IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

PERMIAN GLOBAL INC., AND
MANTICORE FUELS, LLC
Petitioner,

v.

FUEL AUTOMATION STATION, LLC,
Patent Owner

Case No. IPR2023-01238

Patent 10,974,955

PATENT OWNER RESPONSE

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Ex. 2011	Expert Declaration of John Rodgers
Ex. 2012	Intelligencer article (digital print The Intelligencer, January 31, 2020)
Ex. 2013	US Patent 11,305,979
Ex. 2014	Waterman, "Better Safe Than Sorry"
Ex. 2015	World Economic Forum, "Trust Challenge Facing the Global Oil & Gas Industry"
Ex. 2016	Intentionally omitted
Ex. 2017	Intentionally omitted
Ex. 2018	Intentionally omitted
Ex. 2019	Intentionally omitted
Ex. 2020	Intentionally omitted
Ex. 2021	Patents of Rick Shock
Ex. 2022	US Patent 10,633,243
Ex. 2023	ASTM D975 Standard Specification for Diesel Fuel Oils
Ex. 2024	CRC Report Diesel Fuel Storage and Handling Guide
Ex. 2025	AFLAS TM Reg Serial 73310396
Ex. 2026	Rubber Technology, "TFE/P (Aflas®)/FEPM rubber quality" (https://web.archive.org/web/20160404102358/http:/rubbertechnology.info:80/en/-rubber-compounds/tfep-aflasr--fepm-rubber-quality/)
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Ex. 2028	Transcript of Deposition of Robert Durham
Ex. 2029	Energy and Power Engineering, 2023, "Analysis of Emissions Profiles of Hydraulic Fracturing Engine Technologies"
Ex. 2030	Brent Oil/Fuel Hose 3106 (http://web.archive.org/web/20160713193942/ http://www.desihose.com/viewproduct.aspx?pid=192)
Ex. 2031	FAS Virtual Marking page (https://fluidautomationstation.com/patents/)
Ex. 2032	Rodgers CV
Ex. 2033	US Patent 2,425,848
Ex. 2034	US Patent 2,603,312
Ex. 2035	US Patent 3,196,982
Ex. 2036	US Patent 3,216,527
Ex. 2037	US Patent 1,829,173
Ex. 2038	US Patent 3,430,730
Ex. 2039	Well Completion 101 Part 3 (https://www.enverus.com/blog/well-completion-well-stimulation/)
Ex. 2040	Atlas Oil's Rick Shock Named "Industry Leader "At Texas Oil and Gas Awards
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Ex. 2042	*FAS v. Permian Global, et al.* Complaint
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I. INTRODUCTION

A. Mobile fuel delivery

Hydraulic fracturing, colloquially known as "fracking" or a "frac," is an orchestration of machinery, horsepower, and manpower. It is a loud, dusty, and busy "factory" that carries out the stimulation operation of a well. On a conventional modern frac site there is a barricade of proppant, water and chemical storage and transport equipment (trailers, cars, ponds and bins), as well as frac blenders to process the powders, chemicals, gels, and liquids pumped downhole. A mobile data acquisition and control center or "data van" serves as the brains of the operation where engineers and supervisors monitor and direct a job as it is being pumped. At the center of the operation, there are tractor trailer-mounted frac pumps parked within inches of each other. The frac pumps provide the brute force that pumps the fracturing fluid (generally a blend of water and sand) downhole at extremely high pressures to fracture the formation. Over 50,000 frac horsepower may be required for modern completions. A maze of flow lines snakes between the pumps and trucks, culminating at the well-head (or multiple well-heads on some sites). The picture below depicts a common frac site plan, though the plan can vary from site to site. Ex. 2011 at ¶43-48.

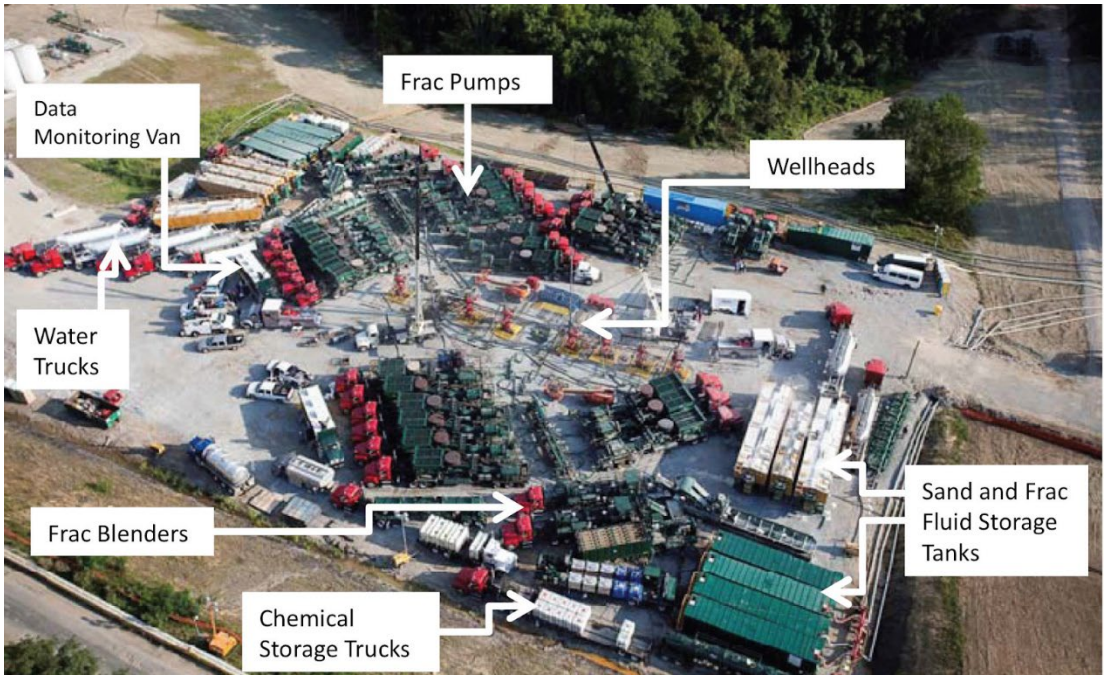


Image Credit: Kansas Geological Survey

The frac pumps are operated 24 hours a day and seven days a week, usually for days or weeks at a time. Ex. 2011 at ¶49. If a frac pump runs out of fuel, it must be taken offline, reducing the total horsepower that is available. If multiple pumps go down, the frac job may have to be shut down, which is costly and inefficient for the well operator. Ex. 2004 at ¶49.

In order to keep the frac pumps fueled and running continuously, a mobile fuel delivery station is used to automatically refuel each frac pump fuel tank when it is low on fuel, which is also known as "hot refueling" because the pumps remain running during the refueling. The *mobile* aspect of the station refers to transportability of the station from wellsite-to-wellsite with each new fracking job. PO has designated its commercial mobile fuel delivery station as a "FAS unit" or simply "FAS," where "FAS"

is an acronym for Fuel Automation Station, which is covered under the '118 Patent. Ex. 2031.

FAS's patented mobile fuel delivery station has fuel hoses that are deployed to each of the fuel tanks of the frac pumps along with level sensors that measure the fuel levels in the tanks. When the level sensors detect that one of the fuel tanks is low on fuel, a controller causes a valve associated with the hose to that fuel tank to open. Fuel is provided from an external fuel source, such as a tanker truck, into the mobile fuel delivery station, where a pump moves the fuel to a manifold and through the valve to the hose to fill the fuel tank. Once the level sensor detects that the tank for that hose has reached a threshold fill level, the controller closes the valve to cease filling the fuel tank. Each time one of the fuel tanks is low on fuel this process is repeated in order to replenish the fuel tanks with fuel, and thus enable the frac pumps to run continuously. Ex. 1001.

B. The invention of the '955 Patent

The '955 Patent is directed to a unique configuration of a mobile fuel delivery station for enhanced operational reliability and functionality.

The ability to safely deliver the fuel to the frac pumps depends on reliable communication between the fuel level sensors and the controller inside of the station. The level sensors need to send constant signals back to the controller so that the controller can know the instantaneous fuel levels in the fuel tanks at all times. A loss of

communication between the level sensors and the controller, even for a short period of time, will deprive the controller of fuel level measurements and potentially lead to several highly undesirable situations.

For one, if communication is lost during a low fuel level condition, the controller will not be able to identify that the tank needs to be refueled. If communication is not re-established, the controller will not know to refuel the tank and it will run out of fuel. Second, if communication is lost during a high fuel level condition when the tank is being refueled, the controller will not be able when to close the control valve to stop refueling. If communication is not re-established, the controller will not know to close the valve to cease fuel flow and the tank will overflow fuel (fuel spill). Thus, loss of communication, even if momentary, creates risk of interrupting frac pump operation and spilling fuel -- situations which are highly undesirable.

Though wireless communication is ubiquitous, FAS recognized that wireless would not be a good option for a mobile fuel delivery station on a well site. For instance, other electronics nearby on a well site can interfere with wireless signals. Large equipment on the well site can act as a physical barrier or source of interference for wireless signals, and vibrations from equipment at the well site can disrupt wireless antenna alignment. All of these factors can lead wireless devices to drop the wireless signals, resulting in loss of communication.

FAS instead pursued a more robust and reliable communication channel that would be less likely to drop signals. In particular, FAS identified hard-wiring the fuel level sensors to the controller. Hard-wiring was counter to the prevailing choice at the time, as Frac Shack[1] had a preference for wireless communication. Ex. 1004, [0018] "preferably includes a wireless transceiver."

FAS faced several technical challenges to reliably hard-wiring the level sensors to the controller. One challenge was that excessive handling and movement of the communication wires would distress and potentially damage the wires, thereby threatening reliability. Another challenge was how to route the communication wires from the level sensors to the controller, as the sensors and controller are hundreds of feet apart, with other equipment physically in between.

FAS, however, came up with solutions to address these challenges. One solution was to route the wires with the hoses. To achieve this, FAS provided a sleeve around the rubber hose tube, and routed the sensor communication wire between the sleeve and the tube. The sleeve not only secured the wire with the hose, but it also shielded the wire from rocks, dirt, snow, and ice at the well site. The sleeve is covered in co-owned U.S. 10,815,118, although it is also described in the specification of the '955 Patent (e.g., Ex. 1001, col. 6, ll. 34 to col. 7, ll. 2).

[1] Frac Shack is the owner of Van Vliet's invention and has since changed its name to Energera.

FAS further recognized that routing the communication wires with the hoses would also provide a reliable routing of the wire into the mobile fuel delivery station to the controller. In particular, since the hoses do not extend to the controller, the wires at some point need to depart from the hoses in order to run to the controller. For this, FAS used reels in the flow path of the fuel. The ends of the hoses were connected to the flow path running through the reel. The reels provided junctions for the wire to depart from the hose and run into the station to the controller. The reel can provide protection of the wire from the surroundings, as well as a connector to help secure the wire.

There was also a need to track the amount of fuel provided so that the customer could be invoiced for the fuel used by the frac pumps. Such tracking could potentially be conducted at any location where the fuel flows, or even based on the volume in the fuel source. FAS, however, recognized that tracking the fuel inside of the mobile fuel delivery station at a location between the pump and the manifold(s) would permit all of the fuel to be tracked from a single location (because all of the fuel flows through the fuel line from the pump to the manifold(s). The '955 Patent thus also captures aspects of FAS's innovation of providing a register between the pump and the manifold to track the fuel and enable invoicing.

The '955 Patent captures aspects of FAS's innovations of routing the wires, which enable reliable wired communication in the mobile fuel distribution station. Indeed, PO's FAS units have enjoyed widespread use, with a total of more than 60 FAS units

that have been used to deliver over 800,000,000 gallons of fuel on well sites in Texas, Oklahoma, Colorado, North Dakota, New Mexico, and Pennsylvania, as well as internationally in Canada, Saudi Arabia, and Argentina. Ex. 2043 at ¶6.

C. Overview of the prior art

The Petition relies on various combinations of prior art references across four grounds in its attempt to establish that challenged claims 1-20 of the '955 Patent are unpatentable. Petition at 5. The primary prior art reference relied upon in all of the grounds is Van Vliet, which was considered by the patent examiner in prosecution. Ex. 1001 at 2 (under "References Cited," US 9,346,662 to Van Vliet et al.) Van Vliet, however, is a flawed reference. It lacks reels that are connected to be fed from the manifold, hoses connected with the reels, and a register between the pump and manifold. The other prior art that Petitioner cites ultimately does not cure those flaws in Van Vliet. For instance, Petitioner relies on Cable but does not provide a rationale or motivation for modifying Van Vliet with the reel of Cable. Petitioner also relies on serval references that disclose registers, namely LCR I and LCR II. Petitioner did not, however, explain why a register would have been be installed directly downstream of the pump as it contends would be obvious.

Accordingly, PO respectfully submits that Petitioner has failed to meet its burden to prove by preponderance of the evidence that any claim of the '955 Patent is unpatentable.

II. BACKGROUND

The '955 Patent has three independent claims (claims 1, 11, and 19), each directed to a distribution station. Each of the claimed stations has a mobile trailer, a pump, a manifold connected with the pump, reels, hoses, valves that are operable to control fluid flow, fluid level sensors connected or connectable with the hoses, and a controller configured to operate the valves responsive to fluid level thresholds to control flow through the hoses.

Claims 1 and 11

Claim 1 also includes the features "each said hose connected with a different one of the reels, wherein a portion of the reels are connected to be fed from the first manifold and another portion of the reels are connected to be fed from the second manifold." Claim 11 recites, "each said hose connected with a different one of the reels." As will be discussed below, a hose connected to a reel would be understood to mean that an end of the hose is coupled to the reel, as opposed to the hose being would on the reel. An example of a flow passage that feeds the reel and hose connected to the reel is shown in Fig. 4 of the '955 Patent, annotated in red below. Not all reels have fluid passages to the hose. Some types of reels are for hose storage and do not have a fluid passage. POPR at 30; Ex. 2011 at ¶65.

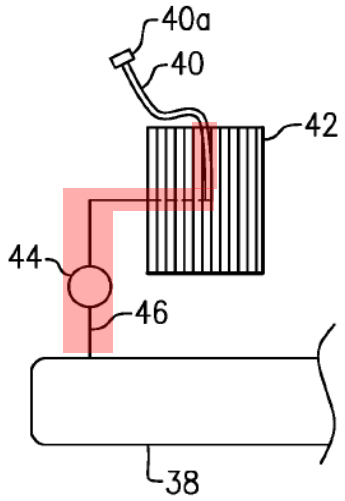


FIG.4

Claim 19

Claims 19 also includes "a register between the at least one pump and the at least one manifold." The pumps (30), register (34), and manifold (38) are shown in Fig. 2 of the '955 Patent, annotated below. The register is in the fuel line between the pumps and the manifolds such that all of the fuel leaving the pump flows through the register to get to the manifold.

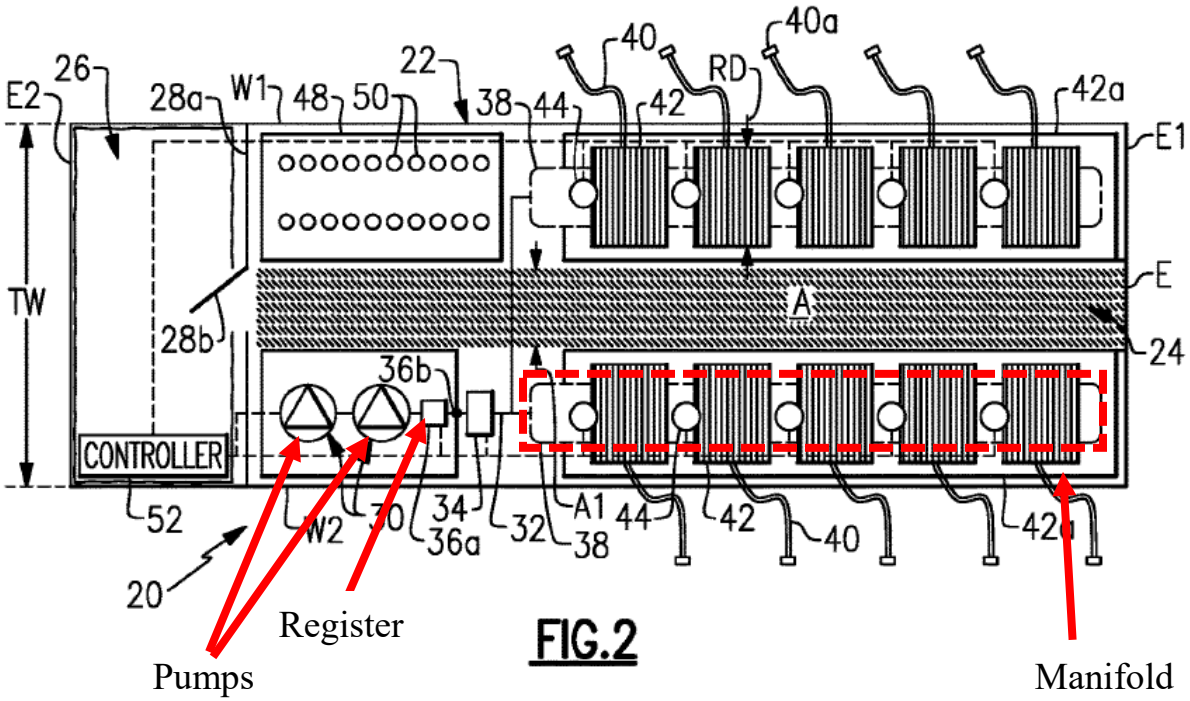


FIG.2

III. LEVEL OF ORDINARY SKILL IN THE ART

For several reasons, PO disagrees with Petitioner's definition of the level of ordinary skill in the art. Petition at 14.

First, Petitioner's proposed definition of a POSITA in the instant IPR is inconsistent with its proposed definition of a POSITA in related IPRs for U.S. 9,586,805 and U.S. 10,815,118 (IPR2023-01237 and IPR2023-01236, respectively). Petitioner's three proposed definitions are provided below for reference. Petitioner's definition in the present IPR lists civil engineering, which is not listed in Petitioner's definitions in IPR2023-01236 and IPR2023-01237. Additionally, Petitioner's definitions in IPR2023-01236 and IPR2023-01237 propose that instead of a degree a POSITA could have at

least four years of industry experience, which is not listed in Petitioner's definition in the present IPR.

The person of ordinary skill in the art is a hypothetical person who is presumed to have known the relevant art at the relevant time. The "hypothetical 'person having ordinary skill in the art' to which the claimed subject matter pertains would, of necessity have the capability of understanding the scientific and engineering principles applicable to the pertinent art." MPEP 2141.03; *Ex parte Hiyamizu*, 10 USPQ2d 1393, 1394 (Bd. Pat. App. & Inter. 1988).

The claimed subject matter is similar between the patents challenged in the three IPRs, all of which are directed to a "distribution station" and share common claim elements, such as a pump, a manifold, valves, reels, hoses, and a controller, and large portions of the descriptions in the three patents are identical or nearly identical. Given these similarities, the definition of a POSITA should be the same for all three IPRs. Accordingly, for the present IPR, PO submits that the PTAB should adopt a definition of a POSITA that is the same as in the IPRs for U.S. 9,586,805 (IPR2023-01237) and U.S. 10,815,118 (IPR2023-01236).

Second, Petitioner's proposed definition in the present Petition is inconsistent with the opinion of its own expert. Petitioner's expert, Dr. Durham, sets forth an opinion of the definition of a POSITA that differs from the definition in the Petition. Ex. 1003, ¶101. In fact, Dr. Durham's proposed definition is the same as in the IPRs for U.S.

9,586,805 (IPR2023-01237) and U.S. 10,815,118 (IPR2023-01236). Accordingly, for the present IPR, PO submits that the PTAB should adopt a definition of a POSITA that is the same as in the IPRs for U.S. 9,586,805 (IPR2023-01237) and U.S. 10,815,118 (IPR2023-01236).

IPR2023-01238 Petitioner's Proposed Level of Ordinary Skill

> As of the earliest claimed priority date, a person of ordinary skill in the art ("POSITA") would have a degree in mechanical, electrical, petroleum, or civil engineering and with at least two years' experience working in a field relating to energy production. This definition is approximate, and more education may substitute for industry experience or vice versa.

IPR2023-01236 Petitioner's Proposed Level of Ordinary Skill

> As of the earliest claimed priority date, a person of ordinary skill in the art ("POSITA") would have either (1) a Bachelor of Science in Mechanical Engineering, Electrical Engineering, Petroleum Engineering or an equivalent field as well as at least 2 years of academic or industry experience in the oil and gas industry, including well drilling, completion, or production, or (2) at least four years of industry experience in the oil and gas industry including well drilling, completion, or production. This definition is approximate, and more education may substitute for industry experience or *vice versa*.

IPR2023-01237 Petitioner's Proposed Level of Ordinary Skill

> As of the earliest claimed priority date, a person of ordinary skill in the art ("POSITA") would have either (1) a Bachelor of Science in Mechanical Engineering, Electrical Engineering, Petroleum Engineering or an equivalent field and at least 2 years of academic or industry experience in the oil and gas industry, including well drilling,

> completion, or production, or (2) at least four years of industry experience in the oil and gas industry including well drilling, completion, or production. This definition is approximate, and more education may substitute for industry experience or vice versa..

For purposes of this proceeding only, PO submits that in the present IPR the PTAB should adopt a definition of a POSITA that is the same as in the IPRs for U.S. 9,586,805 (IPR2023-01237) and U.S. 10,815,118 (IPR2023-01236. PO's expert, Dr. Rodgers, is qualified to provide opinions concerning what a POSITA would have known and understood as of Oct. 11, 2016. As reflected in his qualifications, he is more than qualified as a POSITA at all relevant times under definitions above. Ex. 2011 at ¶8-14, 66-69; Ex. 2032.

IV. CLAIM CONSTRUCTION

The Board applies the same claim construction standard used in district court actions under 35 U.S.C. § 282(b), namely that articulated in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). *See* 37 C.F.R. § 42.100(b) (2021). In applying that standard, claim terms generally are given their ordinary and customary meaning as would have been understood by a person of ordinary skill in the art at the time of the invention and in the context of the entire patent disclosure. *Phillips*, 415 F.3d at 1312–13. "In determining the meaning of the disputed claim limitation, we look principally to the intrinsic evidence of record, examining the claim language itself, the written

description, and the prosecution history, if in evidence." *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 469 F.3d 1005, 1014 (Fed. Cir. 2006) (citing *Phillips*, 415 F.3d at 1312–17).

A. Claims 1[e], 11[e] and 19[f]: "hose connected with a different one of the reels"

The phrase "hose connected with a different one of the reels" should be construed to mean that an end of the hose is coupled to the reel, as opposed to the hose being wound on the reel. A POSITA would have known that a hose has two ends that have couplings for joining the hose to another part. As a result, a POSITA would have understood that a hose is "connected" to another part when the end of the hose is coupled to that other part. Ex. 2011 at ¶70-77.

The '955 Patent also uses the words "wound" and "connect" to have different meanings. For instance, the '955 Patent discloses that "each hose is wound, at least initially, on a reel 42" (Ex. 1001, col. 3, ll. 1-2) and that "a relatively smaller reel diameter RD would only accommodate a shorter hose winding" (Ex. 1001, col. 3, ll. 50-55). "Wound" (and the variation "winding") is therefore associated with storage of the hose on the reel. However, when discussing the hose and the fuel tank, the '955 Patent refers to the end of the hose connecting to the fuel cap sensor. Ex. 2011 at ¶75. "Connecting" is therefore associated in the '955 Patent with an end of the hose being coupled to a mating part. For this reason, the word "connect" (or variations) does not

encompass a hose that is wound on a reel, and the phrase "hose connected with a different one of the reels" should therefore be construed to mean that an end of the hose is coupled to the reel, as opposed to the hose being wound on the reel. Ex. 2011 at ¶75-77.

B. Claim 1[e] "reels are connected to be fed from the [] manifold"

The phrase "reels are connected to be fed from the [] manifold" should be construed to mean that the connection between the reels and the manifold is of a type that permits fluid to be provided from the manifold to the reels. For instance, the earlier recitation in the claim that the manifolds are *fluidly* connected with the pump gives rise to an inference that a fluid is the basis of the later term "*fed*." Moreover, a POSITA would have understood the plain and ordinary meaning of "fed" to mean that something is provided [from the manifold to the reel]. Ex. 2011 at ¶80. Therefore, the phrase "reels are connected to be fed from the [] manifold" would have been understood to mean that the connection between the reels and the manifold is of a type that permits fluid to be provided from the manifold to the reels. Ex. 2011 at ¶81.

Such an understanding is also supported by the description in the '955 Patent. For instance, the '955 patent discloses a "fuel line" through which the manifold and the reel are connected to permit fuel to flow from the manifold to the reel (Ex. 1001, Fig. 4; col. 4, ll. 17-22, "a secondary fuel line 46 leads from the manifold 38 to the reel 42. The control valve 44 is in the secondary fuel line 46. The control valve 44 is moveable

between open and closed positions to selectively permit fuel flow from the manifold 38 to the reel 42 and the hose 40"). Ex. 2011 at ¶82.

Notably, the understanding above is also consistent with the PTAB's understanding at institution, in which the PTAB stated, "'To be fed' limits the type of connection to a fluid connection between the manifold and reel. Inst. Dec. at 8.

For these reasons, the phrase "reels are connected to be fed from the [] manifold" should be construed to mean that the connection between the reels and the manifold is of a type that permits fluid to be provided from the manifold to the reels.

V. GROUND 1: THE CLAIMS ARE NOT ANTICIPATED OR RENDERED OBVIOUS OVER VAN VLIET ALONE

The PTAB found that the Petition does not sufficiently identify how Van Vliet teaches or suggests the limitations of claim 1 and that the Petition fails to show how claim 11 and its dependent claim 12 would be anticipated by or rendered obvious over Van Vliet. Inst. Dec. at 8-12. Those facts have not changed. Furthermore, Dr. Rodgers has reviewed the Petition, PO's preliminary response, and the Institution Decision and agrees with the findings of the PTAB on this ground and based on PO's arguments in its preliminary response at 27-34. Ex. 2011 at ¶101. Accordingly, Ground 1 should be dismissed. Insofar as the PTAB's findings were preliminary, PO submits that Ground 1 should be dismissed for the reasons that follow.

A. As to anticipation, Petitioner misses features of claims 1[e], 11[d], and 19[e][2].

For claim 1[e] in Section VIII.A.1.f. of the Petition, Petitioner shows an annotated figure from Van Vliet, and provides several paragraphs of explanation. Petition at 26-27. However, aside from footnote 6, there is not a single mention in that explanation of any reels being connected to be fed from any manifold. Petitioner points out that Van Vliet has hoses, manifolds, and reels and discusses the hoses being connected to outlets 22 to receive fuel from the manifolds. *Id*. However, the Petition does not attempt to establish a relationship between the reels and the manifolds. Petitioner has therefore missed setting forth with particularity its asserted anticipation grounds against claim 1[e], and by extension claims 11[d] and 19[e] due to interdependence of Petitioner's grounds.

Petitioner's footnote 6 does not excuse the missing element from its analysis. In its footnote 6 Petitioner asserts that the claims do not require that hoses or manifolds be fluidly connected with or through reels. Petitioner presented no claim constructions, e.g., on "connected" or any other term or phrase, and therefore its assertion of what the claims do or do not require completely lacks basis. Moreover, whether Petitioner

[2] Petitioner purports to address claim 1[e] in Section VIII.A.1.f. Petition at 26. Petitioner addresses claim 11[d] in Section VIII.A.2.e, but relies on Section VIII.A.1.f. Petition at 31. Petitioner addresses claim 19[e] in Section VIII.C.12.f, but relies on claim 11[d] in Section VIII.A.2.e, which relies on claim 1[e] in Section VIII.A.1.f. Petition at 56.

thought that the claims require a fluid connection or not does not relieve Petitioner of its burden to explain how the prior art teaches the claim elements. In this regard, Petitioner has not even attempted to explain whether the prior art reels are connected, fluidly or not, to the manifolds. Petitioner has, therefore, entirely missed claim 1[e], and thus also claims 11[d] and 19[e].

Accordingly, Ground 1 as to anticipation should be dismissed. Insofar as Ground 3 for claim 19[e] relies on Ground 1 as applied to claim 11[d], Ground 3 should also be dismissed.

B. Van Vliet does not have the features of claims 1[e] and 11[d].

Van Vliet's description does not disclose reels that are connected to be fed from the manifold. Van Vliet discloses that the "hoses 24 are preferably stored on reels 30," and that reels may be manual reels or spring loaded. Ex. 1005, [0015]. However, aside from serving for storage of the hoses, Van Vliet contains no further description about the function or nature of the reels.

Van Vliet's figures also do not disclose that the reels are connected to be fed from the manifold. Ex. 2011 at ¶¶104-105. Patent drawings are not working drawings and must clearly show the structure which is claimed. *In re Mraz*, 455 F.2d 1069, 173 USPQ 25 (CCPA 1972); MPEP 2125. The reels, numbered as element 30, are only shown in Fig. 1 of Van Vliet. Van Vliet indicates that Fig. 1 is a schematic view. *Id*. at [0008]. As Petitioner's expert acknowledges, "[a] schematic in this context is a high-level

representation and is not intended to depict the physical appearance or form." Ex. 1003, ¶132, footnote 138 citing Ex. 1022 (the definition of schematic as "represented in simplified or symbolic form"). Fig.1 alone is thus unreliable for disclosing features that Petitioner contends are present. Ex. 2011 at ¶104-105. Accordingly, any argument that Van Vliet depicts that the reels are connected to be fed from the manifold is predicated on schematic Fig. 1 that, as a simplified or symbolic representation, was obviously never intended to show a high level of detail. As a result, Van Vliet's figures do not clearly disclose that the reels are connected to be fed from the manifold. Ex. 2011 at ¶¶104-105.

Additionally, insofar as Petitioner relies on its expert, Petitioner's expert holds out contradictory views. In one instance he relies on Van Vliet's figures to allege that the reel is part of the fluid stream. Ex. 1003, ¶¶141-143. Yet, he simultaneously concedes elsewhere in his report that Van Vliet's figures are schematic. Ex. 1003 at 89, footnote 138 citing Ex. 1022 (the definition of schematic as "represented in simplified or symbolic form"). That is, despite the acknowledged simplified or symbolic form of Van Vliet's figures, and the absence of physical appearance or form in the figures, Petitioner's expert appears to rely on physical appearance or form to conclude that the figures somehow show that the reels are part of the fluid stream. Ex. 1003, §143.

Additionally, contrary to Petitioner's assertion, Van Vliet explains that "each hose 24 is connected to a fuel outlet 22 by a dry connection 60 and to a cap 26 by a dry

connection 62." Ex. 1004 at [0022]; Ex. 2011 at ¶¶106-107. In other words, the ends of Van Vliet's hose 24 are not connected to reel 30 because the ends are connected to dry connections 60 and 62, which are not part of the reel and thus do not implicate the reels being *fed* from the manifold.

Accordingly, Ground 1 as to anticipation should be dismissed. Insofar as Ground 3 as to claim 19[e] relies on Ground 1 as applied to claim 11[d], Ground 3 should also be dismissed.

C. Van Vliet does not have the "hose connected with a different one of the reels" of claims 1[e], 11[e], and 19[f].

As addressed earlier above, the phrase "hose connected with a different one of the reels" means that an end of the hose is coupled to the reel, as opposed to the hose being wound on the reel. Van Vliet does not disclose such a feature. Van Vliet provides a dispositive statement that "each hose 24 is connected to a fuel outlet 22 by a dry connection 60 and to a cap 26 by a dry connection 62." Ex. 1004 at [0022]; Ex. 2011 at ¶¶111-112. Thus, Van Vliet too, considers his hose to be connected when the end of the hose is coupled to another component (connections 60/62). The ends of Van Vliet's hose 24 are not connected to reel 30, and the features of claims 1[e] and 11[e], and 19[f] by interdependence of Petitioner's arguments, are therefore missing from Van Vliet. Ex. 2011 at ¶¶111-112.

D. Petitioner does not sufficiently explain how "design choice" renders claims 1[e], 11[d], 11[e], 19[e], and 19[f] obvious.

Petitioner suggests under Ground 1, though only in a footnote, that hoses or manifolds fluidly connected with or through the reels would have been an obvious matter of design choice. Petition at 27, footnote 6. To support a conclusion that a claim is an obvious matter of design choice, a "convincing line of reasoning" must be presented as to why one of ordinary skill in the art would have found the claimed feature to have been obvious. *Ex parte Clapp*, 227 U.S.P.Q. 972, 973 (BPAI 1985).

For several reasons, Petitioner falls short of meeting its burden of establishing that having manifolds fluidly connected to reels in Van Vliet is an obvious matter of design choice. First, Petitioner fails to make any statement of the law to guide its assertion of design choice, nor provide any analysis of the claim feature within that legal framework. Without any analysis under a legal framework, Petitioner's assertion of "design choice" amounts to no more than a conclusory argument of counsel that cannot support institution.

Second, Petitioner does not provide any analysis of design choice in its Petition. Rather, it only casually mentions "design choice" in footnote 6, without any explanation of how it applies to the claim features at hand or Van Vliet. Petitioner's assertion thus amounts to no more than a conclusory statement of counsel that the claims are obvious. The Federal Circuit has stated that "rejections on obviousness cannot be sustained with

mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *In re Kahn,* 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006); see also *KSR,* 550 U.S. at 418, 82 USPQ2d at 1396 (quoting Federal Circuit's statement in *Kahn* with approval). See also MPEP 2142.

VI. GROUND 2: THE CHALLENGED CLAIMS ARE NOT OBVIOUS OVER VAN VLIET IN VIEW OF CABLE

Ground 2 relies on Cable in two basic ways. The first is for allegedly teaching i) a manifold connected with or through reels (with regard to claims 1[e] and by interdependence 11[e]), and the second is for allegedly teaching ii) an aisle walkway and reels on opposing sides of the walkway (with regard to claims 2-5). Petition at 33-38. Reliance on Cable for either of i) or ii) is misplaced for the reasons that follow.

A. Petitioner fails to articulate a rationale or motivation for modifying Van Vliet with the reel of Cable.

Petitioner asserts that it would have been an obvious matter of design choice for a POSITA to implement reels and connections in view of Van Vliet alone and/or in combination with Cable. Petition at 38. In support of combining Van Vliet and Cable Petitioner sets forth various rationales and motivations. Petition at 33-37. However, none of Petitioner's rationales or motivations are directed in particular to combining Cable's reel and hose connection with Van Vliet. For instance, Petitioner's rationales and motivations point to generalities, such as both Van Vliet and Cable having multiple

hoses delivering fuel or other fluids at the same time and both references having hoses that are "pulled out" and "reeled up". Petition at 34. None of these generalities are directed particularly to combining Cable's reels and connections into Van Vliet. Moreover, Petitioner's reliance on those generalities is misplaced. Nowhere does Cable disclose that its hoses deliver fluid at the same time, and nowhere does Van Vliet disclose or suggest "reeling up" a hose (nor does Petitioner or its expert point to support in Cable and Van Vliet for these assertions). Other rationales and motivations given by Petitioner are directed to feature ii) above, not to feature i), for combining Cable's reels and connections into Van Vliet. In fact, Petitioner does not appear to provide any rationale or motivation for feature i) of combining Cable's reels and connections into Van Vliet, nor does Petitioner even assert that Cable has a manifold, let alone teach connections of a manifold and reels as Petitioner contends (Petition at 37-38).

Petitioner further asserts that reels and hose connections were known to POSITAs before the '955 Patent. Petition at 38, citing to Ex. 1015 (Coxreels). The Supreme Court in *KSR Int'l Co. v. Teleflex Inc*., 550 U.S. 398, 418, (2007) noted that the analysis supporting a rejection under 35 U.S.C. §103 "should be made explicit." See also, *In re Zurko*, 258 F.3d 1379 (Fed. Cir. 2001) (deficiencies of references cannot be saved by appeals to common sense and basic knowledge without any evidentiary support.); *In re Nuvasive, Inc*., 842 F.3d 1376, 1383 (Fed. Cir. 2016), ("'conclusory statements' alone are insufficient and, instead, the finding must be supported by a 'reasoned

explanation'"). Beyond Petitioner's assertion that such reels and connections are known, Petitioner's challenge is missing any reasoned explanation of why a POSITA would be prompted to combine Cable's reels and connections into Van Vliet.

Insofar as Petitioner relies on Coxreels because it was allegedly known and commercially available, for the following reasons, a POSITA would not have been motivated to use the Coxreels 1125 Series reel that Petitioner relies on. Petition at 38; Ex. 1003 at ¶¶64-74.

1. The Coxreels 1125 Series reel is not for fracking or automated fuel delivery.

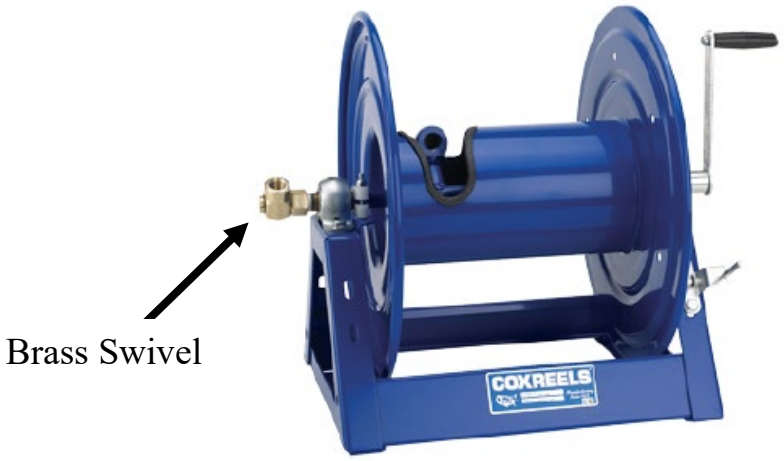
Coxreels may have been marketed for the oil industry, but it is not directed in particular to automated fuel delivery, let alone fracking. For instance, Coxreels provides a bullet point list of 14 different "Possible Fields of Application" of the 1125 Series reel. Ex. 1015 at 1. The list does not explicitly include automated fuel delivery. Insofar as Coxreels suggests use of the 1125 Series in the oil industry, a POSITA would understand that the "oil industry" is too broad to be of practical guidance. The "oil industry" covers a wide variety of areas, such as exploration, extraction, refining, and transportation, and each of these areas would have its own sub-categories with unique technological challenges. A POSITA would, therefore, have drawn the reasonable conclusion that the marketing by Coxreels of the 1125 Series reel in the oil industry was not a representation that the reel is suited to every possible application across the entire

oil industry, or automated fuel delivery in particular. Ex. 2011 at ¶115-117. In fact, each of the 14 fields listed are themselves so enormously broad that it would be virtually impossible for a POSITA to have determined from the list whether the 1125 Series reel would have been suited for some other unlisted field. For instance, the listing of "Chemical Fluid Transfer" is unhelpful to determining whether the reel would be suited for automated fuel delivery. All fluids are necessarily "chemicals" and such a broad reference does not particularly inform a POSITA that the 1125 Series reel is suited for fuel delivery in an automated fueling station. Likewise, the other listed categories are so broad that they do not particularly inform a POSITA that the 1125 Series reel is suited for fuel delivery in an automated fueling station. Ex. 2011 at ¶¶118-119.

2. A POSITA would have recognized that the Coxreels 1125 Series reel would have been unsuited for an automated fueling station as in Van Vliet.

In selecting components such as a reel for an automated fueling station, a POSITA would have at least conducted an initial analysis of the reel to determine whether it is likely to work or not. This would have included preliminary evaluation of the information and design details provided by the manufacturer. Ex. 2011 at ¶121. In particular, a POSITA would not have relied solely on manufacturer representations of a reel, as the manufacturer would not have been likely to be familiar with the design, requirements and operation of an automated fueling station. Ex. 2011 at ¶122.

From the preliminary evaluation, a POSITA would have found that the Coxreels 1125 Series reel would have been unsuited for an automated fueling station as in Van Vliet. The Coxreels 1125 Series reel uses a solid brass swivel inlet. Ex. 1015 at 1, see also annotated picture below. Copper and copper-containing alloys, i.e., brass (a copper-zinc alloy), should not be used with fuel. Ex. 2011 at ¶¶124-127. Copper can promote fuel degradation and can produce mercaptide gels, and zinc can react with water or organic acids in fuel to form gels. These gels can form deposits in downstream equipment that can plug lines, orifices, filter screens, and the like. Ex. 2011 at ¶125. Additionally, metals such as copper and zinc (brass) promote fuel degradation. Fuel degradation can lead to the formation of insoluble gums and particulate materials than can adhere to surfaces, limit fuel flow, or clog small clearances in fuel systems, causing problems such as injector malfunction or seizures. Ex. 2011 at ¶126. Therefore, a POSITA would have understood that a component made of brass, such as the swivel of the Coxreels 1125 Series reel, would have been an unacceptable choice for a mobile fuel delivery station, such as in Van Vliet, because it could have led to formation of gels, insoluble gums, and particulates that could interfere with operation of downstream equipment. Ex. 2011 at ¶127. Accordingly, a POSITA would have found the Coxreels 1125 Series reel to have been an unacceptable choice to use or to even try in a mobile fuel delivery station such as in Van Vliet.



The Coxreels 1125 Series reel also comes in a 1 inch model that has a nickel-plated steel swivel instead of a brass swivel. However, a POSITA would not have found that option to be acceptable either. As indicated in Coxreels, the swivel seals of the 1 inch models have seals made with AFLAS material (Ex. 1015 "AFLAS on 1" models"). AFLAS is a registered trademark of AGC INC. for heat and chemical resistant fluororubber. Ex. 2025. AFLAS was known to have a service temperature of -5 °C to 200 °C and a glass transition temperature of -3 °C or -13 °C, depending on the exact grade. Ex. 2011 at ¶¶129-132. As discussed earlier above, a mobile fuel delivery station may be used in extreme conditions, such as North Dakota in the winter where well site temperatures can fall below -30 °F (-34 °C). A POSITA would have found a reel with an AFLAS seal to have been unacceptable because the expected use in an environment of -30 °F (-34 °C) would have been lower than the minimum service temperature and glass transition temperature of the AFLAS seal, which suggests that the seal would be likely to fail. Ex. 2011 at ¶133. Accordingly, a POSITA would have found the Coxreels

1125 Series 1 inch model reel to also have been an unacceptable choice to use or to even try in a mobile fuel delivery station such as in Van Vliet. Ex. 2011 at ¶135.

3. The Coxreels 1125 Series reel would have resulted in an undesirable operating configuration.

The Coxreels 1125 Series reels were available in 24 different models, which are shown in the table in Coxreels. Ex. 2011 at ¶136. Neither the Petition nor Dr. Durham's declaration appear to identify a particular model, but in his deposition, when discussing the models and hose lengths, Dr. Durham asserts, "I think 700 feet probably would be a good number for a maximum length [of hose] at a fracturing site" (Ex. 2027 at 68). There are two models of the 1125 Series reel that have 700 ft capacity, which are models 1125-4-500 and 1125-4-500-C. Ex. 1005 at 1-2. Both of these models are configured for a 700 ft. long, 3/8 in. inner diameter hose (hereafter the "Durham configuration" refers to model 1125-4-500 or 1125-4-500-C with a 700 ft. long, 3/8 in. inner diameter hose). Ex. 2011 at ¶¶137. The Durham configuration, however, if implemented in Van Vliet would require an undesirable operating configuration.

A "small" frac operation may require 7,500 gallons of diesel in a 12-hr period, a "large" frac operation may require 12,000 gallons in a 12-hr period, and a "superfrac" may require 24,000 gallons or more in a 12 hour period. Ex. 2011 at ¶139. The flow rates that would be required to meet such fuel volumes for a mobile fuel delivery station

such as Van Vliet can be calculated based on the hose diameter, a pump pressure, and an assumption of a "duty cycle." Ex. 2011 at ¶140, Appendix.

A "duty cycle" is the percentage of time of a 12 hour period that the pump is ON and pumping fuel through the hoses at maximum flow rate in order to meet a given fuel demand. For instance, a 90% duty cycle means that the pump is operating to supply the maximum flow rate for 90% of the 12 hour period. In the remaining 10% of the time (i.e., "off-duty time") there is little or no fuel flow through the hoses, which accounts for start-up and shut-down transients and switching valves between different output hoses. A 90% duty cycle would be extreme because any downtime that causes the off-duty time to exceed 10% would prevent the station from meeting the given fuel demand, and a frac pump would then likely need to be taken offline (at the least). A 90% duty cycle would have represented a highly undesirable operating configuration. Ex. 2011 at ¶¶141-142.

For a given flow rate, there is also a pump pressure that would be needed in order to achieve the that flow rate. For safety purposes, pump pressure should be limited to approximately 60 psi. Limiting the pump pressure limits the rate at which fuel, if it spills, would leak out in the event of damage to a hose. Additionally, the number of hoses that are open and providing fuel simultaneously should also be limited, for safety and practical considerations. Ex. 2011 at ¶143. For instance, the greater the number of hoses that are open simultaneously, the greater the burden on the operator(s) to safely

monitor and manage those hoses. As an example, a limit of three simultaneously open hoses means that once three hoses are open and providing fuel, if there is a demand for fuel from a fourth hose, the opening of the valve for the fourth hose would be delayed until one of the first three hoses has completed filling a tank and the valve is closed. A limit of three open hoses would be considered very safe. A limit or five or six hoses would be considered marginally safe, and a limit seven hoses or more would likely be a safety risk. Some of the safety risk could be mitigated with a greater number of operators -- but at the expense of increasing safety risks elsewhere (e.g., more personnel on the well site, more opportunity for human error, etc.). Ex. 2011 at ¶144.

A pressure loss for a desired flow rate through the internal plumbing of the station from the pump, through a fuel filter, a manifold, an elbow fitting, and a hose can also be determined based on a pump outlet pressure limit. Ex. 2011 at ¶145.

For the Durham configuration operating with 3 hoses delivering fuel simultaneously and a comfortable 50% duty cycle, the estimated pressure required to meet the fuel delivery for even a small frac job with 7,500 gallons in 12 hours would be 440 psi. This configuration would pose a higher safety risk because, if there were to be a leak, the higher pump pressure would cause more fuel to be leaked (than 60 psi) and at that pressure the leak may also spew fuel into the air, adding risk of spraying onto an operator or onto a hot surface that could ignite the fuel. Additionally, the pressure would exceed the maximum pressure rating of Brent Hose 3106 that Dr. Durham indicated in

IPR2023-01236 to be "designed for use on engines and fuel lines." Ex. 2011 at ¶¶146-147.This is clearly not an acceptable operating configuration due to the high pressure, the limited fuel delivery, and risk of hose burst.

An increase to seven simultaneously open hoses and a 90% duty cycle, the Durham configuration could achieve delivery of 7,500 gallons in a 12 hr period with a pump pressure under 60 psi. The use of seven simultaneously open hoses at the 90% duty cycle would have been considered a "redline" operating configuration because there would be a safety risk associated with having seven of Van Vliet's ten hoses being simultaneously open and the use of the extreme 90% duty cycle. There would be no margin for error with this configuration, as a problem with any hose would immediately risk a fuel shortfall and, consequently, a frac pump having to be taken offline. More importantly, even at this "redline" configuration, the fuel volume output could only barely meet the fuel requirement of a small frac job and would, without pressing the limits more, be unable to deliver enough fuel for a large frac or a superfrac. Ex. 2011 at ¶¶149-150.

In order to deliver 12,000 gal. for a large frac, the pump pressure for the Durham configuration would have to be increased to 85 psi with seven simultaneously open hoses and a 90% duty cycle - still at *redline* operation for number of hoses and duty cycle. This configuration would also pose a higher safety risk if there were to be a leak, as discussed earlier above. Additionally, the pressure would be approaching the

maximum pressure rating of Brent Hose 3106 (discussion above). This too is clearly not an acceptable operating configuration due to the high pressure, extreme duty cycle, and risk of hose burst. Ex. 2011 at ¶¶151-152.

In order to provide 24,000 gal. of fuel required for a superfrac over 12 hours, the pump pressure for the Durham configuration would have to be increased to 280 psi, with seven simultaneously open hoses and a 90% duty cycle. This would be an extreme safety risk due to the use of seven simultaneously open hoses at the 90% duty cycle, the capacity for a large volume leak, and likelihood of leaked fuel spraying into the air. Moreover, such a pressure level would also be several multiples in excess of the hose pressure rating (discussion above), resulting in a likely hose burst. Ex. 2011 at ¶153.

The Durham configuration with the Coxreels 1125 Series reel and the 3/8 inch hose would lead to undesirable, unsafe operating configurations. A POSITA would have understood this and therefore would have found the Durham configuration to be unacceptable in a mobile fuel delivery station such as Van Vliet. Ex. 2011 at ¶154.

B. A POSITA would not have looked to Cable to modify Van Vliet.

A POSITA would have understood that the equipment in Cable's truck is configured for fast service in a roadside environment. Cable's truck is a drivable road vehicle. Fig. 1 below; Ex. 1005, col. 2, ll. 50 ("driver compartment") that services other road vehicles, likely on or near a road or shoulder of the road. Ex. 2011 at ¶155. A POSITA would have understood this from Cable's explicit disclosure of servicing

vehicles (Ex. 1005, col. 1, ll. 62-65) and the mentioning in Cable of six prior art patents in the background section that all pertain to servicing automobiles or motor vehicles. Ex. 2034, col. 1, ll. 6; Ex. 2037, col. 1, ll. 5; Ex. 2035, col. 1, ll. 55-56; Ex. 2038, col. 1, ll. 29; Ex. 2036, col. 1, ll. 19-21; Ex. 2033, col. 1, ll. 10; Ex. 2011 at ¶156.

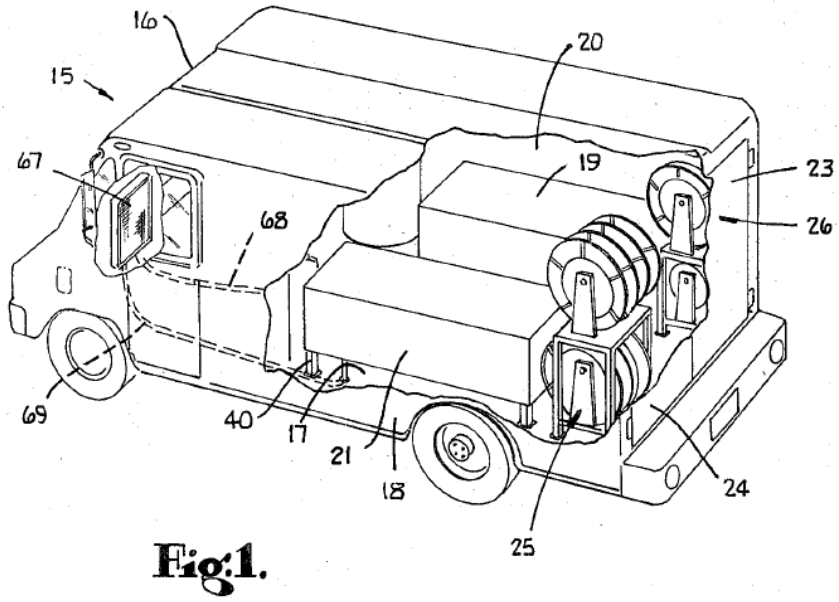


Fig.1.

A POSITA also would have appreciated that there are several reasons that the reels and hoses of Cable are situated at the rear of the truck. First, all of the hoses are deployable from the rear of the truck. A POSITA would have understood that such a configuration with the hoses deploying from the rear would have allowed the truck to be backed up to another vehicle that is to be serviced and that this would thereby avoid a need to pull-up alongside the vehicle being serviced, which could be dangerous in a roadside environment. Ex. 2011 at ¶156. Second, a POSITA would have understood that having all of the hoses deployable from the rear of the truck would have allowed

the driver-operator to be at the rear of the truck, out of the way of any traffic passing alongside the truck while in a roadside environment. Ex. 2011 at ¶158. Third, a POSITA would have understood that the aisleway of Cable would have allowed a driver-operator to go from the driver compartment to the rear of the truck without having to get out of the truck into passing traffic. Taken together, a POSITA would have understood that the configuration of Cable's truck is predicated on its use and function for roadside service. Ex. 2011 at ¶¶156-159.

Additionally, Cable is configured to quickly and easily provide lubricant to a vehicle being serviced. Ex. 2011 at ¶160. Because the hoses deploy from the rear of Cable's truck, an operator would back the truck up the vehicle being serviced, extend a hose from the reel through the rear of the truck to reach the vehicle, provide the lubricant through the hose to the vehicle (and/or collect lubricant from the vehicle), and then wind or wrap the hose back onto the reel. A POSITA would have understood that having all of the reels and hoses in Cable at the rear of the truck allows the operator to quickly access and use each of the hoses, without having to move around to other locations in the truck. Ex. 2011 at ¶161. A POSITA would have further understood that having the hoses all deploy from the rear of the truck allows the operator to quickly service the vehicle, which would be desirable in order to minimize the amount of time that the vehicle being serviced is off-line so that the vehicle can be put back into use (and the truck can move on to a next vehicle to be serviced). Ex. 2011 at ¶162.

In contrast, although a mobile automated fueling station as in Van Vliet would be transported on roads from site to site, the system of Van Vliet is not a drivable road vehicle and it is not used to service road vehicles in a roadside environment. Ex. 2011 at ¶164. The system of Van Vliet, therefore, does not share the same safety concerns of a roadside environment as in Cable.

Van Vliet is also not concerned with rapid use of its hoses. In fact, the hoses are *secured* to the fuel tanks by fuel caps in order to reduce the chances of spilling fuel during refueling, indicating that rapid use of the hoses is not intended. Ex. 2011 at ¶165. In a fracking job, which is the environment of use of Van Vliet's system, the hoses would be secured to the fuel tanks during "rigging up" of the mobile automated refueling station and remain secured to the fuel tanks until the end of the job, usually several days or weeks later when the hoses are removed during "rigging down." Ex. 2011 at ¶166. Thus, unlike in Cable, there would have been no immediate benefit or need in Van Vliet to quickly deploy, use, and collect hoses. In fact, *quick* is the opposite of what a POSITA would have desired in a fracking environment where Van Vliet is used. The hoses are deployed for days or weeks at a time and must be carefully and safely routed around other equipment at the well site to reach the fuel tanks. Ex. 2011 at ¶167. When the job is completed, hundreds of feet of multiple hoses are carefully collected under the supervision of the operators to avoid "catching" on other equipment

and damaging the hoses. Safe hose deployment and damage avoidance are the chief considerations, not speed. Ex. 2011 at ¶168.

The system of Van Vliet is not a drivable road vehicle like Cable's truck and does not share Cable's desire for rapid servicing. As a result, even though Van Vliet and Cable both have reels and hoses, a POSITA would have understood that they are sufficiently different such that a mere presence of reels and hoses in both would not have motivated their combination. Furthermore, to the extent that there is design choice as Petitioner contends (Petition at 36), since Cable's configuration is predicated on a drivable vehicle for rapid servicing in a roadside environment, a POSITA would have been discouraged from looking to Cable for a physical arrangement in Van Vliet, which is not a drivable vehicle and is not concerned with rapid servicing in a roadside environment. Ex. 2011 at ¶¶169-170.

C. Cable is not informative of a practical arrangement for Van Vliet.

There is different equipment in Cable than there is in Van Vliet. For instance, Cable includes a storage cabinet 39, a generator 36, an air compressor 34, an air tank 33, an electric motor 35, a water/anti-freeze tank 27, motor oil tanks 28/29, a waste oil tank 30, a transmission oil tank 31, and a lubrication storage cabinet 32. None of these pieces of equipment of Cable are found in Van Vliet. Ex. 2011 at ¶¶171-172. Van Vliet also includes equipment that is not found in Cable, such as fuel sources 18/20, fuel

pumps 32/34, manifolds 36/38, dry connections 60, and a control station 56. Ex. 2011 at ¶173.

A POSITA would have understood that because there is different equipment between Cable and Van Vliet, Cable's arrangement would not represent a viable option for arranging Van Vliet's equipment (for reference Fig. 2 of Cable and Fig. 1 of Van Vliet copied below). Ex. 2011 at ¶174. In fact, the equipment in Van Vliet cannot be arranged according to Cable's arrangement because Van Vliet has different equipment that would differ in size and shape from Cable's. Ex. 2011 at ¶175. Therefore, a POSITA would not have expected the arrangement of equipment in Cable to improve Van Vliet in the same way, i.e., the combination would not have yielded predictable results. Ex. 2011 at ¶175.

Additionally, a POSITA would have understood Cable's arrangement to be detrimental to Van Vliet. For instance, Dr. Durham states that reels deployed on opposing sides of an aisle walkway adjacent to the sidewalls in Van Vliet would make Van Vliet's system more easily traversable for maintenance and repairs. Petition at 34; Ex. 1003 at ¶172. However, such an arrangement would more likely impede access to the reels for maintenance and repairs, because only one side of the reels facing the aisle would be accessible since the other side would back to the trailer sidewall and thus be inaccessible. Ex. 2011 at ¶¶176-177.

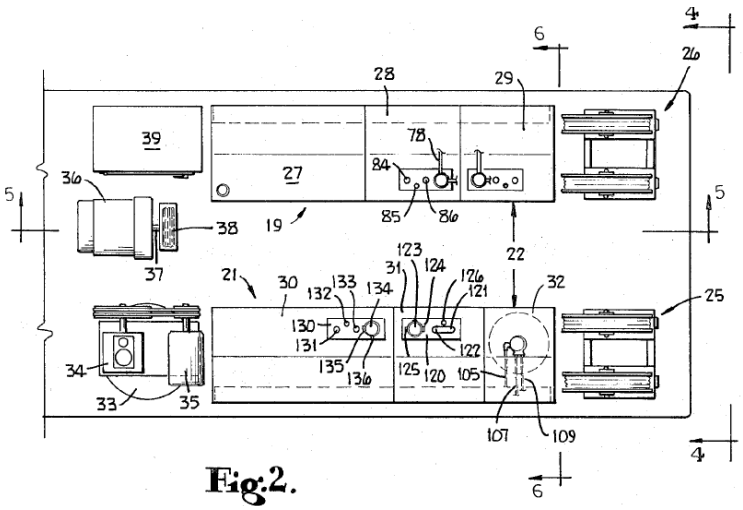


Fig.2.

Cable Fig. 2

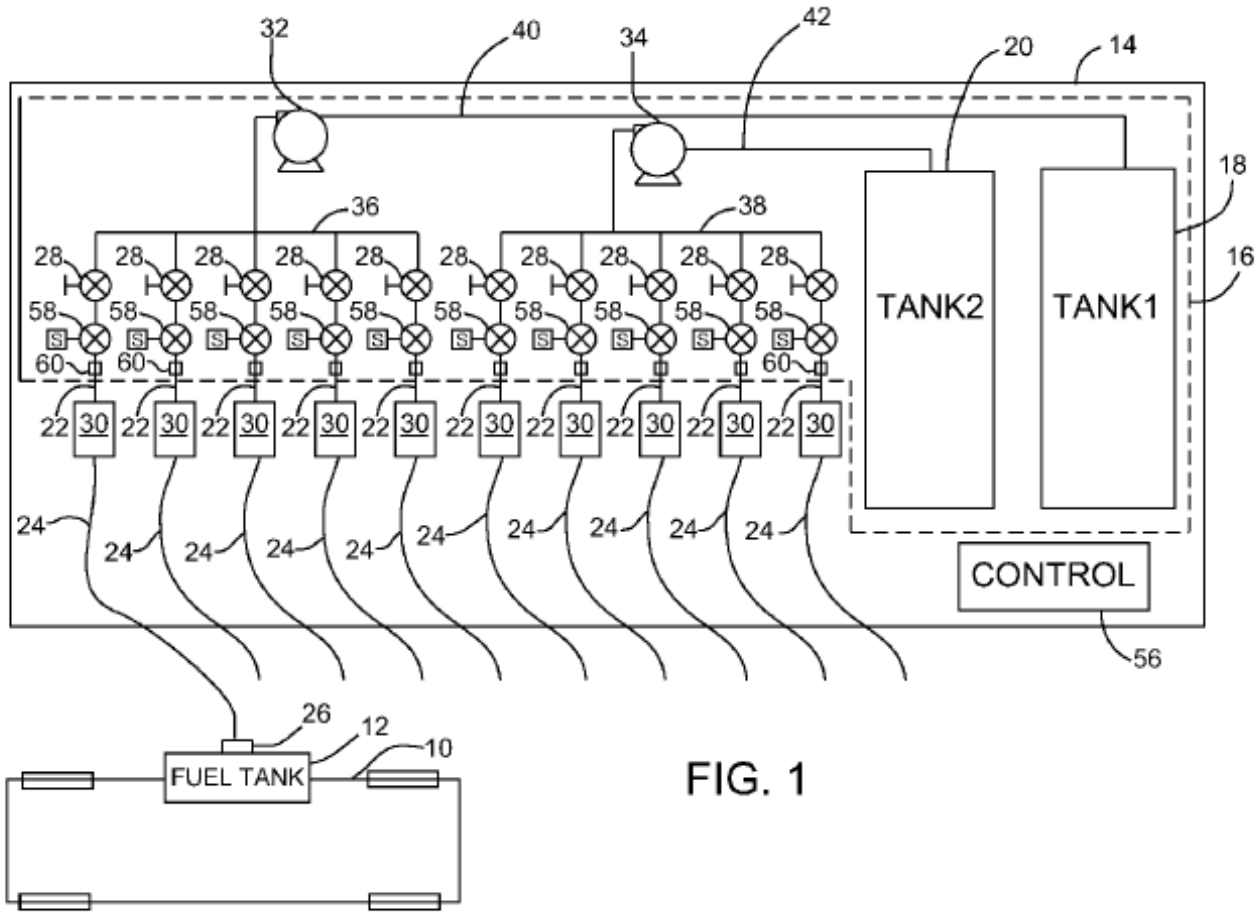


FIG. 1

Van Vliet Fig. 1

Moreover, counter to a POSITA's desire for safety, Petitioner's proposed arrangement of reels deployed on opposing sides of an aisle walkway would not be likely to make Van Vliet's system more traversable. The Coxreels 1125 Series reel that Dr. Durham contends would be used in refueling has a width of 41.5 inches. Ex. 2011 at ¶178-179; Ex. 2028 p. 68, ll. 8-12; Ex. 1015. Given the 8 ft. width (96 inches) of Van Vliet's container, two reels across from each other on opposed sidewalls, oriented as in Cable, would take up at least 83 inches (41.5 x 2) of the trailer width, leaving only 13 inches for an "aisle," which by Dr. Durham's own admission would not meet the OSHA safety requirement of being at least 28 inches. Ex. 2011 at ¶180. Not only would Petitioner's arrangement be unsafe and violate OSHA standards, but a 13 inch width would not be an *aisle walkway* since it would be difficult or impossible to traverse . Ex. 2011 at ¶¶180-182. Four Coxreels reels with two on each side across from each other on opposed sidewalls, oriented as in Cable, would not even fit in Van Vliet's container, as four reels would require 166 inches, which well exceeds Van Vliet's 96 inch wide container. Ex. 2011 at ¶183. Additionally, the 13 inches does not even account for spacing that would be needed between the reels for the hand crank or reel motor. Thus, 13 inches is the maximum amount of space that would be available for the "aisle," but providing spacing between the reels would take up a portion of the 13 inches. Therefore, factoring in this practical consideration, the "aisle" is would likely be less than 13 inches.

Furthermore, arranging the reels of Van Vliet as in Cable would put undue wear and stress on the hoses and reels. The reels of Cable are oriented such that the axes of the spindles about which the reels rotate are transverse (i.e., perpendicular) to the length of the aisle between the reels in Cable's truck. Ex. 1003, Figs. 2 and 4; Ex. 2028 at 117-118. Arranging the reels of Van Vliet according to Cable, with the axes of the spindles transverse to the length of the aisle, means that the reels of Van Vliet would all face toward the rear of Van Vliet's container (to the right or left end of the container in Fig. 1). Therefore, in order to be deployed out of the sidewall in Van Vliet, each hose would need to turn approximately 90° from its reel. This would cause the hose to come into the reel at a steep angle, which would be likely to i) cause the hose to rub/wear on the edge of the spindle, ii) interfere with the winding of the hose, iii) increase stress on the hose from being pulled around a 90° bend, and/or iv) increase winding resistance and stress on the reel. Ex. 2011 at ¶185. A POSITA would have desired the hose to come straight into and out of the reel. *Id*. As a result, a POSITA would not have had an expectation of success for employing the reel arrangement of Cable in Van Vliet because Cable's arrangement is impractical and dangerous for Van Vliet.

VII. GROUND 2: THE CHALLENGE OF CLAIMS 3 AND 4 SHOULD BE SEPARATELY DISMISSED

A. Cable teaches that the walkway is also a storage area.

Petitioner does not address Cable's teaching that the walkway is also a storage area. Cable teaches, "a first row of storage tanks mounted to the truck and extending

along one side thereof … a-second row of storage tanks … extending along the opposite side thereof and being spaced from said first row of tanks with ***a storage area and a walkway therebetween***" (emphasis provided). The teaching of the space between the storage tanks as a storage area would discourage a POSITA from looking to Cable to modify Van Vliet. In particular the Occupational Health and Safety Administration (OSHA) promulgates safety regulations applicable to workplaces. OSHA does not promulgate specific standards for a mobile automated refueling station that is on a well site, but OSHA's "General Industry and Health Standards" are most applicable. One of these standards dictates "exit routes" in the workplace. A walkway that doubles as a storage area would not be acceptable, as items stored in the aisle walkway would block the walkway as an emergency exit route, which is also likely to draw the attention of a site safety supervisor that inspects the equipment before a frac operation starts. Ex. 2011 at ¶187-188. Petitioner did not address this teaching of Cable, which would discourage a POSITA from modifying Van Vliet according to Cable. Ex. 2011 at ¶189. A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. *W.L. Gore & Assoc., Inc. v. Garlock, Inc.,* 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied,* 469 U.S. 851 (1984).

VIII. GROUNDS 3 AND 3A: PETITIONER FAILS TO ACCOUNT FOR THE CLAIMED REGISTER LOCATION AS TO CLAIM 19[d]

A. Petitioner does not provide sufficient support for the claimed location of the register.

Claim 19[d] recites "a register between the at least one pump and the at least one manifold."

Petitioner contends that a POSITA would have understood that a register installed to be used with a pump should be installed *directly* downstream of the pump in order to obtain the most accurate flow rate measurements possible. Petition at 55, 57. Petitioner does not provide any explanation in support but relies on its expert (citing to Ex. 1003, ¶¶224-226). Petitioner's expert, however, also does not provide any support for why a register should be installed *directly* downstream of the pump in order to obtain the most accurate flow rate measurements possible. For instance, Petitioner's expert posits that the electronic register of the LCR reference is designed to be installed downstream of a pump, but he fails to explain what basis, if any, there is for this assertion. In footnote 243 he cites to Ex. 1006 at 3. That citation does not mention a pump or self-evidently give any indication that the LCR register must be installed directly downstream of a pump. Petitioner's expert then continues on to conclude without any analysis that a POSITA would have understood that a register installed downstream of a pump would be installed between pump 32 and manifold 36 [in Van Vliet] in order to capture all of the fluid that was flowing out of pump. *Id*., ¶225. Petitioner's expert cites to footnote

245, but that footnote does not exist at the bottom of the page. The effect of the oversights above by Petitioner and its expert is that there is no support to explain why a POSITA would have modified Van Vliet to include a register in the claimed location between the pump and the manifold.

Additionally, a register could beneficially be located elsewhere in Van Vliet besides directly downstream of the pump. Once the system is loaded with fuel so that there are no air pockets, the flow would be equivalent anywhere it is measured along the entire flow path from a fuel source inlet up to the hoses. For instance, in annotated Fig. 1 of Van Vliet below, a register could be placed in the yellow, green, or two blue highlighted sections. A location downstream of the manifold would require an additional register for each outlet from the manifold, but this would be beneficial because it would allow flow measurement to each individual hose, such as for separate tracking of fuel provided to different customers. Ex. 2011 at ¶198.

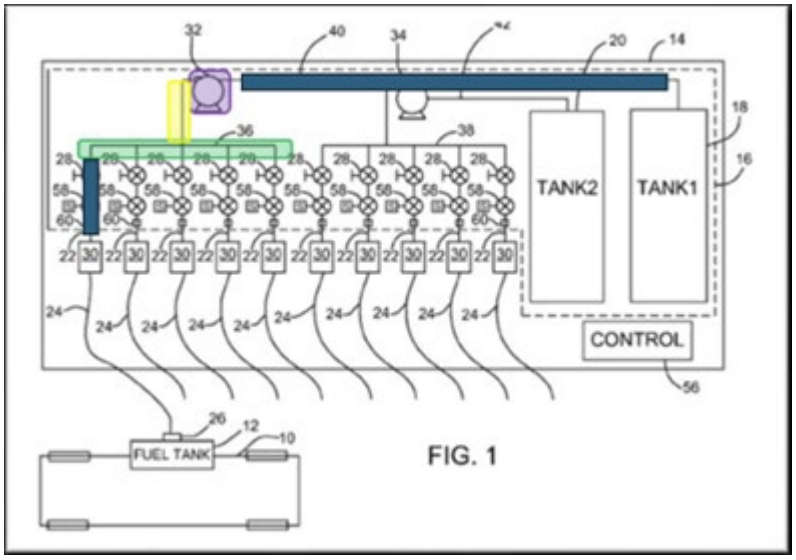


FIG. 1

In contrast, if the hoses were run to equipment of different customers, a register located directly downstream from the pump would be unable to determine how much fuel goes to each customer since all the fuel, regardless of which hose it flows to, would pass through the register at that location. Accordingly, not only did Petitioner fail to support its proposed location, but there are good reasons, if using a register, why a POSITA would locate it somewhere other than Petitioner proposes. Ex. 2011 at ¶199.

For at these reasons, Grounds 3 and 3A should be dismissed.

B. As to dependent claims 6-10 and 14-18, the proposed combination with LCR I and/or LCR II does not cure the deficiencies in the challenges to base claims 1 and 11.

Claims 6-10 depend from claim 1, and claims 14-18 depend from claim 11. Petitioner challenges claims 1 and 11 under Grounds 1 and 2. Grounds 1 and 2 should be dismissed for the reasons discussed earlier above. Neither LCR I nor LCR II address or cure the deficiencies in the challenges under Grounds 1 and 2. Accordingly, Grounds 3 and 3A fall with Grounds 1 and 2.

IX. GROUNDS 4 AND 4A SHOULD BE DISMISSED BECAUSE THE RATIONALE IS INSUFFICIENT AND A POSITA WOULD NOT BE MOTIVATED TO COMBINE VAN VLIET AND DEFOSSE.

A. Petitioner's rationale and motivation for DeFosse is insufficient.

Petitioner first suggests that a POSITA would have been motivated to combine Van Vliet and DeFosse because DeFosse is in the same field of endeavor as Van Vliet and the ‘955 Patent and is directed to the same problem of pumping fluids in the context

of fracking. Petition at 58. However, such allegations are not sufficient to demonstrate obviousness. The fact that references may be analogous to a claimed invention or even share the same design incentives with each other and with the patent at hand does not establish that it would have been obvious to combine their features. Petitioner must show some reason why a person of ordinary skill in the art would have thought to combine particular elements, as evidenced by the prior art, to reach the claimed invention. Conclusory labels do not substitute for a fact-based analysis to establish what is being modified and why, based on the differences between the prior art and the claimed invention, it would have been obvious to a person of ordinary skill to make the modification. See *Shopkick, Inc. v. Novitaz, Inc.*, IPR2015-00279, Paper 7, slip op. at 26–30 (May 29, 2015). Beyond conclusory labels, Petitioner provides no meaningful explanation of a reason why mere analogous art would have prompted the proposed combination.

Next, Petitioner posits that the combination would have been obvious because Van Vliet discloses use of pumps and pumping fluids, and DeFosse discloses pumps in series for pumping fluids in a related context in fracturing operation. However, there are several issues with such an assertion.

First, Petitioner's characterization of Van Vliet is misplaced. The characterization of Van Vliet disclosing "pumping fluids" is an unsupported over-

generalization. Van Vliet is directed to fuel. Ex. 2011 at ¶¶200-201. For instance, the title of Van Vliet's disclosure is "Fuel Delivery System and Method," and nowhere does Van Vliet indicate that his system is designed for anything other than fuel. Ex. 2011 at ¶202. Van Vliet's claims are also directed to fuel delivery systems that include a fuel source (independent claims 1 and 16), a method of delivering fuel that include pumping fuel from a fuel source (independent claim 11), and a cap for a fuel tank that has a fuel level sensor (independent claim 20), all of which indicate that Van Vliet's disclosure is in the context of fuel, not fluids more generally. Ex. 2011 at ¶203. There is nothing in particular in Van Vliet that would lead a POSITA to conclude that Van Vliet's disclosure is more broadly directed to fluids in general. Ex. 2011 at ¶204. Accordingly, Petitioner's characterization of Van Vliet as addressing a problem of pumping fluids is misplaced. *Id*.

Second, as to Petitioner's contention that DeFosse discloses pumps in series for pumping fluids *in a related context in fracturing operations*, Petitioner does not explain what the alleged "related context" is. In fact, contrary to Petitioner's assertion, DeFosse's pumping of fluids is not a "related context" to Van Vliet's pumping of fuel. Ex. 2011 at ¶205. DeFosse is directed to a process for preparing a friction-reduced hydraulic fracturing fluid at a central location which can be readily transported to an oil or gas well in a formation at a well site. Ex. 2011 at ¶206 (citing Ex. 1008, Abstract). The pumps 26/28 in DeFosse serve at the wellsite to pump large quantities of a water

polymer mixture for injection into the well. Ex. 2011 at ¶207. A mixture of water and polymer from a 20 metric tonne storage tank is delivered to the pumps 26/28, which pump the mixture to a surge tank at the wellsite. The water/polymer mixture from the surge tank is then mixed with a proppant before transport to pump 40 to pump the mixture into the well for well stimulation. Ex. 1008, col. 1, ll. 24-29; col. 4, ll. 25-28, 61-64; col. 5, ll. 28-37; Fig. 1].

In contrast, Van Vliet's pumps do not serve to pump large quantities of water or polymer into a well. Rather, Van Vliet's system provides fuel to run the pumpers at the wellsite. Ex. 1004, [0014] "pumpers and blenders" and "pumper 10." Ex. 2011 at ¶208. The pumper 10 in Van Vliet would be analogous to the pumps 40 in DeFosse that are used in combination with blender 38 (Ex. 1008, Fig. 1). Thus, although both are at a wellsite, a POSITA would certainly have understood that Van Vliet's pumps are for an entirely different purpose than the pumps 26/28 of DeFosse. Ex. 2011 at ¶209. Accordingly, DeFosse's pumping of fluids is not a "related context" to Van Vliet's pumping of fuel.

Additionally, Dr. Durham's findings regarding DeFosse are not supported by an underlying factual basis. For instance, in support of the assertion that a POSITA would have been motivated to use two pumps in series in order to produce sufficient pumping capacity using two or more smaller pumps that would individually fall below the necessary pumping capacity and/or to take advantage of the fast startup and protection

from cavitation that such a system would provide (Petition at 58-59), Petitioner cites to Ex. 1003, ¶¶244-251. However, Petitioner's expert provides no factual basis for any of the opinions in those paragraphs. For example, in ¶244 he asserts "[a] POSITA would have recognized that the benefits of a series pumping system are multifold." He then continues on to explain why, but nowhere in that explanation does he provide any factual basis for his assertions. Similarly, he explains in ¶246 that "[o]ne common method of maintaining NPSH on a discharge pump is through the use of a 'boost pump'," but he again does not provide an underlying factual basis for that explanation. The explanations in ¶¶247-249 likewise do not contain any factual basis. Rather, DeFosse uses one pump for the mixer output and another pump to add water to hydrate the mixture. Ex. 2011 at ¶¶210-211. This is *not* a boost pump function but instead the arrangement has a purpose specific to the mixing operation. Ex. 2011 at ¶212. Paragraph ¶244 is the only one of the paragraphs in which Dr. Durham cites to any factual basis, but even there it is merely for the vapor pressures of diesel fuel and water, not to support the overall premise of the paragraph that a POSITA would have known to maintain equal or similar net positive suction head. Accordingly, Petitioner's assertion that a POSITA would have been motivated to combine Van Vliet and DeFosse is without support.

1. A POSITA would not have been motivated to combine Van Vliet and DeFosse.

"Obviousness requires more than a mere showing that the prior art includes separate references covering each separate limitation in a claim under examination. Rather, obviousness requires the additional showing that a person of ordinary skill at the time of the invention would have selected and combined those prior art elements in the normal course of research and development to yield the claimed invention." *Unigene Labs., Inc. v. Apotex, Inc.,* 655 F.3d 1352, 1360 (Fed. Cir. 2011) (internal citations omitted). Petitioner has failed to meet this burden.

As discussed above, although the pumps of both Van Vliet and DeFosse are at a well site, a POSITA would understand that Van Vliet's pumps serve for an entirely different purpose and function than the pumps 26/28 of DeFosse. For instance, pumps 26/28 in DeFosse pump the water/polymer mixture to a surge tank 34 at the well site. Ex. 2011 at ¶¶215-217. The water/polymer mixture from the surge tank is then mixed with a proppant before transport to pump 40 to pump the mixture into the well for well stimulation. Ex. 2011 at ¶216. The pumps 26/28 of DeFosse thus serve at the well site to move the water/polymer mixture downstream to another pump 40 (Fig. 1) that injects the mixture into the well. Ex. 2011 at ¶217. Van Vliet does not do any mixing of water and polymer, or any two fluids for that matter. Rather, Van Vliet's pumps simply deliver fuel to run the frac pumps. Given that DeFosse's pumps function for mixing of hydraulic

frac fluid and Van Vliet's pumps handle fuel and have no need for mixing, a POSITA would not have looked to DeFosse's pumps to modify Van Vliet.

For at least the reasons above, Grounds 4 and 4A should be dismissed.

X. SECONDARY CONSIDERATIONS

The nonobviousness of the challenged claims is strongly supported by a number of objective indicia of nonobviousness, including industry praise, commercial success, licensing, and copying by others. When present, secondary considerations of nonobviousness must be considered. To be given weight, there must be some nexus between the secondary consideration and a novel feature of the claimed invention. However, secondary considerations are presumptively attributed to the patented invention where a marketed product embodies the claimed features and is coextensive with them. *Muniauction, Inc. v. Thomson Corp*., 532 F.3d 1318, 1328 (Fed. Cir. 2008) (citation omitted). As it relates to the products discussed below, including the FAS Unit, the secondary considerations should presumptively apply.

A. The Claimed Technology Has Received Industry Praise

The FAS Unit, embodying claim elements, has received praise and recognition within the United States oil and gas industry in connection with its safety. Specifically, in 2018, the inventor of the FAS Unit, Ricky Dean Shock, was named an Industry Leader at the Texas Oil & Gas Awards for the FAS Unit’s improvements in safety. Ex. 2043.

The FAS Unit is covered by the challenged claims, creating a presumption that this secondary consideration of nonobviousness should apply. Dr. Rodgers has testified that the FAS Unit meets each and every limitation of at least the challenged claims. Ex. 2011 at ¶ 219. Patent Owner marks each of its FAS Units with the '118, '805, and '955 patents. Ex. 2031.

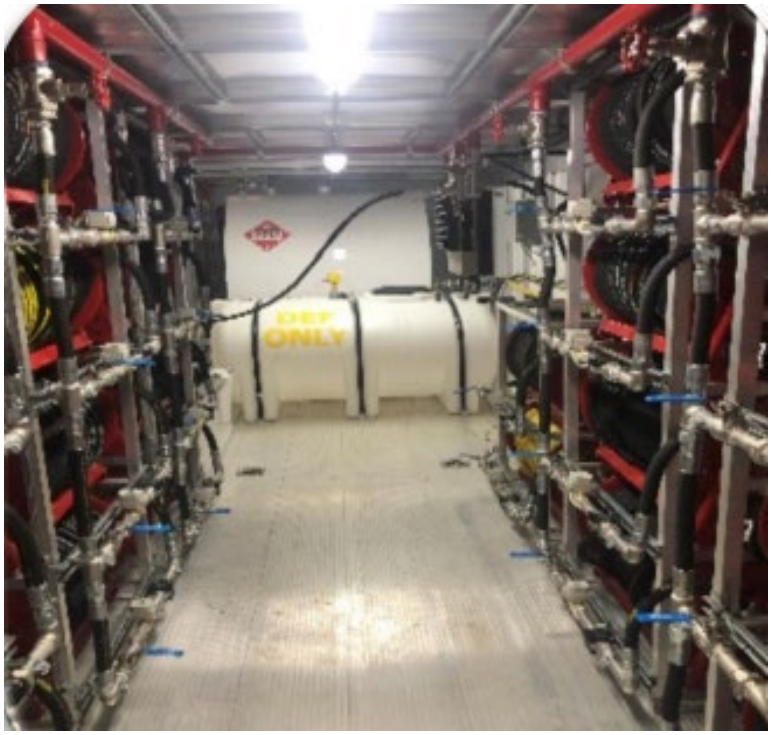
B. The Claimed Technology Was Copied by Others, Including Petitioner

Multiple entities have copied the claimed configuration. First, Petitioner is the owner of US Patent No. 11,305,979. During prosecution of the '979 patent, on December 26, 2019, Petitioner filed an Information Disclosure Statement citing the '805 Patent as prior art. (Ex. 2044). In spite of this knowledge of the '805 Patent, Petitioner offered its CORE Automated Fueling Solution commercially, complete with the claimed features in the '805 Patent – a mobile trailer, a pump, manifolds, a set of reels on each side of the trailer, and an aisle walkway between the sets of reels. A first group of the hoses are deployable from the first trailer side wall and a second group of the hoses are deployable from the second trailer side wall.

The publicly available photos above showing these claimed features in Petitioner's product were included in the Complaint Patent Owner filed against Petitioner for patent

infringement, *Fuel Automation Station, LLC. V. Permian Global, Inc.,* Case No. 1-22-cv-008001 (WDTX Aug. 10, 2022). Ex. 2042.

Patent Owner also asserted the ‘118 and ‘955 patents in litigation against Comanche Gas Solutions, LLC in connection with their Comanche fuel distribution system. This matter was captioned 21-cv-01007-MN in the District of Delaware. The Comanche fuel distribution system included a mobile trailer, first and second manifolds on the trailer, reels on opposing sides of the trailer, with an aisle walkway between the sets of reels. Ex. 2041.



C. Licensing

Patent Owner has granted licenses under the '118, '805, and '955 patents to Comanche Gas Services LLC, in which Comanche pays Patent Owner a royalty for the use of automated fracking fuel delivery systems. Ex. 2043.

D. Commercial Success

The invention has also achieved significant commercial success, demonstrating market demand and consumer approval that is directly attributable to the inventive features of the patented fuel delivery system. Indeed, a total of more than 60 FAS units have been used to deliver over 800,000,000 gallons of fuel on well sites in Texas, Oklahoma, Colorado, North Dakota, New Mexico, and Pennsylvania, as well as

internationally in Canada, Saudi Arabia, and Argentina. Ex. 2043. Again, each FAS Unit embodies the claim elements of the '118, '805, and '955 patents.

XI. CONCLUSION

For the foregoing reasons, Patent Owner respectfully submits that Petitioner has not established by preponderance of evidence that any claims of the '955 Patent are unpatentable.

Respectfully Submitted,

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STATEMENT OF COMPLIANCE

Pursuant to 37 C.F.R. § 42.24(b)(1), the undersigned hereby certifies that the foregoing document is produced using a 14-point Times New Roman font and contains 12,769 words (excluding a table of contents, table of authorities, certificate of service, and appendix of exhibits), which is fewer than the 14,000 words permitted by PTAB rules. Counsel relies on the word count of the computer program used to prepare the brief.

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CERTIFICATE OF SERVICE

I HEREBY CERTIFY that on May 31, 2024, a true and correct copy of the foregoing document was served electronically via e-mail in its entirety on counsel identified below by Petitioner for service at DLPermianIPR@bakerbotts.com.

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