex. 2008, 136:1-4. However, when asked to point to any specific location in Davis supporting his assertion, Mr. Simpson conceded there was none. Ex. 2008, 136:5-8 (“Q. All right. Point me to a specific location please. (Document review by witness.) A. I’m not finding it.”) (parenthetical in original).

Since Mr. Simpson’s opinion is not grounded in the references, as amply demonstrated above, it should be disregarded as not credible.

2. There Is No Expectation of Success Because the Methods of Davis Cannot Be Applied to Hemstock

Nowhere in the Petition or the Reply does Petitioner explain how the sedimentation process of Davis, directed to a vertical narrow channel and laminar suspension conditions, can be applied to the horizontal, turbulent conditions of Hemstock. While Petitioner’s Reply treats this as an issue of semantics, the physical processes behind these conditions disallows Davis to be applied to Hemstock.

“Suspension”

Davis teaches sedimentation of a “suspension” and specifically teaches that increasing the area available for settling increases the probability a particle will randomly interact with a wall, increasing the settling efficiency. Ex. 1005 at 17. Hemstock does not have such a suspension. Ex. 2001, ¶103. In order to argue that Hemstock includes a suspension, Petitioner’s expert invents a definition of suspension in which particles are in a liquid and have a “horizontal liquid velocity,” carrying particles downstream. Reply 16. As Petitioner concedes, settling rate in such a system is a function of “particle size and settling velocity, as well as fluid velocity,” and not surface area available for settling as taught by Davis. *Id.* Petitioner’s expert further conceded that the inclination method of Davis does not apply to this overbroad definition of suspension:

Q. When Davis is talking about a suspension, is it applying the definition you’re talking about?

A. I believe so.

Q. So you think Davis is teaching that inclining a vessel will increase the sedimentation rate of a boulder in a stream?

A. A boulder in a stream?

Q. You testified that’s a suspension, right?

A. It absolutely is.

Q. In your opinion, will inclining the stream increase the sedimentation rate of the boulder?

A. No.

[...]

Q. There's no situation where the stream would be moving fast enough that the boulder wouldn't settle straightaway. Is that right?

A. Certainly, happens all the time.

Q. Okay. Imagine that situation. Does Davis apply to that situation?

A. No, nothing applies to that situation.

Q. Is that a suspension?

A. Yes.

Ex. 2008, 146:6-22, 149:9-17. When the proper definition of suspension is applied, a POSITA would not understand Hemstock to disclose a suspension of solids in a liquid as explained by Mr. McGowen. Ex. 2001, ¶103. Therefore, a POSITA would not be able to apply the teachings of Davis, which is limited to suspensions, to Hemstock, which does not include a suspension.

“Laminar Flow”

Davis also teaches that its enhanced sedimentation technique only applies to laminar systems, as any turbulence will reduce, rather than enhance, sedimentation. Ex. 1005 at 18, 21; Ex. 2001, ¶105. Although Petitioner argues that Davis is applicable to turbulent flow (Reply 17), its expert conceded multiple times that Davis is limited to laminar flow. Ex. 2008, 151:21-24 (“And Davis is limited to only

laminar flow, right? That's what you just testified. A. Yes."), 153:12-14 ("Q. But you're trying to apply a reference [Davis] which is limited to laminar flow to it [Hemstock], right? A. Yes."), 150:4-7 ("Does it [Davis] apply to a particle in the turbulent portion of Hemstock? A. No.").³ Petitioner admits that most of the Hemstock system will be turbulent, but argues that areas near the vessel wall will not be moving, and therefore will be laminar. Reply 17. However, Petitioner's obviousness argument is concerned with sand particles being carried down vessel and out of the outlet, i.e. not the sand particles contained in the still liquid of Hemstock. Reply 15. Indeed, Petitioner's expert conceded that sand in the still liquid of Hemstock would not escape the vessel. Ex. 2008 at 140:8-21. Thus, although Hemstock may contain some areas of laminar liquid flow according to Petitioner's expert, improving sand separation in these areas does not accomplish

³ Although on redirect Petitioner's counsel asked leading questions about a paragraph in Mr. Simpson's Reply Declaration regarding whether Davis can be applied to non-laminar flow regimes (Ex. 2008, 275:4-22), on re-cross Mr. Simpson admitted that the portion of Davis upon which he relied does not in fact support applying Davis to non-laminar flow regimes. Ex. 2008, 288:9-290:8.

the goal Petitioner argues is the motivation to combine: increasing settling efficiency to achieve less sand out of the outlet.

Petitioner also argues that a POSITA would expect laminar flow in Hemstock (Reply 17), yet its expert, Mr. Simpson, testified on cross-examination that he could not determine which parts, if any, of Hemstock he would expect to have laminar flow:

Q. Looking back at Figure 3 –

A. Okay.

Q. – can you identify which portions of Hemstock aren't turbulent?"

A. Not without some numbers.

Q. It's your opinion that part of Hemstock is laminar right?

A. Not without some numbers.

[...]

Q. So based on what Hemstock actually teaches – which you just read, right? – will there be any portion of Hemstock which is laminar?

A. ***There's no way to tell that.*** He's teaching that the inlet stream is high velocity, which would – without numbers, you can generally assume a high-velocity stream has a high Reynolds number and would be turbulent. Within the belly portion of the vessel, there is a range of velocities from zero to whatever the velocity of the freeboard section is. So whether there are regions

of the belly portion of Hemstock that are laminar, it's fairly likely.

Q. But you don't know for sure?

A. No, not without numbers

[...]

Q. You didn't do that calculation, right?

A. I don't have a set of conditions with which to apply those numbers.

Q. But you're trying to apply a reference which is limited to laminar flow to it, right?

A. Yes.

Q. How do you know you can do that?

A. You know you can do it by calculating the velocities in the particular stream that you're talking about.

Q. But you didn't do that, right? You didn't do that.

A. I didn't do that.

Ex. 2008, 150:9-18, 151:6-20, 153:9-23 (emphasis added). Mr. Simpson further testified that he would expect a portion of Hemstock to be laminar based on "more gut feel than anything else." Ex 2008, 156:18-157:4. Without any substantial evidence that a POSITA would have expected laminar flow in Hemstock, or that improving settling in any laminar flow would improve the sand removal process in Hemstock, Petitioner has failed to demonstrate that a POSITA, would have applied Davis to Hemstock.

III. THE COMBINATION OF HEMSTOCK AND THE DATA BOOK DOES NOT RENDER OBVIOUS ANY ASSERTED CLAIM

Petitioner has failed to support its obviousness ground based on Hemstock and the Data Book with substantial evidence. Petitioner asserts that a POSITA would have been motivated to improve slug flow capacity in the Hemstock vessel, based only on Mr. Simpson's unsupported opinions, despite contrary evidence in Hemstock itself. Petitioner also asserts that a POSITA would have understood the gas/liquid interface in the Data Book to be at the fluid outlet based solely on Mr. Simpson's understanding of slug catchers, yet Mr. Simpson himself admits that his understanding of slug catchers requires ignoring the text of the Data Book itself, and instead applying a definition he concocted for this IPR.

The record evidence shows that a slug catcher like the one in the Data Book relied on by Petitioner operated by placing the gas/liquid interface well below the fluid outlet. Patent Owner's expert laid this out in detail in his Declaration, using a contemporary reference (Rhinesmith) cited by the Data Book's authors as exemplary. And Mr. Simpson admits that while his understanding of slug catchers is contrary to the express definitions in the Data Book, the Rhinesmith slug catcher meets that definition. There is simply no evidence to support the proposition that a POSITA would have modified Hemstock based on the Data Book by inclining it such that the gas/liquid interface was at the fluid outlet.

A. Petitioner's Motivation to Combine Is Contradicted by the Record

Hemstock is not concerned with liquid slugs, in fact no part of Hemstock is concerned with handling liquid slugs. Reply 22 (“Hemstock does not disclose any way to handle liquid slugs”); Ex. 2008, 163:3-165-21 (Petitioner’s expert admitting that nothing in Hemstock supports the proposition that a POSITA would want to improve slug flow in Hemstock). Instead, Hemstock teaches that the problem with slug flow in desanders in the prior art—failing filter bags—was solved by the invention disclosed in Hemstock. Ex. 2001, ¶118; Ex. 1001, 6:16-35.

Petitioner incorrectly relies on Hemstock’s disclosure that the expected multiphase flow in Hemstock would include slugs as a motivation to better handle slug flow. Pet. 50. But as Petitioner’s expert admitted in his first deposition, Hemstock discloses that it is able to handle multiphase flow. POR 47; Ex. 2005, 82:21-83:10, Ex. 1001, 6:16-35. Now Petitioner pivots and attempts to distinguish between Hemstock’s disclosure that it can handle multiphase flow, and “the expected multiphase flow, including slug flow.” Reply 22. However, on cross-examination, Mr. Simpson admitted that the multiphase flow described in this portion of Hemstock is the expected flow from oil and gas wells, and that he has no reason to believe it does not include slug flow. Ex. 2008, 99:11-101:3 (“Q. Is there any reason for you to believe that this sentence was intended to exclude slug flow? A. No.”). Thus, no substantial evidence supports that a POSITA having read

Hemstock would seek to improve the slug flow capacity of the desanding vessel disclosed in Hemstock.

B. Petitioner Fails to Demonstrate that Inclining Hemstock Would “Improve Slug Flow”

As described further in Section D *infra*, petitioner’s only argument regarding motivation to combine is that a POSITA would have wanted to “maximize the desander’s ability to handle liquid slugs.” Pet. 50; Ex. 1002, ¶171; Reply 22-23. Yet the Data Book provides no support that inclining Hemstock would help maximize the desander’s ability to handle liquid slugs. Ex. 1008 at 41. Instead, Petitioner simply observes that a slug catcher in the Data Book is described as inclined, without identification of any benefit provided by such inclination. Pet. 49 (“The Data Book teaches that it was well known to use an inclined or sloped slug catcher to absorb the fluctuation liquid slugs...such devices are generally inclined from one to ten degrees.”). Nor does the Data Book explain that a sloped slug catcher performs better than a non-sloped slug catcher.⁴ Thus Petitioner has failed

⁴ Although Mr. Simpson testified on cross-examination that he believed that the benefit of inclining the pipe slug catcher in the Data Book was creating a freeboard portion in the pipe where none exists in a horizontal pipe, Mr. Simpson later recanted this testimony on redirect. Ex. 2008 181:9-182:10; 284:21-285:12. Regardless, Mr.

to meet its burden in showing any motivation to incline Hemstock based on the Data Book.

C. Petitioner's Arguments Regarding the Interface Limitations Based on the Understanding of a POSITA Are Contradicted by the Record

Petitioner fails to describe, either in the Petition or in Reply, how the teachings of the Data Book are meant to “maximize the device’s ability to handle liquid slugs,” including in devices like Hemstock. Pet. 50; Reply 22-23. Further, the Data Book itself provides no express disclosure regarding the processes used by its disclosed slug catcher to catch slugs, or the location of any gas/liquid interface. POR 47-50. Conversely, Mr. McGowen, Patent Owner’s expert, explains in detail that slug catchers like the one in the Data Book are able to catch slugs by creating extensive volume below the fluid outlet, which requires setting the gas/liquid interface well below the fluid outlet. Ex. 2001, ¶¶113-126. This evidence is supported by Rhinesmith, a reference contemporary with the ‘256 Patent, and cited by the next

Simpson also testified that Hemstock already has a freeboard portion (Ex. 2008 182:12-13), so creating a freeboard portion is not a motivation for a POSITA to incline Hemstock.

edition of the Data Book⁵ as exemplary to slug catcher design, and Mr. McGowen's testimony regarding the disclosures of Rhinesmith. Ex. 2001, ¶108-112; *see* Ex. 2004. Even Petitioner's expert concedes that in applying the Data Book to Hemstock, the preferred mode of operation would be "the way that we see the slug catcher most of the time is the fluid level below the outlet." Ex. 2008, 218:5-25.

Although the Parties dispute the meaning of the Interface Limitations, even under Petitioner's construction, the gas/liquid interface is required to be "adjacent, about, close, or near the fluid outlet." Reply 10-11. Thus, under either party's construction of the Interface Limitations, the gas/liquid interface needs to be at least close to or near the fluid outlet. As a result, Rhinesmith's exemplary explanation of slug catchers including a gas/liquid interface well below the fluid outlet would not meet either party's construction.

Petitioner argues that the slug catcher in the Data Book would have its gas/liquid interface at the fluid outlet rather than below the fluid outlet, but this argument is based on a fiction. Petitioner's sole evidence for its argument is Mr. Simpson's understanding of the slug catcher disclosed in the Data Book. Reply 19.

⁵ This version of the Data Book was published before the priority date of the '256 Patent. POR 43, n.5.

However, Mr. Simpsons' understanding of this slug catcher contradicts the express disclosure of the Data Book.

As previously explained, the Data Book defines "slug catcher" as a "separator," and a "separator" as "a vessel used to separate a mixed-phase stream into gas and liquid phases that are 'relatively' free of each other." Ex. 1008 at 3; POR at 43. Thus, the Data Book defines slug catchers as separating gas and liquid. Contrary to this definition, Petitioner's understanding of the slug catcher in the data book is that it is a "single phase separator" that does not separate liquid and gas, but instead sends both phases out of a single outlet. Reply 20-21.

Petitioner's "single phase separator" concept is allegedly based on its expert's understanding of the slug catcher disclosed in the Data Book. Reply 20-21 (citing Ex. 1006). But on cross-examination, Mr. Simpson admitted that he did not apply the definition of slug catcher from the Data Book in his analysis, and instead applied his own definition of slug catcher. Ex. 2008, 197:15-18 ("Q. Are you applying the definitions in the Data Book or are you applying your own definitions? A. I'm applying my own definitions."). Mr. Simpson also admitted that he invented the term "single phase separator." Ex. 2008, 197:20-198:2 ("Q. Why? A. [...] The term 'single phase separator' does not exist in literature, as far as I can see. Q. You made it up? A. *I made it up.*") (emphasis added). Moreover, Mr. Simpson admitted that

in order to accept his opinion regarding the operation of the slug catcher in the Data Book requires ignoring the definitions provided in the Data Book:

Q. So in your opinion, although the Data Book calls the slug catcher a separator in its definition, a slug catcher is not a separator?

A. The separator fails the definition of a – slug catcher fails the definition of separator in the Data Book

Q. So in order for the Patent Office to accept your opinion, we'd have to ignore these definitions, right?

A. I don't believe so.

Q. If it applied these definitions, it would understand that there was a liquid outlet and a gas outlet and those outlets were relatively free of one another, wouldn't it?

A. Yes.

Q. And your opinion is that it's not that, right?

A. Yes.

Q. So they would have to ignore the definitions in the Data Book to accept your opinion, right?

A. Yes.

Ex. 2008, 202:18-203:21.

Finally, Mr. Simpson conceded that the Patent Office should apply the definitions of the Data Book, and not his own definition, when interpreting the slug catcher in the Data Book. Ex. 2008, 200:22-201:3 (“Q. All right. So when you are asking the Patent Office to consider your testimony, would you like them to apply

the definitions in the Data Book or your own definitions when evaluating what the Data Book teaches? A. I would expect them to use the definitions in the Data Book.”). As Petitioner and Mr. Simpson’s description of the gas/liquid interface in the Data Book relies on a definition of slug catcher contradicted by the record, it should not be considered. *Ericsson Inc. v. Intell. Ventures I LLC*, 890 F.3d 1336, 1346 (Fed. Cir. 2018) (“To contradict a reference, an unsupported opinion is not substantial evidence.”).

Rather than dispute that the description of the slug catchers in Rhinesmith provided by Patent Owner’s expert is accurate, Petitioner in Reply characterizes Mr. McGowen’s arguments as a “strawman” because “these arguments [are] directed to an unasserted combination.” Reply. 19. Petitioner misses the point. The Data Book does not disclose where any gas/liquid interface is or should be located. Ex. 1008 at 41. Thus, Petitioner’s entire argument regarding the position of the gas/liquid interface in the Data Book, and in turn in the combination of Hemstock and the Data Book, rests on where a POSITA would have understood that gas/liquid interface to be in the slug catcher disclosed in the Data Book. And Petitioner’s argument rests on applying a definition of slug catchers contrary to the express definition of the Data Book, as described above. In contrast, Patent Owner’s argument relies on Mr. McGowen’s testimony relating to Rhinesmith, an exemplary slug catcher which Petitioner’s expert admits meets the definition of slug catcher set forth in the Data

Book. Ex. 2008 at 294:3-6. Thus, the record evidence supports Patent Owner's position only—that the gas/liquid interface would be well below the fluid outlet in the Data Book, and thus would be placed there if the Data Book were applied to Hemstock. Therefore, Petitioner's proposed modification fails to meet the Interface Limitations, even under Petitioner's construction of that term.

D. Petitioner Has Not Alleged Alternative Motivations to Combine

Petitioner argues in a single sentence that the Petition includes motivations to combine Hemstock and the Data Book beyond wanting to improve slug flow in Hemstock. Reply 23. Not so.

The Petition devotes three paragraphs to a supposed motivation to modify Hemstock based on the Data Book, none of which provide a cogent motivation to modify theory. Pet. 49-51. The first paragraph states that the Data Book teaches “an inclined device is desirable for absorbing the fluctuating liquid inlet flow rates through liquid level fluctuation.” This relates to a discussion about slug flow in the Data book, and provides no information or argument regarding why a POSITA would want to apply such a teaching to Hemstock. The third paragraph argues that Hemstock and the Data Book both function as “single-phase separators” and thus concludes that “a POSITA would have recognized that the Data Book's inclined design would be effective and useful for Hemstock.” This paragraph does not identify any benefit to the Data Book's inclined design, or any other benefit of the

Data Book that could be applied to Hemstock, much less why such a benefit would be useful for the Hemstock desander. Pet. 49-51.

This leaves the second paragraph, which argues that a POSITA would have wanted to “maximize the [Hemstock] device’s ability to handle liquid slugs.” Pet. 50. Petitioner’s only evidence supporting this claim is that Hemstock discloses multiphase flow that may include slugs. As previously described, Hemstock only discloses slugs as problems with filter bags in the prior art that the Hemstock vessel solves. POR at 46-47. Petitioner provides no support for its argument that a POSITA would have sought to improve Hemstock to better deal with slug flow, other than its expert. Pet. 50. It’s expert in turn parrots the Petition, and again cites the prior art problem that Hemstock solves. Pet. 50; Ex. 1002 ¶171. Further, on cross examination, Petitioner’s expert testified that the only basis in Hemstock for wanting to improve slug flow was Figure 3, in relation to which he testified “the first thought that went through my mind when I looked at it was, that’s not a lot of room,”—hardly substantial evidence of a motivation to improve Hemstock. This leaves no substantial evidence to support Petitioner’s alleged motivation to modify.

IV. CLAIM CONSTRUCTION

The parties’ dispute over the Interface Limitations is relevant only to whether Hemstock itself discloses the Interface Limitations, and based on this disclosure, the combination of Davis and Hemstock also discloses the Interface Limitations. As

described above and throughout Patent Owner's Response, there are numerous reasons why there is no motivation to combine Davis and Hemstock. Should the Patent Office agree, construction of the Interface Limitations would be unnecessary.

Regarding the combination of Hemstock and the Data Book, under Petitioner's view of the Data Book, the Interface Limitations would be met by either party's construction. Conversely, under Patent Owner's view, neither party's construction would be met. For this additional reason, construction of the Interface Limitations is unnecessary here.

Should the Patent Office need to construe the Interface Limitations, it should adopt Patent Owner's construction for all the reasons set forth in the Patent Owner's Response. POR 10-15. Petitioner's arguments all rely on Figure 7 of the '256 Patent instead of Figures 2 and 4. Reply 3-11. However, Figures 2 and 4 are described in the '256 Patent as relating to the positioning of the gas/liquid interface, and Figure 7 is not. Ex. 2008 at 252:20-253:4. Further, Petitioner argues that the correct construction of the Interface Limitations should not exclude the embodiment of Figure 7. Reply 10. However, the claims need not cover every embodiment of the patent. *PPC Broadband, Inc. v. Corning Optical Commc'ns RF, LLC*, 815 F.3d 747, 755 (Fed. Cir. 2016) ("[E]ach and every claim" need not "be interpreted to cover each and every embodiment"). Therefore, Patent Owner's construction should be adopted, if necessary.

V. THE COMBINATION OF HEMSTOCK, MILLER AND EITHER DAVIS OR THE DATA BOOK DOES NOT RENDER OBVIOUS ANY ASSERTED CLAIM

Patent Owner has demonstrated that none of Hemstock, Miller, Davis, or the Data Book disclose the limitation “wherein said vessel has a smaller diameter downstream of the fluid outlet” of claims 12 and 13 of the ‘256 Patent. On Reply, Petitioner provides no evidence that any reference discloses this limitation. Reply 25; Ex. 1006 ¶¶308-309. Instead, Petitioner appears to argue that the combination may still have this missing limitation based on “common sense and background knowledge of a POSITA.” Reply 25. However, the Federal Circuit has made clear that its 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.” *DSS Tech. Mgmt., Inc. v. Apple Inc.*, 885 F.3d 1367, 1374 (Fed. Cir. 2018). Here, Petitioner simply asserts that despite any description in any reference of the missing limitation, that some proposed combination would include it. Reply 25. Petitioner simply saying that some undisclosed combination would include this missing limitation, without any reasoned analysis, cannot invalidate these claims.

VI. CONCLUSION

For the foregoing reasons, the Board should find that Petitioner fails to establish the unpatentability of any challenged claim.

Respectfully submitted,

Date: September 23, 2019

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CERTIFICATION UNDER 37 C.F.R. §42.24

The undersigned certifies that the foregoing **PATENT OWNER’S SUR-REPLY TO PETITION FOR *INTER PARTES* REVIEW** complies with the type-volume limitation in 37 C.F.R. § 42.24(c)(1). According to the word-processing system’s word count, the brief contains 5,552 words, excluding the parts of the brief exempted by 37 C.F.R. § 42.24(a).

Date: September 23, 2019

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CERTIFICATE OF SERVICE

I hereby certify that on September 23, 2019, a copy of the foregoing:

**PATENT OWNER'S SUR-REPLY
TO PETITION FOR *INTER PARTES* REVIEW**

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