



**Liberty Energy, Inc. and Liberty Oilfield Services LLC
v.
U.S. Well Services, LLC**

**IPR2025-00031
U.S. Patent No. 10,655,435**

**Patent Owner's Demonstrative Exhibits
February 19, 2026**

Grounds 1, 2, and 5: Norris Fails to Disclose or Render Obvious the Claimed “Acceptable Threshold”

“Desired Settings” Fail to Disclose or Render Obvious the Claimed “Acceptable Threshold”

- **All challenged claims require measuring “one or more parameters” and determining whether a “first parameter” is “outside of an acceptable threshold.”**
 - **Claim 1**
 - **1[d]**: a plurality of sensing devices configured to measure one or more parameters of the plurality of pumps and the distribution system;
 - **1[e][ii]**: detect that the first parameter is outside of an acceptable threshold; and
 - **Claim 7**
 - **7[d]**: measuring one or more parameters of the plurality of pumps, the distribution system, or the wellhead via a plurality of sensing devices instrumented thereon;
 - **7[e]**: detecting that a first parameter of the one or more parameters is outside of an acceptable threshold;
 - **Claim 13**
 - **13[b]**: measuring one or more operational parameters of the plurality of pumps, the distribution system, or the wellhead;
 - **13[d]**: detecting that the first parameter is outside of an acceptable threshold;
- **Petitioners’ Expert Dr. Durham and Langewis Confirm the Objective Distinction Between Norris’ Desired Settings and the 435 Patent’s Acceptable Threshold**

Source: Paper 29 (PO Sur-Reply) at 1; Paper 1 (Petition) at 13, 16, 29, 30; EX-1003 at 83, 90, 139, 141, 156, 156.

Norris' Desired Settings Fail to Disclose or Render Obvious the Claimed Acceptable Threshold

- The Petition incorrectly relies on Norris's application controller and/or local pump control that compares measured rates with "desired rates." Pet., 16–17, 32.
- Desired rates, however, are not acceptable thresholds. EX-2010, ¶¶ 65, 67. Petitioners' expert Dr. Durham admitted as much:

Q: Could a desired level of pump performance here be higher than an acceptable level of performance, as described in Langewis?

A: Yes, You may want a higher – oftentimes, we do design systems that have a higher positive suction head than the minimum. EX-2012, 19:24–20:4 (discussing Langewis's use of the term "acceptable pump performance" as it related to minimum pressure required for acceptable pump performance). EX-2010, ¶ 67.

Q: In other words, a POSITA might desire a higher pump performance, but this level of performance is acceptable, right?

A: Acceptable to prevent cavitation, according to the Langewis.

Q: Even though a POSITA might desire a higher pump performance, right?

A: It may.

...

A: I said a POSITA may desire a different performance or a higher pressure.

Q: And below this minimum pressure, the pumps would be at higher risk of damage, right?

A: Yes. That's a fair statement. EX-2012, 18:7–22 (same).

EX-2012, 18:7–22.

Source: POR (Paper 20) at 16–17.

- Dr. Nikolaou agrees that a POSITA might desire a higher pump performance than an acceptable level of performance. EX-2010, ¶¶ 67–68.
- Norris's "desired pressure and flow rates" rely on continuous "increasing or decreasing" changes in pumping operations to attain the "desired rates":
 - Upon variation from the ***desired settings***, multiple drivetrain controller 402 will signal each local drivetrain controller 405 to ***increase or decrease pumping operations***. The resulting change in pumping operations will restore the ***desired pressure and flow rates*** at pressure side manifold 250b and wellhead 180. EX-1004, [0037] (emphases added).

Source: POR (Paper 20) at 17.

Norris' Desired Settings Fail to Disclose or Render Obvious the Claimed Acceptable Threshold

- These adjustments to attain “desired rates” cannot satisfy “*detect[ing] that the first parameter is outside of an acceptable threshold*” for at least two reasons. EX-2010, ¶¶ 69–74.
- First, Norris’s desired rates cannot be claimed “*acceptable threshold[s]*” because there is no claimed “*detect[ion]*” of being “*outside of an **acceptable** threshold.*” EX-2010, ¶ 70.
- Any reasonable construction requires an acceptable threshold to indicate a merely adequate limit. EX-2010, ¶ 70; EX-2013 (*Acceptable*, CollinsDictionary.com, <https://www.collinsdictionary.com/us/dictionary/english/acceptable> (last visited August 20, 2025) (defining *acceptable* as “merely adequate”); EX-2014 (*Acceptable*, Cambridge.org, <https://dictionary.cambridge.org/us/dictionary/english/acceptable> (last visited August 20, 2025) (defining *acceptable* as “just good enough, but not very good”). EX-2010, ¶ 70.

Source: POR (Paper 20) at 18.

- In turn, a “threshold” is a defined point or value or limit that typically requires action when it is exceeded.

See EX-2002 (*Threshold*, Merriam-Webster.com, <https://www.merriam-webster.com/dictionary/threshold> (last visited Jan. 22, 2025) (defining *threshold* as “a level, point, or value above which something is true or will take place and below which it is not or will not”); EX-2003 (*Threshold*, CollinsDictionary.com, <https://www.collinsdictionary.com/us/dictionary/english-word/threshold> (last visited Jan. 30, 2025) (defining *threshold* as “an amount, level, or limit on a scale,” and explaining that “[w]hen the threshold is reached, something else happens or changes”); EX-2004 (*Threshold*, Britannica.com, <https://www.britannica.com/dictionary/threshold> (last visited Jan. 29, 2025) (defining *threshold* as “the point or level at which something begins or changes,” and illustrating usage with example that “sounds that are above/below the threshold of hearing” are “sounds that are too high/low to be heard”); EX-2010, ¶ 71;

Source: POR (Paper 20) at 18–19.

- ***O2 Micro Int'l Ltd. v. Sumida Corp.***, 2005 U.S. Dist. LEXIS 46584, *9 (E.D. Tex. March 8, 2005) (construing the claimed term “threshold” to mean “the value of current, voltage or other quantity at which something happens,” which requires “certain events to occur if the value is at or above a threshold”).

Source: POR (Paper 20) at 19.

- Thus, a POSITA would have understood the plain and ordinary meaning of an “acceptable threshold” to be a high or low value or limit that, when crossed, requires action or change. EX-2010, ¶ 72. This is consistent with how the ’435 Patent uses the term as well. EX-2010, ¶ 72; see EX-1001, 10:4-9 (explaining that when a parameter associated with a pump is “outside of an acceptable threshold,” the pump is “automatically adjust[ed] or turn[ed] off”); 11:11-15 (“The method 180 may further include detecting that a measurement associated with a first pump of the plurality of pumps is outside of an acceptable threshold, and automatically taking the first pump offline in response to the detection.)).

Source: POR (Paper 20) at 19-20.

- Norris's system discloses no such acceptable threshold.
- Norris's system, as described in the Petition, instead uses increasing and decreasing pump parameters to configure the system to operate at “**desired rates.**” Pet., 16–17 (citing EX-1004, [0035], [0037]–[0038]); see Pet., 32; EX-2010, ¶ 73.
- The Petition does not provide any explanation for how Norris's usage of “**desired rates**” satisfies the claimed “**detection**” of a parameter being “**outside**” an acceptable threshold. EX-2010, ¶ 73.

Source: POR (Paper 20) at 20.

- Norris's “**desired rates**” cannot satisfy the claimed “***acceptable***” threshold.
- “**Desired**” and “**acceptable**” have inconsistent meanings, and the Petition provides no explanation to reconcile those differing meanings. EX-2010, ¶ 74; EX-2015 (*Desired*, CollinsDictionary.com, <https://www.collinsdictionary.com/us/dictionary/english/desired> (last visited August 20, 2025) (defining *desired* as “yearned or wished for; coveted”).

Source: POR (Paper 20) at 21.

- Dr. Durham admits as much:

Q: You also don't explicitly compare the definitions of the terms "desired" and "acceptable," right?

A: Well, correct. There is no particular definition other than their plain and ordinary meaning. EX-2012, 27:25–28:5 (objections omitted).

- The Petition thus effectively ignores the claim term "**acceptable**" in failing to address that term. See Pet., 16–17.
- ***Bicon, Inc. v. Straumann Co.***, 441 F.3d 945, 950 (Fed. Cir. 2006) (holding claims must be "interpreted with an eye toward giving effect to all terms in the claim"); EX-2010, ¶ 75.

Source: POR (Paper 20) at 21.

- The Petition fails to give any limiting effect to the claim term “acceptable” and improperly reads out the term from the claim.
- *See Playtex Prods., Inc. v. Procter & Gamble Co.*, 400 F.3d 901, 909–10 (Fed. Cir. 2005) (claim construction was flawed in part because it read “substantially flattened” as “flat,” effectively ignoring the “substantially” qualifier in the claim); EX-2010, ¶ 75.

Source: POR (Paper 20) at 21–22.

Norris' Desired Settings Fail to Disclose or Render Obvious the Claimed Acceptable Threshold

- The record confirms that acceptable thresholds are different from desired rates. EX-2010, ¶ 76.
- Specifically, the '435 Patent explains that the claimed “*acceptable threshold*” is used to trigger actions caused by exceedance of an operational limit—not an ideal or desired setting. EX-2010, ¶ 76.
- Dr. Durham admits as much:

Q: And if that received parameter is to be – is determined to be outside of an acceptable threshold, then, according to the system of the '435 patent, the system may turn off that pump, right?

A: In this embodiment, it may, correct.

...

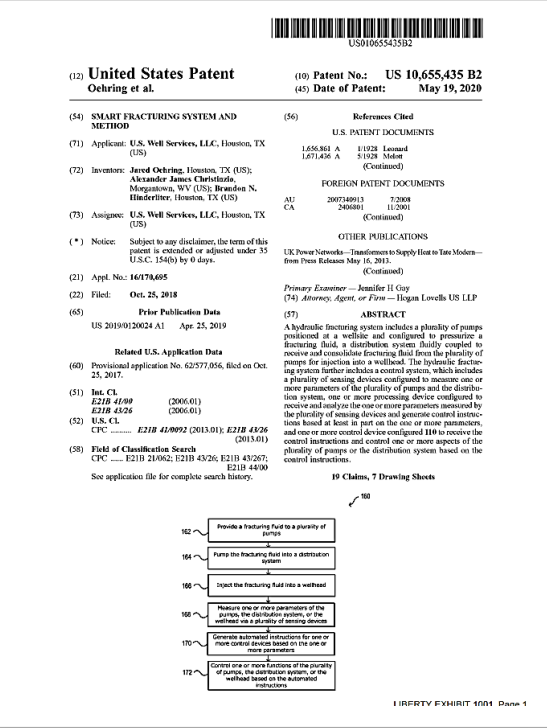
Q: A POSITA would understand that detection of a measurement outside of an acceptable threshold could be an indication the pump has exceeded an operational limit, right?

A: It could be.

EX-2012, 109:22–111:3 (objections omitted).

Source: POR (Paper 20) at 22.

Norris' Desired Settings Fail to Disclose or Render Obvious the Claimed Acceptable Threshold

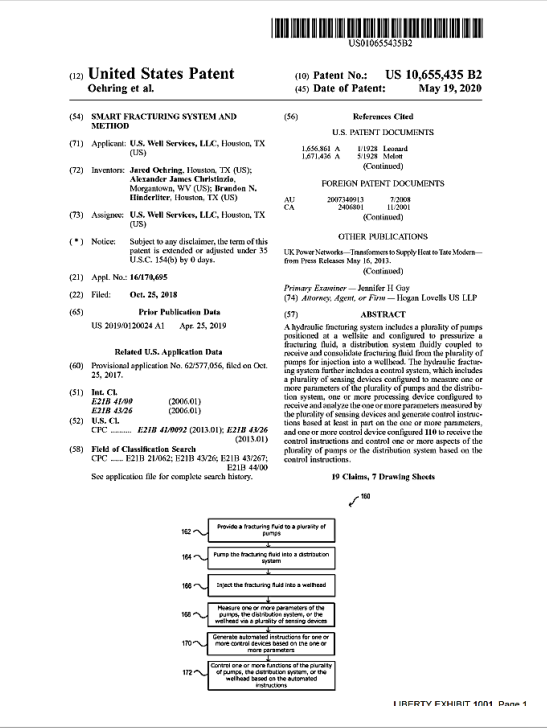


EX-1001 ('435 Patent)

- The '435 Patent explains that when “one or more parameters is outside of an acceptable threshold,” the patent “automatically adjust[s] or turn[s] off the [] pump” exceeding the threshold and “adjust[s] one or more . . . pumps . . . to compensate for the first pump.” EX-1001, 10:4–11; EX-2010, ¶ 77.
- A POSITA would understand the claimed threshold is an operational limit—not simply a desired output-rate setting—because there would otherwise be no need to automatically remove such a pump from operation. *Id.*

Source: POR (Paper 20) at 23.

Norris' Desired Settings Fail to Disclose or Render Obvious the Claimed Acceptable Threshold



EX-1001 ('435 Patent)

- The '435 Patent, in one example, explains that “the system as a whole may automatically select the best pumps to make up that needed rate” to compensate for a failing/offline pump. '435 Patent, 6:56–59.
- *see also id.*, 8:16–17 (“[A]n individual pump may be dropped from operation to prevent further failures[.]”), 8:25–28 (“If any . . . components were to indicate an alarm that would be detrimental to the equipment, the signal from that sensor may relay the message to shut the entire pump down[.]”).

Source: POR (Paper 20) at 23.

- A POSITA reading the intrinsic record would understand “*acceptable threshold[s]*” to be operational limits instead of desired output settings because these “*threshold[s]*” trigger automatic responses to, for example, shut the out-of-limits pumps down. EX-1001, 7:63–66 (“Failures may be reduced because of the ability to automatically shut down equipment based on continuous real-time readings from various sensors[.]”);
- EX-2012, 110:15–19 (“Q: And after detecting that the measurement is outside of an acceptable threshold, the method includes automatically taking the first pump offline in response to the detection, right? A: Yes, in this embodiment, that’s one response.”); EX-2010, ¶ 77.

Source: POR (Paper 20) at 23-24.

Norris' Desired Settings Fail to Disclose or Render Obvious the Claimed Acceptable Threshold



- An example demonstrates the difference between Norris's "desired rates" and the claimed "acceptable threshold."
- A POSITA would understand Norris to determine a desired rate at which the fluid should be pumped, for example, 1,000 liters per minute. EX-2010, ¶ 78.
- Norris teaches measuring the flow rate and operating the pumps to keep the fluid pumping rate as close to the "desired rate" of 1,000 liters/min as possible. EX-2010, ¶ 78.

Source: POR (Paper 20) at 24.

Norris' Desired Settings Fail to Disclose or Render Obvious the Claimed Acceptable Threshold



- The invention in the '435 Patent does more. EX-2010, ¶ 78.
- The claimed “acceptable threshold” is used to, e.g., ensure safe and efficient equipment operation. EX-1001, 5:65-6:9; EX-2010, ¶ 78.
- For example, an individual pump in the system may be set to pump at a desired rate 1,000 liters/min.
- An “acceptable threshold” may then be set for the pump rate, e.g., 900 liters/min.
- If the pump drops below the acceptable threshold, it may be an indication that the pump is not working properly and remedial action should be taken, such as taking the pump offline. See EX-1001, 10:4-11; 11:11-18; EX-2010, ¶ 78.
- Norris, by merely disclosing that the pumps should operate to maintain, e.g., a “desired” fluid flow rate, fails to disclose or render obvious the *acceptable threshold* limitation. EX-2010, ¶ 78

Source: POR (Paper 20) at 24-25.

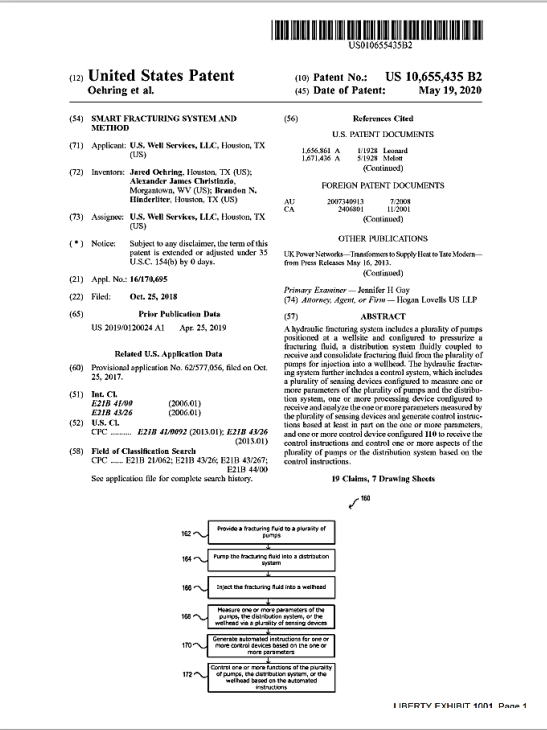
- In its Institution Decision, the Board preliminarily rejected the “claim construction position that the claim term ‘acceptable’ requires that the limit must be an ‘operational limit’ representing a potential failure condition that results in shutting down one or more pumps 270.” ID at 32.
- Patent Owner respectfully submits that, with the additional evidence and argument submitted herein, the Board should reconsider. EX-2010, ¶ 79.
- There is a difference between “acceptable” and “desirable,” and there is similarly a difference between a desired rate and an acceptable threshold. EX-2010, ¶ 79.

Source: POR (Paper 20) at 25.

- The Board also determined that the specification “indicates the control system may ‘adjust’ the pumps and other system components ‘so that each is performing its job *most efficiently*.’” ID at 32 (citing Pet., 5:51–6:9 and adding emphasis).
- That is true, but the claim limitation in question is not directed at maintaining efficient performance, but at ensuring that a piece of equipment does not exceed a specific operating value or limit. EX-2010, ¶ 80.

Source: POR (Paper 20) at 25.

Norris' Desired Settings Fail to Disclose or Render Obvious the Claimed Acceptable Threshold



EX-1001 ('435 Patent)

- The specification confirms this difference by allowing for real time conditional monitoring to identify and respond to component degradation and/or failure conditions:

The components may also include communication means that enable all the sensor packages, actuation devices, and equipment components to communicate with each other allowing for *real time conditional monitoring*. This would allow equipment to adjust rates, pressure, operating conditions such as engine, transmission, power ends RPMs, sand storage compartment gates, valves, and actuators, sand delivery belts and shoots, water storage compartments gates, valves, and actuators, water delivery lines and hoses, individual fracture pump's rates as well as collective system rates, blender hydraulics such as chemical pumps, liquid and dry, fan motors for cooling packages, blender discharge pumps, electric and variable frequency powered chemical pumps and auger screws, suction and discharge manifold meters, valves, and actuators. *Equipment can prevent failures, reduce continual damage, and control when it is allowed and not allowed to continue to operate* based on live and continuous data readings. Each component may be able to provide *troubleshooting codes and alerts that more specifically narrow down the potential causes of issues*. This allows technicians to more effectively *service equipment*, or for *troubleshooting* or other processes to be initialized automatically. *Conditional monitoring will identify changes in system components* and will be able to direct, divert, and manage all components so that each is performing its job the most efficiently.

Source: POR (Paper 20) at 25-26.

EX-1001, 5:51-6:9

- As Dr. Nikolaou explains, a POSITA would understand conditional monitoring as capable of identifying component changes, equipment degraded performance, or failure—not simply adjusting performance of functioning equipment. EX-2010, ¶ 81.
- As Dr. Nikolaou explains, even slight component degradation often impacts component and system efficiency. EX-2010, ¶ 81.
- A POSITA would understand that degraded components are often still operational but require adjustment of both the degraded component and other system components to compensate for the degraded component to maintain system efficiency. EX-2010, ¶ 81.

Source: POR (Paper 20) at 27.

- All excerpts cited by the Board support the '435 Patent's teaching of system adjustments in response to exceeding an operational limit instead of Norris's maintenance of desired settings, as illustrated in the below table. EX-2010, ¶ 82. For example, a POSITA would understand that:
 - Data from a degraded pump can be used to trigger shifting a portion of the degraded pump load to other pumps in response to operational limit exceedances (i.e., dropping below merely adequate performance). EX-2010, ¶ 8
 - Measurement of operational efficiency is an effective way to detect component degradation and identify failure modes.
 - Monitoring numerous components to holistically assess system health is an effective tool to identify component degradation and shift operational requirements—whether whole or in part—away from degraded components. EX-2010, ¶ 82.
 - There are benefits to adjusting system operation to maximize service life and delay maintenance costs.

Source: POR (Paper 20) at 28–33.

- Regarding the dependent claim 10 limitation “determining that the one or more parameters are indicative of a potential failure condition,” the Board overlooked that this limitation delineates the narrower claim 10 failure condition from the broader claim 7 failure and degraded condition. EX-2010, ¶ 83.
- Patent Owner agrees with the Board that “[c]laim differentiation ... suggests that the independent claims are broader than” (ID at 33) dependent claim 10, which requires “determining that the one or more parameters are indicative of a potential failure condition.” EX-1001, cl. 10.
- Independent claims 1 and 7 are broader than claim 10 because they encompass both potential failure conditions and component degraded—but still functional—conditions. EX-2010, ¶ 83.

Source: POR (Paper 20) at 33.

- Dr. Durham admitted as much:

Q: So a POSITA would understand that detection of a measurement outside of an acceptable threshold could be an indication of a failing pump, right?

A: Yes, sir, it could be.

Q: A POSITA would understand that detection of a measurement outside of an acceptable threshold could be an indication of a degraded pump, right?

A: I would say, yes, taking – taking the document as a whole and that paragraph as a whole, that would be fair.

EX-2012, 112:20–113:4.

Source: POR (Paper 20) at 33-34.

- The '435 Patent explains that the method also includes “logging operation data” and “determining a maintenance schedule based at least in part on the operation data.” EX-1001 at 10:21–26.
- As Dr. Nikolaou explains, a POSITA would understand that operation data can be used to detect a degraded component condition by triggering an exceedance condition when a component's performance falls below a minimally acceptable threshold. EX-2010, ¶ 84.

Source: POR (Paper 20) at 34.

- This type of control is consistent with monitoring for conditions **outside of** an acceptable operational limit. EX-2010, ¶ 82.
- The '435 Patent identifies the “acceptable threshold” as this operational limit, which if exceeded requires action. EX-1001, 10:4-9 (“[T]he method 160 also includes detecting that a first parameter of the one or more parameters is **outside of an acceptable threshold**, in which the first parameter is associated with a first pump of the plurality of pumps, and automatically **adjusting or turning off** the first pump.”); 11:11-15 (“The method 180 may further include detecting that a **measurement associated with a first pump** of the plurality of pumps **is outside of an acceptable threshold**, and automatically **taking the first pump offline in response** to the detection.”) (emphasis added). EX-2010, ¶ 82.

Source: POR (Paper 20) at 27.

- Petitioners continue to mistake optimal economic and production outcomes (i.e., Norris's desired settings) for operational necessities (i.e., the 435 Patent's claimed "acceptable threshold").

Source: Paper 29 (PO Sur-Reply) at 1.

- Petitioners' continued error is illustrated by their argument that Norris's "desired settings" are the same as the 435 Patent's "acceptable threshold" because "desired" may be "deemed correct or proper; selected; required." Paper 25 ("Petitioners Reply to POR"), 2–3.

Source: Paper 29 (PO Sur-Reply) at 1–2.

- But Petitioners ignore the example provided by their dictionary definition:
 - “The chef added stock until the sauce reached the ***desired consistency***.”
EX-2015, 1.
- This dictionary example illustrates that “desired” is a user preference and not an operational necessity requirement.
- It makes no difference whether the user “desires” or “requires” a setting—it is still a ***user*** preference, not a ***system*** requirement.

Source: Paper 29 (PO Sur-Reply) at 2.

Norris' Desired Settings Fail to Disclose or Render Obvious the Claimed Acceptable Threshold

- The distinction that desired is a user preference and not a system requirement is further illustrated by replacing the word “desire” with “require” in Dr. Durham’s admission of the distinction between desired performance and acceptable threshold performance as it relates to Langewis:

Q: “In other words, a POSITA might desire[/**require**] a higher pump performance, but this level of performance is acceptable, right?

A: Acceptable to prevent cavitation, according to the Langewis.

Q: Even though a POSITA might desire[/**require**] a higher pump performance, right?

A: It may.

...

A: I said a POSITA may desire[/require**] a different performance or a higher pressure.**

Q: And below this minimum pressure, the pumps would be at higher risk of damage, right?

A: Yes. That’s a fair statement.”

EX-2012, 18:7–22.

Source: Paper 29 (PO Sur-Reply) at 2–3.

■ Dr. Nikolaou explains that:

- The “acceptable threshold” is “objectively acceptable for safe operation, safe for the equipment and for humans”
- “[t]he manufacturer of the pump would contribute, indeed, to explaining what conditions for the pump would be safe and what would not be safe, and that would be communicated to the operator.”
- “the bottom line is that whoever is responsible for ensuring safe operation would actually set these values so that they would not be exceeded,” and that is an “***engineering decision.***” EX-1031, 72:4–73:18.
- This is ***not*** how Norris describes its “desired settings.”

Source: Paper 29 (PO Sur-Reply) at 3.

- Petitioners and Dr. Durham admit that Norris's "desired settings" are akin to Dr. Durham's thermostat example.
- Dr. Durham admits that in his thermostat example, the threshold is not based on "the system's capabilities."

Q: "So if I understand the statement correctly, the thermostat is making that decision based on what the user set and not the system's capabilities, right?"

A: Correct. It's based on the threshold that it's comparing to, not necessarily the system's capabilities."

EX-2012, 42:1-5.

Source: Paper 29 (PO Sur-Reply) at 3-4.

- But a homeowner in Dr. Durham's thermostat example is not setting the thermostat based on an “**engineering decision**” that concerns the operating capabilities of the HVAC system.
- And Norris's user is not inputting “**desired settings**” based on engineering decisions, but instead merely on a desired system output preference.

Source: Paper 29 (PO Sur-Reply) at 4.

- The 435 specification confirms the claim term “**acceptable**” is an operational limit representing a potential failure or degraded condition.
- The claimed “**acceptable threshold**” is identified twice in the specification.
 - Both instances show the claimed “**acceptable threshold**” is an operational limit representing a potential failure or degraded condition.

Source: Paper 29 (PO Sur-Reply) at 4.

- In the first instance where the specification discusses the claimed acceptable threshold, the 435 Patent explains:
 - In some embodiments, the method 160 also includes detecting that a first parameter of the one or more parameters is ***outside of an acceptable threshold***, in which the first parameter is associated with a first pump of the plurality of pumps, and ***automatically adjusting or turning off the first pump***. In some embodiments, the method 160 also includes adjusting one or more of the other pumps in the plurality of pumps to ***compensate for the first pump***. In some embodiments, the method 160 also includes ***selecting the one or more of the other pumps [to compensate for the first pump]*** to adjust based at least in part on the conditions of the other pumps as indicated by one or more of the one or more parameters. In one or more embodiments, the method 160 also includes determining that ***the one or more parameters are indicative of a potential failure condition***; and ***determining a source of the potential failure condition***. In some embodiments, the method 160 also includes ***generating an alert or notification indicative of the potential failure condition*** and the source. In some embodiments, the method 160 also includes logging operation data including a number of strokes and pumping hours performed by a pump of the plurality of pumps, and ***determining a maintenance schedule*** based at least in part on the operation data.
EX-1001, 10:4–26.

Source: Paper 29 (PO Sur-Reply) at 4-5.

- Dr. Nikolaou confirms that a POSITA would have understood that the appropriate response to detection of a failing or degraded pump is to either adjust (i.e., reduce the load on) the pump or to turn the pump off entirely.

“A POSITA would understand that systems may continue to operate even with degraded components. For example, by reducing the workload of a degraded component and shifting the workload to other components, overall system performance may be retained while extending the service life of the degraded component.”

EX-2010, ¶ 82

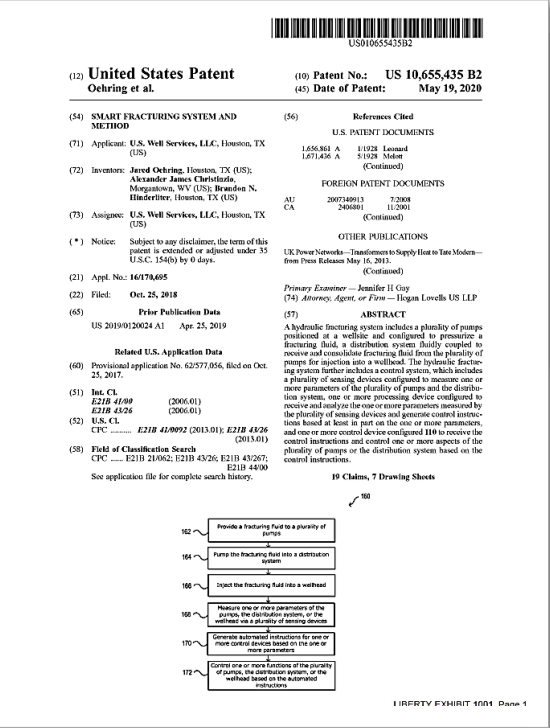
Source: Paper 29 (PO Sur-Reply) at 5.

- The 435 Patent's teaches "automatically adjusting" the pump in response to detection of a pump parameter being outside of a threshold.
- But in the next sentence, the 435 Patent explains that "the method 160 also includes adjusting one or more of the other pumps in the plurality of pumps to ***compensate for the first pump.***" EX-1001, 10:9–11.
- This compensation step shows the acceptable threshold is an operational limit representing a potential failure or degraded condition.
 - There would otherwise be no need to compensate (i.e., supply an equivalent pump output) for the first pump if its output was not being reduced due to its failing or degraded state.
 - A POSITA would understand:
 - (1) the compensation step as indicating the load on the first pump is reduced, and
 - (2) the reduction is not based on a mere desired pump output rate as in Norris because there would otherwise be no need to compensate for the first pump by adjusting other pump output rates.

Source: Paper 29 (PO Sur-Reply) at 6.

- The 435 Patent also discloses additional actions that are all consistent with detection of a failure or degraded condition.
 - “selecting the one or more other pumps to adjust ***[to compensate for the failed/degraded first pump]*** based ... on the conditions of other pumps”
 - “determining that the one or more parameters are ***indicative of a potential failure condition***”
 - “determining a ***source of the potential failure condition***”
 - “***generating an alert or notification*** indicative of the potential failure condition”
 - “***logging operation data***”
 - “***determining a maintenance schedule***”

Source: Paper 29 (PO Sur-Reply) at 6-7.



EX-1001 (‘435 Patent)

- The 435 Patent explains:
 - The method 180 may further include detecting that a measurement associated with a first pump of the plurality of pumps is **outside of an acceptable threshold**, and **automatically taking the first pump offline** in response to the detection. The method may further include adjusting one or more of the other pumps in the plurality of pumps to **compensate** for taking the first pump offline. EX-1001, 11:11–18.

Source: Paper 29 (PO Sur-Reply) at 7-8.

- A POSITA would have understood that “taking the first pump offline” and “adjusting ... pumps ... to compensate for taking the first pump offline” are in response to a failed or degraded pump
 - There would otherwise be no need to take the pump offline **and** compensate for the offline pump by using other pumps as discussed above.

Source: Paper 29 (PO Sur-Reply) at 7.

Grounds 2 and 5 Have the Same Flaw as Ground 1 By Relying on Norris's Desired Settings to Satisfy the Claimed "Acceptable Threshold."



- Like Ground 1, Grounds 2 and 5 rely on the same teaching from Norris to satisfy the claimed "***acceptable threshold.***"
- Both are therefore deficient for the same reason as Ground 1 because neither Ground fixes the flaw in Ground 1—namely, Norris' desired rates cannot satisfy an "***acceptable threshold.***"

Source: Paper 29 (POR) at 35.

- Petitioners argue that even if Norris does not disclose the “acceptable threshold” limitation, Patent Owner has conceded that Omont does.
- Petitioners Misinterpret the Patent Owner Response (Paper 20)

Source: Paper 29 (PO Sur-Reply) at 8.

- In the POR, Patent Owner explained that Omont fails to disclose or render obvious Limitation 1[e][i]:

“one or more processing devices configured to receive a first parameter from a first device of the plurality of pumps, the distribution system, or the wellhead, and transmit the first parameter to a second device of the plurality of ... pumps, the distribution system, or the wellhead.”

POR (Paper 20) at 43–56.

Source: Paper 29 (PO Sur-Reply) at 8.

- **Petitioners assert that Patent Owner has:**

- (1) not contested that Norris discloses limitation 1[e][i], and

- (2) has not contested that Omont discloses limitation 1[e][ii], which, as discussed above, requires “detect[ing] that the first parameter is outside of an acceptable threshold.”

Source: Paper 29 (PO Sur-Reply) at 8.

- Petitioners' argument is faulty because claims must be read ***as a whole***.
 - ***In re Gulack***, 703 F.2d 1381, 1385 (Fed. Cir. 1983) (holding that, under Section 103, the Board cannot “dissect a claim” and ignore the specific limitations because a “claim must be read as a whole”).
- Here, limitation 1[e][ii] cannot be simply divorced from limitation 1[e][i] because:
 - The “**first parameter**” of limitation 1[e][ii] is the same “**first parameter**” of limitation 1[e][i].
 - Because Omont does not disclose limitation 1[e][i], it follows that Omont also does not disclose the “first parameter” of limitation 1[e][ii].

Source: Paper 29 (PO Sur-Reply) at 9.

- It is impermissible to “read [a claim] limitation in isolation, divorced from the claim as a whole.”
 - ***Univ. of Strathclyde v. Clear-Vu Lighting LLC***, 17 F.4th 155, 162 (Fed. Cir. 2021).

- “Obviousness cannot be based on the hindsight combination of components selectively culled from the prior art to fit the parameters of the patented invention.”
 - ***ATD Corp. v. Lydall, Inc.***, 159 F.3d 534, 546 (Fed. Cir. 1998).

Source: Paper 29 (PO Sur-Reply) at 9.

- The Evidence will show that Omont fails to teach limitation 1[e][i] and therefore also does not disclose limitation 1[e][ii].
- Because, as previously explained, Norris also fails to disclose limitation 1[e][ii], Ground 3 does not render the claims invalid.

Source: Paper 29 (PO Sur-Reply) at 9.

- As explained in the POR, the Examiner reviewed and considered the same Omont disclosures during examination of the 435 Patent. POR, 44–45.
- During prosecution, the Examiner correctly determined that the Omont disclosures did not disclose or render obvious the subsequently modified limitation “transmit[ting] the first parameter” from a first device “to a second device,” each of which being “of the plurality of pumps, the distribution system, or the wellhead” (limitation 1[e][i]). POR, 44–46; EX-2010, ¶ 95.

Source: Paper 29 (PO Sur-Reply) at 9-10.

- Petitioners rely on the same Omont disclosures as allegedly disclosing the exact same limitation that the Examiner already found was not present in Omont.

Source: Paper 29 (PO Sur-Reply) at 10.

- Petitioners suggest that the Examiner did not consider Omont's control hardware when allowing the challenged claims.
- Petitioners have not met their “especially difficult” burden of showing Examiner error for at least four reasons.

(“The “presumption of validity under 35 U.S.C. § 282 carries with it a ***presumption that the Examiner did his duty and knew what claims he was allowing.*** ... [T]he challenger’s “burden is ***especially difficult when the prior art was before the PTO examiner during prosecution of the application.***”) (internal citations omitted).

Al-Site Corp. v. VSI Int'l, Inc., 174 F.3d 1308, 1323 (Fed. Cir. 1999)

Source: Paper 29 (PO Sur-Reply) at 10.

- **First**, in allowing the challenged claims, the Examiner stated:
 - [t]he **prior art of record [i.e., Omont842 containing the Omont disclosures]** fails to disclose or suggest transmitting a first parameter from a first device of the plurality of pumps, a distribution system, or wellhead to a second of a plurality of pumps, a distribution system, or wellhead as recited in the claimed combination and method. EX-1002, 970.
- It is well established law that deference is due to the Examiner, who is **presumed under the law “to have properly done [her] job,”** and who is “assumed to have some **expertise in interpreting the references [e.g., interpreting Omont842’s control hardware] and to be familiar from their work with the level of skill in the art and whose duty it is to issue only valid patents.**” *Shire LLC v. Amneal Pharms., LLC*, 802 F.3d 1301, 1307 (Fed. Cir. 2015).
- Petitioners thus have an even higher burden of showing Examiner error, which Petitioners have not met here.

Source: Paper 29 (PO Sur-Reply) at 10-11.

- **Second**, the Examiner previously issued a Section 103 obviousness rejection based on Omont842, which shows she properly considered it.
- During prosecution, the Examiner ultimately found that Omont842 fails to disclose or render obvious the challenged claims. EX-2010, ¶ 97.
- Specifically, the Examiner previously objected to a dependent claim 21 for containing ***allowable subject matter***. EX-1002, 998–99.

Source: Paper 29 (PO Sur-Reply) at 11.

Claim 21 included the following limitations:

21. (New) The method of claim 7, further comprising:

transmitting the first parameter from a first device of the plurality of pumps, the distribution system, or the wellhead to a second device of the plurality of the plurality of pumps, the distribution system, or the wellhead;

generating the automated instructions at the second device; and

automatically adjusting one or more functions of the second devices based on the automated instructions.

‘435 Patent File History, 1317, (EX-1002)

- Stated differently, the Examiner, who is “presumed to have properly done [her] job” and “assumed to have some expertise in interpreting the references [including Omont842’s control hardware] and to be familiar from their work with the level of skill in the art,” identified the allowable subject matter in then-claim 21. *Shire*, 802 F.3d at 1307.
- In response, Patent Owner amended the independent claims to include the allowable subject matter in the above dependent claim 21.
- The Examiner, in response, wrote that this “amendment to claims 1, 7, and 14 overcome[s] the previously presented 35 USC 103 rejection thereof,” including Omont842. *Id.*, 968; *see id.*, 999.

Source: Paper 29 (PO Sur-Reply) at 12.

- The Examiner's reasons for allowance correctly show that Omont does not disclose or render obvious claim limitation 1[e][i]. EX-2010, ¶ 98.
- In allowing the claims, the Examiner noted that the prior art—including Omont842—failed to disclose or suggest this limitation.

Source: Paper 29 (PO Sur-Reply) at 12.

Regarding claims 1, 7, and 14: The prior art of record fails to disclose or suggest transmitting a first parameter from a first device of a plurality of pumps, a distribution system, or wellhead to a second of a plurality of pumps, a distribution system, or wellhead as recited in the claimed combination and method.

'435 Patent File History, 970, (EX-1002)

- Thus, the Examiner clearly carefully considered the exact same Omont disclosures—via Omont842—during prosecution as evidenced by:
 - (1) issuing a Section 103 obviousness rejection based on Omont842;
 - (2) identifying allowable subject matter that would overcome Omont842 if re-written in independent form; and
 - (3) determining the Omont842 disclosures, which included Omont’s control hardware—fail to “disclose or suggest” the challenged claims.

Source: Paper 29 (PO Sur-Reply) at 13.

- **Third**, and contrary to Petitioners' assertion that the Examiner erred, the Examiner did consider Omont842's control hardware in her initial § 103 rejection in view of Omont842 as part of the June 7, 2019 office action.
- The Examiner issued a § 103 obviousness rejection of claim 11's limitation requiring "determining that the one or more parameters are indicative of a potential failure condition," citing, *inter alia*, Omont842, ¶ 67. EX-1002, 1136.

Source: Paper 29 (PO Sur-Reply) at 13.

- In citing Omont ¶ 67 in her rejection, the Examiner objectively documented her awareness and understanding of the sensor/control hardware interface as explained in Omont, ¶ 67:

The coded instructions 432 stored in the local memory 414 may further include program instructions or computer program code that, when executed by the processor 412, **facilitate one or more instances of the control hardware 400 to record the information generated by the sensors 204, 214, 222, such as for determining efficiency, accuracy, and/or other operational aspects of one or more components of the additive system 200** based, for example, on the information generated by the sensors 204, 214, 222. For example, the coded instructions 432 stored in the local memory 414 may also include program instructions or computer program code that, when executed by the processor 412, **facilitate one or more instances of the control hardware 400 to determine remaining functional life of one or more components of the additive system 200, determine remaining operational time until failure of one or more components of the additive system 200, and/or determine health of one or more components of the additive system 200** based on the information generated by the sensors 204, 214, 222. EX-2001, ¶ 67.

Source: Paper 29 (PO Sur-Reply) at 13-14.

- The Examiner ***did consider*** Omont842's control hardware and its interface with sensors, as shown by her claim 11 obviousness rejection. *Id.*
- As the record shows, the Examiner considered Omont842's control hardware and rightly determined that Omont842—with the same disclosures as Omont—did not disclose or render obvious the 435 Patent claims.
 - See *Shire*, 802 F.3d at 1307 (“Defendants’ primary reference is ... listed on the face of the patents-in-suit and therefore ***the examiner is presumed to have considered it.***”).

Source: Paper 29 (PO Sur-Reply) at 14.

Omont Fails to Teach Limitation 1[e][i]

- Petitioners have not demonstrated that the Examiner erred in analyzing the Omont disclosures concerning limitation 1[e][i].
- The Examiner correctly found that Omont did not disclose or render obvious that limitation, and, absent evidence of clear error, which Petitioners have not shown, the Board should not second-guess the Examiner's conclusions in this proceeding.
- For all the reasons explained in the POR, Omont does not disclose limitation 1[e][i], and subsequently cannot disclose limitation [1][e][ii].

Source: Paper 29 (PO Sur-Reply) at 14.

- Petitioners' Example 3B cannot meet the claim requirement of “transmit[ting] the first parameter” from a first device “to a second device,” each of which being “of the plurality of the pumps, the distribution system, or the wellhead.”
- Patent Owner notes that nowhere in the Petition do Petitioners expressly define the claimed “second device” as Omont’s control hardware.
- Petitioners attempt to play both sides of the coin by:
 - Defining the claimed “**second device**” as Omont’s subsystems to meet the “**of the plurality of the pumps, the distribution system, or the wellhead**” limitation; and
 - Sneaking in Omont’s control hardware to meet the “**transmit[ting] the first parameter**” from a first device “**to a second device**” limitation.
- But whether the subsystems or control hardware are mapped to the claimed “second device,” ***both mappings fail.***

Source: Paper 29 (PO Sur-Reply) at 15.

- Petitioners expressly defined Omont's sensors as the claimed "first device" and Omont's subsystems as the claimed "second device[s]".
 - Pet., 49 ("1[e][i] – Omont's sensors are a "first device" and Omont's subsystems are "second device[s].").
- Petitioners presumably mapped Omont's sensors and subsystems as the claimed first and second devices, respectively, to also meet the claim requirement that the first device and second devices must both be "of the plurality of the pumps, the distribution system, or the wellhead."

Source: Paper 29 (PO Sur-Reply) at 16.

- But this mapping ***cannot meet the claim requirement*** of “transmit[ting] the first parameter” from a first device “to a second device” for the reasons discussed in the POR, including because “the first device (i.e., Omont’s sensors) is part of the second device (i.e., Omont’s subsystem).” See POR (Paper 20), 56–65.
 - The Petition’s mapping improperly maps claimed different devices to non-separated structures. POR (Paper 20), 56–65.
 - None of Omont’s disclosures describe, let alone mention, Omont’s sensors 204, 214, and 222 (the claimed first device) transmitting data to Omont’s subsystems 212 and 220. POR (Paper 20), 56–65.
 - Without doing so, Omont cannot render obvious the claim limitation “transmitting a first parameter ... from a first device to a second device.”
 - Thus, Petitioners’ mapping of Omont’s subsystems as the claimed “second device” fails. POR (Paper 20), 56–65.

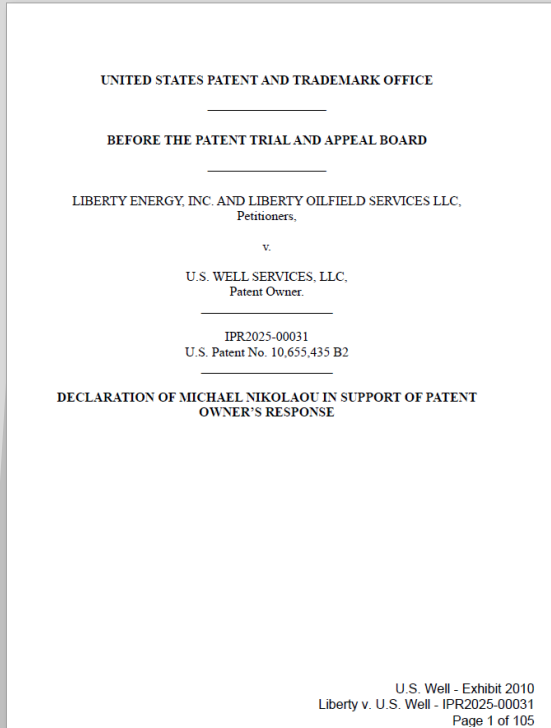
Source: Paper 29 (PO Sur-Reply) at 16; POR, 56–65.

- Mapping Omont's control hardware as the claimed "second device" fails because Petitioners have not shown the control hardware is "of the plurality of the pumps, the distribution system, or the wellhead."
 - Petitioners assert that "[s]ubsystems **[not control hardware]** are "of the plurality of pumps, the distribution system, or the wellhead" and cite supporting examples. Pet., 50.
 - But Petitioners rely on Omont's "control hardware' that 'receive[s] information generated by the sensors'" to meet the "transmit[ting] the first parameter" from a first device "to a second device" limitation. *Id.*, 50.
- Petitioners must show that "control hardware" is "of the plurality of the pumps, the distribution system, or the wellhead" to meet the claim requirement, but fail to do so.
- Mapping Omont's control hardware as the claimed "second device" fails.

Source: Paper 29 (PO Sur-Reply) at 17; Paper 1 (Pet.), 50.

- Petitioners' Example 3A fails because Omont's SCM Device 306 cannot be the claimed "second device"
 - Omont's SCM device 306 cannot be the claimed "*second device*" because it is not "*of the plurality of pumps, the distribution system, or the wellhead.*" EX-1001, cl. 1; EX-2010, ¶ 99.
 - In its Institution Decision, the Board agreed with Patent Owner, concluding that "SCM device 306 is a device 'of' CAM system 300, and not a device 'of' subsystems 202, 212, or 220 in the additive system 200 (ID at 40). EX-2010, ¶ 99.

Source: Paper 20 (POR) at 47.



EX-2010

- Nowhere in Omont does it explicitly disclose or suggest that the SCM device 306 is part of the pumping system, distribution system, or wellhead. EX-2010, ¶ 100.

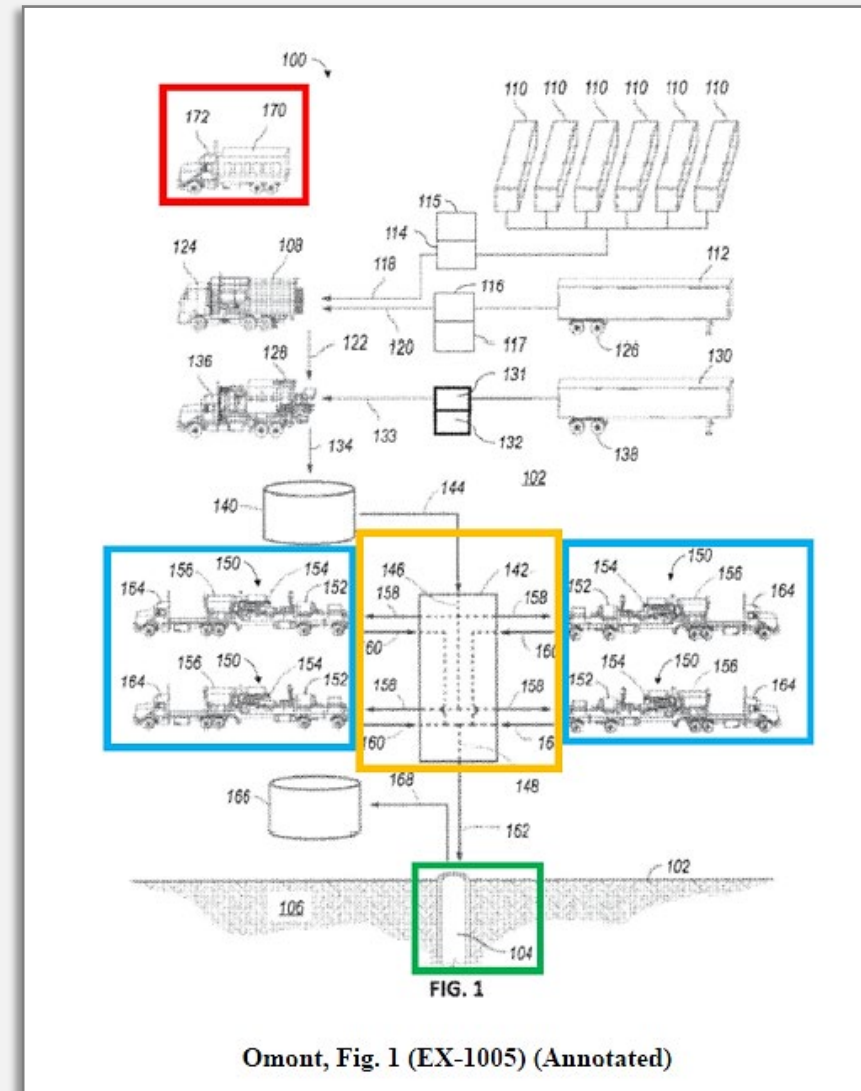
Source: Paper 20 (POR) at 47.

- Omont discloses that Fig. 1 is a “schematic view of at least a portion of an example additive system 100.” EX-1005, [0017].
- The system includes the “wellsite surface 102 adjacent to a wellbore 104.” *Id.* EX-2010, ¶ 100.
- Also depicted in Fig. 1 is a “common manifold 142” which “may comprise a combination of valves and/or diverters, as well as a suction line 146 and a discharge line 148, such as may be collectively operable to direct flow of the [fracturing fluid] mixture.” *Id.*, [0023].
- The common manifold 142 “may distribute the mixture to a pump fleet. EX-2010, ¶ 100.
- The pump fleet may comprise multiple pump assemblies 150 each comprising a pump 152, a prime mover 154, and a heat exchanger 156.” *Id.* EX-2010, ¶ 100.

Source: Paper 20 (POR) at 47-48.

- **Fig. 1** therefore shows the plurality of pumps, the distribution system [manifold], and the wellhead, annotated below in blue, orange, and green respectively:

Source: Paper 20 (POR) at 48-49.



- Also shown in Fig. 1 and annotated in red is “control center 170,” which is “operable to monitor and control at least a portion of the additive system 100 during operations.” EX-1005, [0026]; EX-2010, ¶ 101.
- It is readily apparent from Fig. 1 that the control center 170 is a separate system from the pump fleet, distribution system, and wellhead.
 - EX-1005, [0026] (“Signals may be communicated between the control center 170 and ***other components of the additive system 100*** via a local network.”) (emphasis added); EX-2010, ¶ 101.

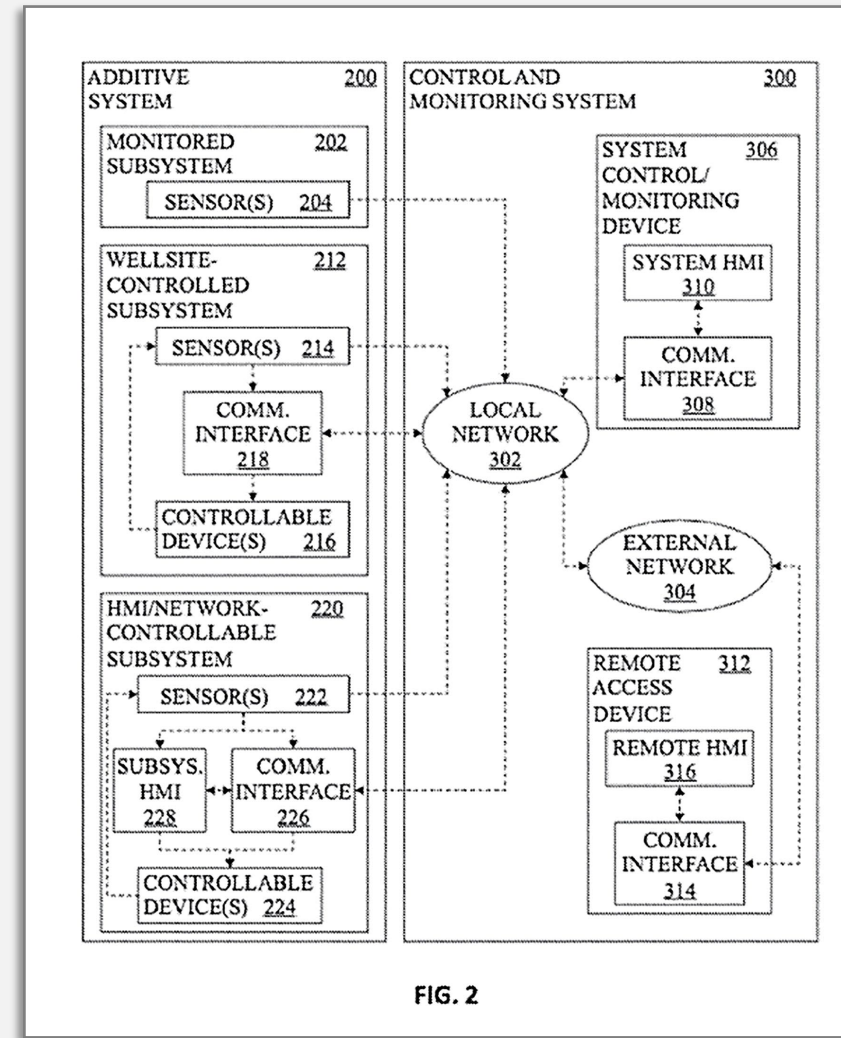
Source: Paper 20 (POR) at 49-50.

- Additional portions of Omont's specification confirm that SCM Device 306 is not "*of the plurality of pumps, the distribution system, or the wellhead.*"
- Fig. 2 depicts "an example implementation of a control and monitoring (CAM) system 300 according to one or more aspects of the present disclosure."
- The CAM system 300 is an implementation of the "control system 170" shown in Fig. 1. EX-2010, ¶ 102.
- Both are disclosed as monitoring and controlling at least some of the operations of the additive system.

Source: Paper 20 (POR) at 50.

- **Fig. 2** shows that the CAM system 300 includes the “system control/monitoring (SCM) device 306” relied on by Petitioners. EX-1005, [0038]; EX-2010, ¶ 103.
- As shown in Fig. 2 below, the CAM 300, including the SCM device 306, is a separate system from the claimed pump system, distribution system, or the wellhead found in “additive system 200”:

Source: Paper 20 (POR) at 51-52.



Omont, Fig. 2 (EX-1005)

- Omont's SCM device 306 is a subsystem of CAM system 300, which is a separate system from the pump, distribution, and wellhead subsystems. EX-1005, [0029], [0037]; EX-2010, ¶ 104.
- In their Reply, Petitioners failed to address Patent Owner's associated arguments—supported by the Examiner's claim allowance (*id.*, 54)—or the Board's conclusion (ID, 39–40) that SCM Device 306 cannot be the claimed “second device.”
- The failure of Example 3A to disclose limitation 1[e][i] is thus not reasonably in dispute.

Source: Paper 20 (POR) at 17-18.

- Petitioners allege that Norris discloses limitation 1[e][i] and Borgstadt discloses limitation 1[e][ii].
- But as Patent Owner explained regarding Omont, it is impermissible to “read [a claim] limitation in isolation, divorced from the claim as a whole.”

Univ. of Strathclyde v. Clear-Vu Lighting LLC, 17 F.4th 155, 162 (Fed. Cir. 2021).

- “Obviousness cannot be based on the hindsight combination of components selectively culled from the prior art to fit the parameters of the patented invention.”

ATD Corp. v. Lydall, Inc., 159 F.3d 534, 546 (Fed. Cir. 1998).

Source: Paper 29 (PO Sur-Reply) at 9.

- The Evidence shows that Borgstadt fails to teach limitation 1[e][i] and therefore also does not disclose limitation 1[e][ii].

Source: Paper 29 (PO Sur-Reply) at 18.

- Independent claim 1 has four different requirements for the claimed ***“first parameter”***:
 - *“receive a first parameter from a first device”*;
 - *“transmit the first parameter to a second device”*;
 - *“detect that the first parameter is outside of an acceptable threshold ”*;
 - *“generate automated control instructions at the second device based at least in part on the first parameter.”* See EX-1001, Claim 1.

Source: Paper 20 (POR) at 65.

- Challenged independent claims 7 and 13 have similar requirements involving the following requirements:
 - “*transmitting a first parameter [. . .] from a first device*”;
 - “*detecting that the first parameter [. . .] is outside of an acceptable threshold*”;
and
 - “*generating automated instructions at the second device based at least in part on the first parameter.*”

Source: Paper 20 (POR) at 66.

- The claims further require that the automated instructions generated from the first parameter be used to “automatically adjust[] one or more functions of the second device.” See EX-1001, Claim 1; *id.* Claims 7 (same) and 13 (same).

Source: Paper 20 (POR) at 66.

- In its institution decision, the Board summarized the four different requirements for the claimed “***first parameter***”:
 - (1) it must be received from the first device;
 - (2) it must be transmitted to a second device;
 - (3) it must be detected to be outside of an acceptable threshold; and
 - (4) it must be utilized to generate automated control instructions. Paper 9 (Institution Decision) at 46; EX-2010, ¶ 125.

Source: Paper 20 (POR) at 66; Paper 9 (Institution Decision) at 46.

- Based on the preliminary record, the Board determined that the Petition satisfied all the above claim requirements for Borgstadt's pump efficiency parameter. Paper 9 (Institution Decision) at 46.
- But the Petition's mapping for this parameter has a fundamental flaw in its mapping of the claimed "second device" because that claimed "device" is required to both "generate automated control instructions" and "automatically adjust[] one or more of" its functions according to those instructions. See EX-1001, Claim 1; *id.* Claims 7 (same) and 13 (same); EX-2010, ¶ 126.
- The Petition attempts to address this limitation by remapping the "first parameter" to different parameters (i.e., measured output pressure and flow rate) in Example 4. Pet., 68-70.
- This is improper because the mapping in Example 4 still relies on the same threshold comparison for efficiency values rather than remapping the comparison step against the newly mapped parameters. EX-2010, ¶ 126.

Source: Paper 9 (Institution Decision) at 46; Paper 20 (POR) at 67.

Ground 4 Improperly Mixes and Matches Different Parameters From Borgstadt to Satisfy the Claimed First Parameter

- Stated differently, the Petition’s Prior Art combination in Ground 4 improperly mixes and matches different parameters from Borgstadt to satisfy the claimed first parameter.
- The Petition maps the claimed “*first parameter*” to a pump’s **efficiency value**¹⁸ in step 1[e][ii], referring to “*detect[ing] that the first parameter is outside of an acceptable threshold.*”
 - Pet., 67 (“Borgstadt teaches [**pump modulator—as second device**¹⁹] comparing a pump’s **efficiency** with a ‘threshold efficiency value’ in diagnostics.”)²⁰; EX-2010, ¶ 134.
- Yet the Petition maps the claimed “*first parameter*” to “measured parameters” of **output pressure 132 or output flow rate—pump controller mapped to second device**—for steps 1[e][i] (Pet., 68) (requiring “*receiving a first parameter from a first device*”) and 1[e][iii] (requiring “*generat[ing] automated control instructions at a second device based at least in part on the first parameter.*”).
 - See Pet., 68 (“Sensors at each pump transmit ‘to the **pump controller**’ . . . a ‘measured parameter . . . of the pump unit, for example **output pressure 132 and output flow rate.**’”) (emphasis added), 69 (“Borgstadt teaches that the **local pump controllers [mapped to second device]** ‘may use different measured parameters . . . to adjust the performance of the pump unit.’”) (citing EX-1006, [0024])²¹; EX-2010, ¶ 134.

Source: Paper 20 (POR) at 75–76.

- As Dr. Durham admits, Borgstadt ¶0024 does not state that efficiency can be used to adjust the drive signal. EX-2012, 30:18–21 (“Q: Borgstadt does not explicitly state that efficiency can be used to adjust the drive signal, right? A: In this paragraph [¶0024], he does not call out efficiency as one of the examples.”).
- Thus, the Petition mapped different—and/or unsupported (e.g., efficiency)—parameters to the claimed “*first parameter*” to satisfy different limitations and never reconciles how these **different** parameters satisfy the **same** parameter. EX-2010, ¶ 134.

Source: Paper 20 (POR) at 76.

- By mapping the claims to different parameters when the claim requires the same parameter, the Petition cannot show a reasonable likelihood of success for challenging the claims via Ground 4. EX-2010, ¶ 135.

Source: Paper 20 (POR) at 76-77.

- For its theory involving Borgstadt’s “efficiency values,” the Petition’s Prior Art combination in Ground 4 improperly mixes and matches different devices from Borgstadt to satisfy the claimed second device.
- The claims require that the “second device” perform the following steps:
 - Receive the first parameter,
 - Generate automated control instructions at the second device based at least in part on the first parameter,
 - Automatically adjust one or more aspects of the second device based on the control instructions. See EX-1001, Claims 1,7 and 13; EX-2010, ¶ 127.
- But the Petition improperly mixes and matches different devices from Borgstadt to satisfy the claimed second device as shown in the following table and annotated Figure 1, EX-2010, ¶ 128.

Source: Paper 20 (POR) at 76-77.

Ground 4 Improperly Mixes and Matches Different Parameters From Borgstadt to Satisfy the Claimed First Parameter



Second Device Must Perform the Following Steps	Petition’s Mapping of Second Device	Petition’s Example 4 Mapping of Second Device
Receive the first parameter (Limitation 1[e][i])	[“ <i>pump controller</i> ” and “ <i>pump modulator</i> ”] ⁹ AND [“ <i>pump modulator 107</i> ”] ¹⁰	“ <i>Local pump controller</i> ” ¹¹
Generate automated control instructions at	“ <i>master controller 106</i> ” AND	“ <i>local pump controllers</i> ” ¹³

the second device based at least in part on the first parameter (Limitation 1[e][iii])	“ <i>pump modulator 107</i> ” AND “ <i>local pump controllers</i> ”. Pet., 67. ¹²	
Automatically adjust one or more aspects of the second device based on the control instructions (Limitation 1[f])	“ <i>Pump unit</i> ” ¹⁴	“ <i>local pump unit</i> ” ¹⁵

⁹ Pet., 66 (“*Borgstadt* Figure 1 illustrates measured parameters transmitted from ‘pump unit[s]’ to ‘pump controller[s]’ and a ‘pump modulator.’).

¹⁰ Pet., 66 (“*Borgstadt* also describes a pump modulator ‘receiv[ing] a pump unit’s current efficiency value’ or ‘other pump parameters’ for diagnostics.).

¹¹ Pet., 68 (“Sensors at each pump transmit ‘to the pump controller, ...’”).

¹³ Pet., 69 (“*Borgstadt*’s local pump controllers are ‘second devices’ that ‘generate[s] automated control instructions at the second device’”).

¹² Pet., 67 (“... illustrating generation and communication of automated control instructions at each of master controller, pump modulator, and local pump controllers ...”).

¹⁴ Pet., 68 (“Section VIII.D.2(i) below provides an example of a pump unit receiving automated control instructions and automatically adjusting operation of a second device”).

¹⁵ Pet., 70 (“The pump unit thus receives control instructions from the local pump controller and adjusts aspects of both the local pump controller and its own operation).

Source: Paper 20 (POR) at 68-69.

The Prior Art in Ground 4 Fails to Render the Claims Obvious

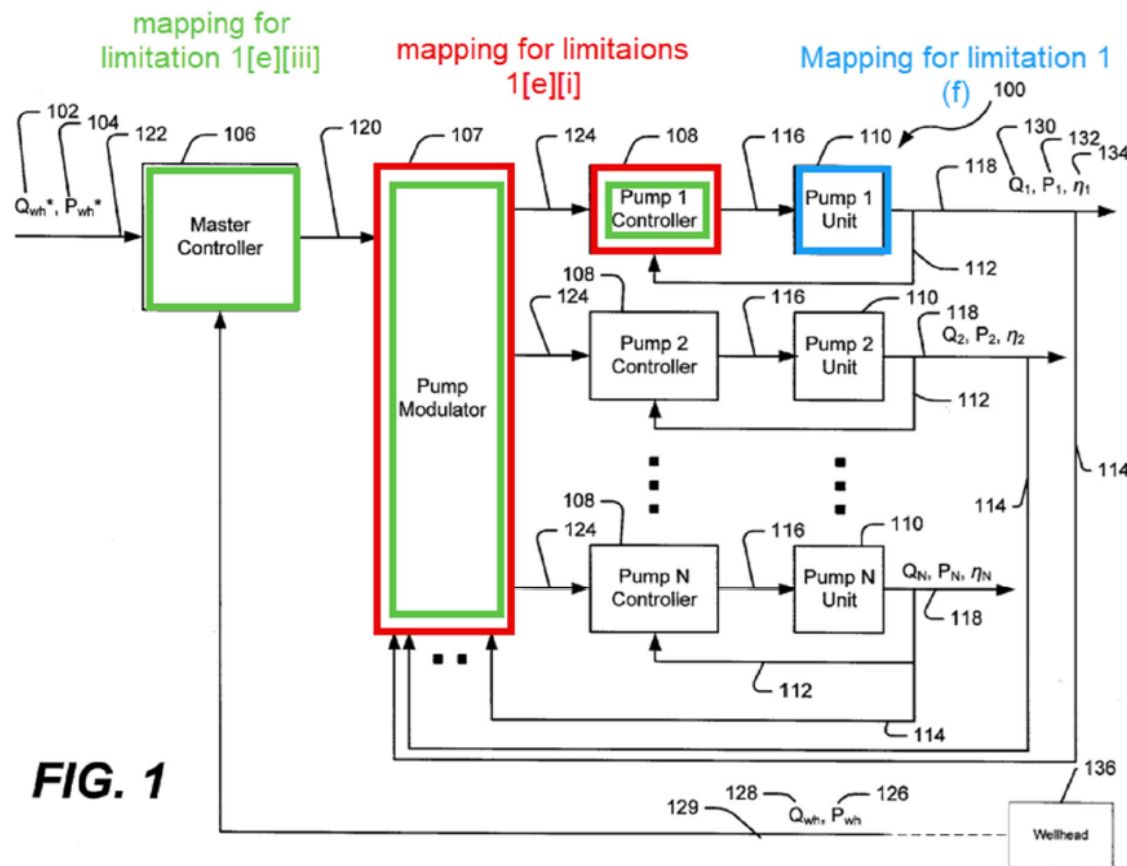


FIG. 1

EX-1006, Figure 1 (annotated).

Source: Paper 20 (POR) at 70.

- Regarding the first bullet for Borgstadt’s “efficiency value,” Ground 4 maps the claimed “second device” to Borgstadt’s pump controller 108 (multiple instances) or pump modulator 107.
 - Pet., 66 (“Borgstadt Figure 1 illustrates measured parameters transmitted from pump unit[s] to pump controller and a pump modulator. . . Borgstadt also describes a pump modulator receiv[ing] a pump unit’s current efficiency value or other pump parameters for diagnostics.) *citing* EX-1006, Fig. 1, [0025], [0033]. EX-2010, ¶ 129.
- Thus, the Petition’s mapping of the “second device” is either ***pump controller 108*** (multiple instances) or ***pump modulator 107*** based on those device’s alleged reception of Borgstadt’s current efficiency value—mapped to the claimed “first parameter.” EX-2010, ¶ 129.

Source: Paper 20 (POR) at 70–71.

- But for the second bullet, the Petition contends that Borgstadt's system generates automated control instructions at a different device—***master controller 106***—and at the ***pump modulator***. EX-2010, ¶ 130.
- Dr. Durham likewise maps the second device in his mapping of the automated control instructions to two different devices, but executed at other devices than the ones allegedly generating the instructions (e.g., generated at master controller for execution at pump modulator and local pump controller, generated at pump modulator for execution at local pump controllers):
 - A POSITA would have known that Borgstadt's system generates automated control instructions at the master controller for execution at the pump modulator and local pump controller, and at the pump modulator for execution at local pump controllers. EX-1003, ¶410; EX-2010, ¶ 130.

Source: Paper 20 (POR) at 71-72.

- Dr. Durham’s declaration also states that the pump modulator and pump controller also generate control instructions, but those instructions are executed in different devices—that is, when devices “automatically adjust one or more aspects” of that device by executing the control instructions (“based on the control instructions”). EX-2010, ¶ 130.
- Consequently, the mapping in the Petition shows that other devices beyond the supposedly mapped “second device” perform the step of “automatically adjust[ing] one or more aspects. . . based on the control instructions” by executing the instructions. EX-2010, ¶ 130.

Source: Paper 20 (POR) at 71-72.

- With regard to the last bullet, the Petition’s mapping of the automated control instructions do not “automatically adjust one or more aspects of the second device.” EX-2010, ¶ 131.
- The Petition’s mapping at best shows that “automated control instructions” adjust aspects of the ***local pump unit***—that is, the Petition’s mapped “first device”—or are otherwise unclear. EX-2010, ¶ 131.

Source: Paper 20 (POR) at 71-72.

- To address this limitation (1[f]), the Petition includes the following statements:
 - “[A] POSITA would understand that the pump controllers, pump modulator, or master controller may also act as control devices adjusting aspects of a second device. Pet., 68 (implying that the second device is **not** one of the pump controller, pump modulator, or master controller).” Pet., 68.
 - “Borgstadt’s local pump unit is a “control device” that ‘receive[s] the automated control instructions’ and adjusts aspects of local pump operation and control.” Pet., 69 (not mentioning any “second device”).
- Petitioners’ expert declaration does not provide any clarity concerning this ambiguity or mismatched “second device.” See EX-1003, ¶¶409-415; EX-2010, ¶ 132.

Source: Paper 20 (POR) at 73.

- None of the cited disclosures in the Petition or Dr. Durham's declaration to Borgstadt mention any control instructions¹⁷ sent by the pump modulator, let alone "automated control instructions" that "automatically adjust one or more aspects of the second device." See EX-1006, [0010], [0022]-[0026], Fig. 1; EX-2010, ¶ 133.
- Rather, the Petition and Dr. Durham cite, at most, only evidence about how only the local pump unit makes adjustments. See Pet., 68-69; EX-2010, ¶ 133.
- Consequently, the Petition's mapping of the automated control instructions does not "automatically adjust one or more aspects of the second device" because it mismatches the second device with a different device. EX-2010, ¶ 133.

Source: Paper 20 (POR) at 73-74.

- Petitioners now argue that the “second device” is not required to perform the claimed “generate automated control instructions” limitation (the “Generating Step”) nor the claimed “automatically adjust one or more aspects of the second device based on the control instructions” limitation (the “Adjusting Step”). Reply, 21–22.

Source: Paper 29 (PO Sur-Reply) at 18–19.

- A plain reading of claims 1 and 13 show Petitioners' error.
- Claims 1 and 13 require the Generating Step “***at the second device.***”
- The claims state that the generating must occur “***at***” as opposed to “for execution at” the second device.

Source: Paper 29 (PO Sur-Reply) at 19.

- Petitioners allege that “one or more processing devices” perform the “generat[ing]” such that “generat[ing]” is not required to occur at the “second device.” Reply, 22.
- Even assuming that the claim requires processing devices to perform the Generating Step, claim 1 plainly requires that such processing devices are found at the “second device” for claim 1. *Id.*, cl. 1 (“generate automated instructions **at the second device**”).
- Claims 7 and 13 do not recite “processing devices” and the plain language of both claims requires that “generating” occur “at the second device.” EX-1001, cl. 7 (“generating the automated instructions **at the second device**”); cl. 13 (“generating automated instructions **at the second device**”).
- Thus, the “second device” must perform the Generating Step.

Source: Paper 29 (PO Sur-Reply) at 19.

- Petitioners' position that the "second device" is not required to perform the Generating Step nor the Adjusting Step effectively reads one or more claim limitations out of the claims, as illustrated by Petitioners' alleged invalidity read.
- Though the illustrations below discuss efficiency as the "first parameter," Petitioners' invalidity theory fails no matter whether Petitioners map the claimed "first parameter" to flow rate, pressure, or efficiency.

Source: Paper 29 (PO Sur-Reply) at 19-20.

- According to Petitioners' theory, Borgstadt's "pump modulator" compares "a pump's efficiency with a 'threshold efficiency value' in diagnostics." Pet., 67 (citing EX-1006, ¶ 33); EX-1006, ¶ 33 ([T]he pump modulator compares the current efficiency value of the particular pump unit 110 with a threshold efficiency value.”).
- Petitioners appear to be relying on this comparison by the pump modulator—whether directly or indirectly through the pump modulator signaling the pump controller—to generate automated control instructions at the “second device.” Pet., 67 (“Borgstadt teaches generating automated control instructions at the second device based on the first parameter. See, e.g., EX1006, [0010], [0022]-[0026], Fig. 1 (illustrating generation and communication of automated control instructions at each of master controller, pump modulator, and local pump controllers).”).

Source: Paper 29 (PO Sur-Reply) 20.

- But this reading effectively reads out or renders unnecessary the “transmit the first parameter to the second device” limitation.
- If adjustments are being made because of “automated control instructions” originating from the pump modulator as Petitioners allege, there would be no need for the “transmit the first parameter to a second device” limitation.
- Petitioners thus read out and/or render meaningless the “transmit the first parameter to the second device” limitation.

Source: Paper 29 (PO Sur-Reply) 20-21.

- ***Bicon, Inc. v. Straumann Co.***, 441 F.3d 945, 950 (Fed. Cir. 2006) (holding claims must be “interpreted with an eye toward giving effect to all terms in the claim”).
- If the threshold comparison is not performed at the “second device,” there would be no need to transmit the “first parameter” to the “second device,” thus rendering the “transmit the first parameter to the second device” limitation to have no meaning. *Id.*
- Hence, Petitioners’ alleged theory of the pump modulator performing the claimed threshold comparison fails because it reads out—or at least renders meaningless—the “transmit the first parameter to the second device” limitation. *Id.*

Source: Paper 29 (PO Sur-Reply) 21.

- By Petitioners' own allegation, the threshold comparison is allegedly occurring in the pump modulator and not in the pump controller (i.e., the alleged "second device").
- Petitioners' modulator threshold theory thus fails.

Source: Paper 29 (PO Sur-Reply) 21.

- Petitioners' theory of measured parameters being transmitted to the “pump controller” via path 112 provides another illustration of Petitioners' error.
- According to Petitioners' theory, “Borgstadt Figure 1 illustrates measured parameters transmitted from “pump unit[s]” to “pump controller[s] [via path 112].” Pet., 66 (citing EX-1006, Fig. 1).

Source: Paper 29 (PO Sur-Reply) 21.

- Petitioners further allege:
 - Borgstadt’s local pump controllers are “second devices” that “generate[s] automated control instructions at the second device” ***based on receiving a first parameter***. Borgstadt teaches that local pump controllers “may use different measured parameters ... to adjust the performance of the pump unit.” EX1006, [0024], Fig. 1. The “pump controller 108 may use a measured parameter ... to adjust the driving signal 116 sent to the pump unit.” *Id.*
Pet., 69.
- Petitioners’ theory reads out and/or renders meaningless the claimed threshold comparison limitation at the second device, which Petitioners allege occurs in the pump modulator.

Source: Paper 29 (PO Sur-Reply) 21-22.

- If the pump controller is receiving measured parameters via path 112 and making adjustments based on receipt of the first parameter via path 112, there would be no need for the pump modulator to perform the threshold comparison step.
- Thus, Petitioners' pump controller adjustment theory fails because it reads out—or at least renders meaningless—the threshold comparison step, including the “detecting that the first parameter is outside of an acceptable threshold” limitation.

Source: Paper 29 (PO Sur-Reply) 22.

- Petitioners point to no equivalent threshold comparison step occurring within the “pump controller.”
- Adjustments made by the pump controller under Petitioners’ theory are being made at the pump (i.e., not at the claimed “second device”), which does not meet the “automatically

Source: Paper 29 (PO Sur-Reply) 22.

- Petitioners have thus failed to show that Borgstadt discloses limitation 1[e][i] and by extension limitation 1[e][ii].
- Because Norris does not disclose limitation 1[e][i] for the reasons already discussed, Ground 4 fails to invalidate the claims.

Source: Paper 29 (PO Sur-Reply) 22-23.

