

# United States Court of Appeals for the Federal Circuit

2007-1149

HALLIBURTON ENERGY SERVICES, INC.,

Plaintiff-Appellant,

v.

M-I LLC

(doing business as M-I Drilling Fluids L.L.C.),

Defendant-Appellee.

Edward D. Manzo, Cook, Alex, McFarron, Manzo, Cummings & Mehler, Ltd., of Chicago, Illinois, argued for plaintiff-appellant. With him on the brief were Monte M. Bond and David L. Patterson, Dykema Gossett PLLC, of Dallas, Texas.

John R. Keville, Howrey LLP, of Houston, Texas, argued for defendant-appellee. With him on the brief were Stephen H. Cagle and Richard L. Stanley. Of counsel on the brief was S. Calvin Capshaw, Brown McCarroll LLP, of Longview, Texas.

Appealed from: United States District Court for the Eastern District of Texas

Judge Leonard Davis

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Appeal from United States District Court for the Eastern District of Texas in case no.  
6:05-CV-155, Judge Leonard E. Davis

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DECIDED: January 25, 2008

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Before MICHEL, Chief Judge, BRYSON, Circuit Judge, and FOGEL, \* District Judge.

MICHEL, Chief Judge.

Halliburton Energy Services, Inc. ("Halliburton") appeals from a final judgment of the United States District Court for the Eastern District of Texas. Halliburton Energy Services, Inc. v. M-I LLC, No. 6:05-CV-155 (E.D. Tex. Nov. 20, 2006) ("Judgment Order"). The district court granted summary judgment in favor of M-I LLC ("M-I"), holding that independent claims 1-3 and 5 and their asserted dependent claims of U.S. Patent No. 6,887,832 B2 ("the '832 patent") were invalid as indefinite under 35 U.S.C.

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\* Honorable Jeremy Fogel, District Judge, United States District Court for the Northern District of California, sitting by designation.

§ 112, ¶ 2. We heard oral argument on November 7, 2007. Because a claim term in each asserted claim lacked clear meaning to the ordinary artisan, we affirm.

I.

Halliburton is the assignee of the '832 patent, which relates to oil field drilling fluids that are fragile gels. In the process of drilling such wells, drilling fluid is used for a variety of purposes, such as “removing drill cuttings from the wellbore, cooling and lubricating the drill bit, aiding in support of the drill pipe and drill bit, and providing a hydrostatic head to maintain the integrity of the wellbore walls and prevent well blowouts.” '832 patent col.1 ll.27-31.

The '832 patent claims recite certain fragile gel drilling fluids. Claim 1 for example recites:

1. A method for conducting a drilling operation in a subterranean formation using a fragile gel drilling fluid comprising:
  - (a) an invert emulsion base;
  - (b) one or more thinners;
  - (c) one or more emulsifiers; and
  - (d) one or more weighting agents, wherein said operation includes running casing in a borehole.

(emphasis added).

During prosecution, Halliburton distinguished the claims of the '832 patent from prior art fluids by stating that the claims were “limited to” a “fragile gel” drilling fluid or the method of using a “fragile gel” drilling fluid. Thus, although the term “fragile gel” appears only in the preamble of the asserted independent claims, Halliburton concedes that the claimed drilling fluids are limited to those that are “fragile gels.” Pitney Bowes, Inc. v. Hewlett-Packard Co., 182 F.3d 1298, 1305 (Fed. Cir. 1999) (“If the claim preamble, when read in the context of the entire claim, recites limitations of the claim,

or, if the claim preamble is ‘necessary to give life, meaning, and vitality’ to the claim, then the claim preamble should be construed as if in the balance of the claim.”)

(citations omitted). The specification defines “fragile gels” as follows:

A “fragile gel” as used herein is a “gel” that is easily disrupted or thinned, and that liquifies or becomes less gel-like and more liquid-like under stress, such as caused by moving the fluid, but which quickly returns to a gel when the movement or other stress is alleviated or removed, such as when circulation of the fluid is stopped, as for example when drilling is stopped. The “fragileness” of the “fragile gels” of the present invention contributes to the unique and surprising behavior and advantages of the present invention. The gels are so “fragile” that it is believed that they may be disrupted by a mere pressure wave or a compression wave during drilling. They seem to break instantaneously when disturbed, reversing from a gel back into a liquid form with minimum pressure, force and time and with less pressure, force and time than known to be required to convert prior art fluids from a gel-like state into a flowable state.

'832 patent col.2 ll.26-42.

In May 2005, Halliburton sued M-I in the United States District Court for the Eastern District of Texas, alleging that M-I’s Rheliant drilling mud system infringed certain claims of the '832 patent. M-I moved for summary judgment of invalidity, arguing that the asserted claims of the '832 patent were invalid for indefiniteness, lack of enablement, and/or lack of written description. After holding a combined Markman and motion hearing to address claim construction disputes as well as M-I’s motion for summary judgment of invalidity, the district court granted M-I’s motion for summary judgment, finding that all asserted claims of the '832 patent were invalid as indefinite. Halliburton Energy Serv., Inc. v. M-I LLC, 456 F. Supp. 2d 811, 825 (E.D. Tex. 2006).

First, the district court looked at the definition of fragile gel in the specification and found that it was too subjective and unclear because it relied on terms such as “easily transitions,” “easily disrupted or thinned,” “less gel-like,” “more liquid-like,”

“quickly returns to a gel,” “break instantaneously,” and “minimum pressure, force, and time.” *Id.* at 817. Additionally, the district court rejected Halliburton’s argument that Figure 3 (depicted below) and Figure 4<sup>1</sup> of the ’832 patent distinguish the invention from the prior art. *Id.* at 822-23.

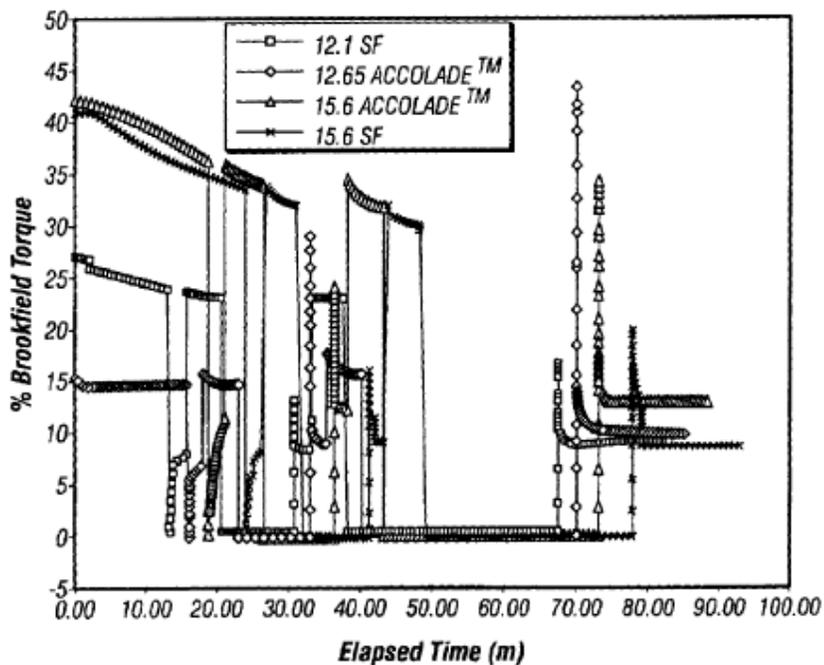


FIG. 3

SF fluids are prior art fluids whereas ACCOLADE™ fluids have the characteristics of the invention of the ’832 patent. ’832 patent col.4 l.65 – col.5 l.7. In Figure 3, at around the 70 minute mark, the height of the curve when stress is applied represents the strength of the gel that the fluid forms at rest, and the speed at which the curve falls back on

<sup>1</sup> Halliburton conceded at oral argument that it does not rely on Figure 4 to support its assertion that the term “fragile gel” is definite. As such, we need not address that figure directly but note only that there is no observable distinction between the relaxation rates (i.e., how quickly fluids return to gel-like state once stress is removed) of at least one of the SF (prior art) fluids and the fluids of the invention of the ’832 patent.

itself indicates how quickly the gel breaks (i.e., transitions back to a liquid state). The district court found that this graph did not delineate the bounds of the invention because both prior art fluids and fluids of the invention exhibit the same shape curves (the curves of the 12.1 SF, 12.65 ACCOLADE, and 15.6 ACCOLADE fluids all fall directly back on themselves). Halliburton, 456 F. Supp. 2d at 820. The primary difference between these fluids is the height of the curves (i.e., the strength of the gels formed), but the district court found that Halliburton had produced no evidence of “precisely how high the vertical leg of a fluid’s L-shaped curve must reach—i.e., how ‘strong’ a gel must be—for that fluid to exhibit ‘fragile gel behavior.’” Id.

The district court also noted that Halliburton’s proposed additional limitation to the term “fragile gel,” that it contains no or only low amounts of organophilic clay or lignite, was improperly imported from the specification, which states that the fragile gel of certain embodiments of the invention of the patent preferably does not have these clays. Id. at 824. The court found that the doctrine of claim differentiation further counseled against this construction because dependent claims added the limitation that the fluid is “substantially free of organophilic clay.” Id. at 824-25.

In November 2006, the court issued a final judgment that all asserted claims of the ’832 patent were proven invalid as indefinite, held that all other issues of infringement and validity were moot, and dismissed M-I’s counterclaims without prejudice. This timely appeal followed. We have jurisdiction pursuant to 28 U.S.C. § 1295(a)(1).

## II.

We review both a district court's grant of summary judgment and a conclusion that a claim is indefinite under 35 U.S.C. § 112, ¶ 2 de novo. Datamize, LLC v. Plumtree Software, Inc., 417 F.3d 1342, 1347 (Fed. Cir. 2005).

35 U.S.C. § 112, ¶ 2 requires that the specification of a patent "conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention." Because claims delineate the patentee's right to exclude, the patent statute requires that the scope of the claims be sufficiently definite to inform the public of the bounds of the protected invention, i.e., what subject matter is covered by the exclusive rights of the patent. Otherwise, competitors cannot avoid infringement, defeating the public notice function of patent claims. Athletic Alternatives, Inc. v. Prince Mfg., Inc., 73 F.3d 1573, 1581 (Fed. Cir. 1996) ("[T]he primary purpose of the requirement is 'to guard against unreasonable advantages to the patentee and disadvantages to others arising from uncertainty as to their [respective] rights.'") (quoting Gen. Elec. Co. v. Wabash Appliance Corp., 304 U.S. 364, 369, (1938)). The Supreme Court has stated that "[t]he statutory requirement of particularity and distinctness in claims is met only when [the claims] clearly distinguish what is claimed from what went before in the art and clearly circumscribe what is foreclosed from future enterprise." United Carbon Co. v. Binney & Smith Co., 317 U.S. 228, 236 (1942).

This court has applied the definiteness requirement of 35 U.S.C. § 112, ¶ 2 in numerous circumstances. For example, we have held claims indefinite where a claim recites means-plus-function elements without disclosing corresponding structure in the specification, Biomedino, LLC v. Waters Techs. Corp., 490 F.3d 946, 950 (Fed. Cir.

2007), includes a numeric limitation without disclosing which of multiple methods of measuring that number should be used, Honeywell Int'l, Inc. v. Int'l Trade Comm'n, 341 F.3d 1332, 1340 (Fed. Cir. 2003), and contains a term that is “completely dependent on a person’s subjective opinion,” Datamize, 417 F.3d at 1350. We have also stated that a claim could be indefinite if a term does not have proper antecedent basis where such basis is not otherwise present by implication or the meaning is not reasonably ascertainable. Energizer Holdings, Inc. v. Int'l Trade Comm'n, 435 F.3d 1366, 1370-71 (Fed. Cir. 2006). The common thread in all of these cases is that claims were held indefinite only where a person of ordinary skill in the art could not determine the bounds of the claims, i.e., the claims were insolubly ambiguous.

Of course, claims are not indefinite merely because they present a difficult task of claim construction. Instead, “[i]f the meaning of the claim is discernible, even though the task may be formidable and the conclusion may be one over which reasonable persons will disagree, we have held the claim sufficiently clear to avoid invalidity on indefiniteness grounds.” Exxon Research & Eng'g Co. v. United States, 265 F.3d 1371, 1375 (Fed. Cir. 2001) (citations omitted). Proof of indefiniteness requires such an exacting standard because claim construction often poses a difficult task over which “expert witnesses, trial courts, and even the judges of this court may disagree.” Id. Nevertheless, this standard is met where an accused infringer shows by clear and convincing evidence that a skilled artisan could not discern the boundaries of the claim based on the claim language, the specification, and the prosecution history, as well as her knowledge of the relevant art area.

In this case, the district court found that the asserted claims, which contained the limitation that the drilling fluid be a “fragile gel,” were indefinite. “Only claims ‘not amenable to construction’ or ‘insolubly ambiguous’ are indefinite.” Datamize, 417 F.3d at 1347 (citing Novo Indus., L.P. v. Micro Molds Corp., 350 F.3d 1348, 1353 (Fed. Cir. 2003); Honeywell, 341 F.3d at 1338; Exxon Research, 265 F.3d at 1375). Because we conclude that neither Halliburton’s proposed definition nor any other possible construction resolves the ambiguity in the scope of the term “fragile gel,” we agree with the district court that claims containing that term are indefinite.<sup>2</sup>

Halliburton argues that “fragile gel” as used in the asserted claims is definite and has a three-part definition:

- 1) A gel that easily transitions to a liquid state upon the introduction of force (e.g., when drilling starts) and returns to a gel when the force is removed (e.g., when drilling stops); and
- 2) At rest, is capable of suspending drill cuttings and weighting materials; and
- 3) Contains no organophilic clay or organophilic lignite or can contain low amounts of organophilic clay or lignite individually or

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<sup>2</sup> At oral argument, Halliburton asserted that the district court erred in finding that the asserted dependent claims stood or fell with the independent claims as to their definiteness. On appeal, Halliburton raised this issue only in a single sentence in the Summary of the Argument section of its opening brief, which did not identify the dependent claims at issue and provided no basis for finding them definite if the independent claims are indefinite. Following argument, Halliburton by letter identified the dependent claims at issue at the time of the district court’s summary judgment ruling. Nevertheless, Halliburton has presented nothing on appeal to show that this issue (i.e., whether additional limitations in the dependent claims rendered them sufficiently definite) was raised before the district court. Because Halliburton has inadequately presented this issue on appeal and failed to show it was presented below so as to preserve the issue for appeal, we deem this argument waived. SmithKline Beecham Corp. v. Apotex Corp., 439 F.3d 1312, 1320 (Fed. Cir. 2006) (“[M]ere statements of disagreement with the district court as to the existence of factual disputes do not amount to a developed argument.”) (citations omitted); see also United States v. Dunkel, 927 F.2d 955, 956 (7th Cir. 1991) (“A skeletal ‘argument’, really nothing more than an assertion, does not preserve a claim. . . . Judges are not like pigs, hunting for truffles buried in briefs.”).

in combination so that the fragile gel can still easily transition between a gel and liquid state and suspend drill cuttings and weighting materials.

We address the third part of Halliburton's definition (no or low organophilic clay or lignite) first, and conclude that "fragile gels" that have no or low organophilic clay or lignite are merely preferred embodiments of the invention covered by certain dependent claims, and thus "fragile gel" as used in the independent claims is not limited to those embodiments.

The specification of the '832 patent states that one of the advantages of the invention is that it "suspends drill cuttings through its gel or gel-like characteristics, without need for organophilic clays to add viscosity to the fluid." '832 patent col.2 ll.48-51 (emphasis added). It also states that "preferably no organophilic clays are added to the drilling fluid for use in the invention." Id. at col.3 ll.51-53 (emphasis added).

Contrary to Halliburton's argument, nothing in the specification of the '832 patent requires the fragile gel drilling fluid as claimed to have low or no organophilic clay. Instead, the specification merely says there is no need for such clays. Absence of need for a component does not necessarily mean that that component is absent, or present only in low amounts. Additionally, the specification states that "preferably" none of these clays are added; this strongly suggests that absence of clays is simply a preferred embodiment. This reading is reinforced by the dependent claims: claims 20, 58, 95, 125 add the limitation that the fluid is "substantially free of organophilic clay." Thus, a requirement of low or no organophilic clays is not properly part of the construction of "fragile gel" as contained in the asserted independent claims.

We next review the remainder of Halliburton's proposed definition. The first two parts of Halliburton's definition (i.e., that fragile gels are those that easily transition to a liquid state upon the introduction of force and return to a gel when the force is removed, and those that are capable of suspending drill cuttings and weighting materials at rest) are indeed supported by the specification. Regarding the first part, the specification states:

A "fragile gel" as used herein is a "gel" that is easily disrupted or thinned, and that liquifies or becomes less gel-like and more liquid-like under stress, such as caused by moving the fluid, but which quickly returns to a gel when the movement or other stress is alleviated or removed, such as when circulation of the fluid is stopped, as for example when drilling is stopped.

'832 patent col.2 ll.26-33. And regarding the second part:

When drilling is stopped while using a drilling fluid of the present invention, and consequently the stresses or forces associated with drilling are substantially reduced or removed, the drilling fluid forms a gel structure that allows it to suspend drill cuttings and weighting materials for delivery to the well surface.

Id. at col.2 ll.43-48.

The fact that Halliburton can articulate a definition supported by the specification, however, does not end the inquiry. Even if a claim term's definition can be reduced to words, the claim is still indefinite if a person of ordinary skill in the art cannot translate the definition into meaningfully precise claim scope. Having reviewed the remaining two parts of Halliburton's proposed construction, both individually and in combination, in the context of the intrinsic record and the knowledge of a person of ordinary skill in the art, we hold that the ambiguity as to the scope of "fragile gel" cannot be resolved.

Halliburton argues that the first part of its definition (i.e., a gel that easily transitions from gel to liquid and back again) is sufficiently objective so that a skilled

artisan would understand the limits of the claimed “fragile gel.” Halliburton primarily focuses on the L-shaped curve shown in Figure 3 of the ’832 patent.<sup>3</sup> According to Halliburton, a person of ordinary skill in the art would have interpreted Figure 3 as requiring that fragile gels of the invention exhibit “L-shaped” curves when tested with an off-the-shelf Brookfield viscometer. Figure 3 shows Brookfield test data for two fluids of the ’832 patent (ACCOLADE) and two prior art fluids (SF). Halliburton argues that the key feature of the L-shaped curve is that it falls directly back onto itself when force is applied. While Halliburton admits that the prior art 12.1 SF fluid also exhibits this very same feature, it notes that the heavier 15.6 SF fluid does not. Halliburton argues, however, that whether the prior art (i.e., 12.1 SF fluid) is covered by the claim as construed is properly addressed in validity challenges of other types (anticipation,

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<sup>3</sup> Halliburton also argues that other advantages of the invention provide other objective ways to delineate the scope of “fragile gel,” such as lack of sag problems or lack of appreciable pressure spikes when the fragile gel drilling fluid transitions easily from a liquid to a gel and back again. ’832 patent col.2 ll.42-51. While these are disclosed as benefits of the invention, it is unclear how they provide an objective way of determining the scope of the claims. For example, one of the named inventors, Don Siems, testified that to determine whether there were appreciable pressure spikes, a competitor would have to compare his prior experience with other prior art fluids to his experience with fluids of the ’832 patent. He also testified that pressure measurements in pressure-while-drilling equipment can depend on factors other than the drilling fluid, such as the size of the hole and type of formation. J.A. 1323-24. Thus, it appears that these considerations (sag and pressure spikes) are as ambiguous as Figure 3, on which Halliburton primarily relies.

Additionally, these limitations both appear in dependent claims. Claims 11, 49, 87 (“no appreciable pressure spike is observed by pressure-while-drilling equipment when said drilling is resumed”); claims 19, 57, 94, 127 (“said fluid does not exhibit sag when at rest”). Under the doctrine of claim differentiation, “the presence of a dependent claim that adds a particular limitation gives rise to a presumption that the limitation in question is not present in the independent claim.” Phillips v. AWH Corp., 415 F.3d 1303, 1315 (Fed. Cir. 2005) (en banc). While claim differentiation is a presumption that can be rebutted, Andersen Corp. v. Fiber Composites, LLC, 474 F.3d 1361, 1370 (Fed. Cir. 2007), Halliburton’s argument that the presumption is rebutted in this case is unpersuasive.

obviousness, etc.) rather than in claim construction or in evaluating definiteness. We disagree that the evaluation of a claim's definiteness cannot include whether the patent expressly or at least clearly differentiates itself from specific prior art. Such differentiation is an important consideration in the definiteness inquiry because in attempting to define a claim term, a person of ordinary skill is likely to conclude that the definition does not encompass that which is expressly distinguished as prior art.

Of course, that is not to suggest that a claim can never be definite and yet read on the prior art. For example, a claim that recites a specific numeric range for a physical property may be definite even though prior art products fell within that range. In such a case, a person of ordinary skill in the art would know the boundaries of the claim, and the focus would properly be on other validity challenges (e.g., anticipation).

This case presents a different situation, however. Here, in describing Figure 3, the figure on which Halliburton primarily relies in asserting that "fragile gel" is definite, the patent specification stated that Figure 3 distinguished the fluids of the invention (ACCOLADE) from the prior art fluids (SF):

FIG. 3 indicates superior response and performance by the drilling fluids of the present invention. Not only do the fluids of the present invention build up more gel when at rest, which enables the fluids of the invention to better maintain weight materials and drill cuttings in suspension when at rest—a time prior art fluids are more likely to have difficulty suspending such solid materials—but the fluids of the present invention nevertheless surprisingly provide less resistance to the sheer, which will result in lower ECDs as will be discussed further below.

'832 patent col.6 ll.5-14 (emphases added). A person of ordinary skill would not have ignored these explicit teachings, but rather would have looked to Figure 3 to try to determine the bounds of the claims.

Thus, we reject Halliburton's assertion that a "fragile gel" can be defined by an L-shaped curve alone because the specification does not distinguish how the "fragile gels" claimed in the '832 patent performed differently than the disclosed prior art—how much more quickly the gels broke when stress was imposed or how much more quickly the gels reformed when stress was removed. Halliburton's failure to distinguish the fragileness of the drilling fluids of the invention from the close prior art (the 12.1 SF fluid that exhibited the L-shaped curve behavior) is fatal. Amgen, Inc. v. Chugai Pharm. Co., Ltd., 927 F.2d 1200, 1218 (Fed. Cir. 1991) (holding that the term "at least about" was indefinite because the patent provided no guidance as to where the line should be drawn between the numerical value of the prior art cited in the prosecution history and the close numerical value in the patent); see also Verve, LLC v. Crane Cams, Inc., 311 F.3d 1116, 1119-20 (Fed. Cir. 2002) (recognizing that guidance as to measurement of a term of degree can come from the intrinsic record or from the knowledge of a person of ordinary skill in the art).

Even if the '832 patent distinguished "fragile gels" of the invention from those of the prior art, it did not place any limit on the scope of what was invented beyond the prior art. By Halliburton's own admission, drilling fluids which included an invert emulsion base, a thinner, an emulsifier, and a weighting agent were known in the prior art, and independent claims 1-3 and 5 are distinguishable from the prior art only because they are "fragile gels." By failing to identify the degree of the fragility of its invention, Halliburton's proposed definition would allow the claims to cover not only that which it invented that was superior to the prior art, but also all future improvements to

the gel's fragility.<sup>4</sup> While patentees are allowed to claim their inventions broadly, they must do so in a way that distinctly identifies the boundaries of their claims. The fluids of the '832 invention may provide less resistance to shear (i.e., break more quickly) than the prior art fluids, but the degree of improved speed remains ambiguous. Thus, it is unclear whether a person of ordinary skill in the art would have interpreted this claim as having an upper bound of fragility.<sup>5</sup>

We note that where a claim is ambiguous as to its scope we have adopted a narrowing construction when doing so would still serve the notice function of the claims. See Athletic Alternatives, 73 F.3d at 1581 (“Where there is an equal choice between a broader and a narrower meaning of a claim, and there is an enabling disclosure that indicates that the applicant is at least entitled to a claim having the narrower meaning, we consider the notice function of the claim to be best served by adopting the narrower meaning.”). In this case, however, Halliburton asks that we resolve the ambiguity in a way that gives it the broadest possible construction (i.e., that its claim covers all future improvements without regard to whether Halliburton invented such improvements); such a construction would undermine the notice function of the claims because it would allow

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<sup>4</sup> Additionally, by failing to identify the precise composition of the fluids of the invention, Halliburton's proposed definition would allow the claims to cover fluids with added components beyond the four prior art base elements, when use of the additional components results in the same degree of fragility as the fluids of the '832 patent, even though Halliburton never contemplated such compositions.

<sup>5</sup> Of course, a claim may contain a limitation that includes no explicit upper bound at all (e.g., a claim limitation that requires “at least 5%” of an element). Since such a limitation does not contemplate an upper bound beyond what is practically required (e.g., the total percentage must be less than 100%), the limitation may not present definiteness concerns. See Exxon Research, 265 F.3d at 1382 (holding that a claim limitation that average particle diameter be greater than 5  $\mu\text{m}$  was not indefinite where no upper limit on particle size was given). However, when a limitation is ambiguous as to the presence or absence of an upper bound, an inquiry into the definiteness of that limitation is warranted.

Halliburton to benefit from the ambiguity, rather than requiring Halliburton to give proper notice of the scope of the claims to competitors. Additionally, adopting the broadest possible construction could retard innovation because cautious competitors may steer too far around that which Halliburton actually invented, neglecting improvements that otherwise might be made. We thus hold that the term “fragile gel” is not sufficiently definite if construed in accordance with the first part of Halliburton’s proposed definition because a person of ordinary skill in the art could not determine how quickly the gel must transition to a liquid when force is applied and how quickly it must return to a gel when the force is removed.

The second part of Halliburton’s definition (i.e., the fragile gel is capable of suspending drill cuttings and weighting materials at rest) fares no better because nothing in the record suggests what degree of such capability is sufficient. Halliburton argues that a person of ordinary skill would know how to measure the quantity of drill cuttings suspended in a fluid (either through laboratory measurements or in the field for example by measuring weight (or density) of the fluid when entering the borehole and when exiting the borehole), and would also know how to determine when the fluid no longer exhibited the L-shaped curve behavior when tested with a Brookfield viscometer. The fact that an artisan would know how to perform these measurements and tests, however, says nothing about whether the artisan would also know which fluids were “fragile gels” as that term is used in the claims of the ’832 patent.

Assuming a person of ordinary skill would add solids incrementally, determining the effect of each addition by observing whether the fluid still maintains its fragile gel characteristics (the L-shaped curve), as Halliburton suggests, this testing protocol still

does not answer the fundamental question: what quantity, weight, size and/or volume of cuttings must be suspended? Halliburton does not attempt to resolve this ambiguity, instead arguing that this limitation merely means adequate for the circumstances.

In Geneva Pharmaceuticals, Inc. v. GlaxoSmithKline PLC, 349 F.3d 1373, 1384 (Fed. Cir. 2003), we refused to adopt a proposed construction for “synergistically effective amount” (“a formulation falls outside the scope of the claims if a given antibiotic, bacteria, and disease combination provides no synergy”) because the construction would have been indefinite. Because the patent claims at issue did not identify the specific bacteria, we rejected the proposed construction because “a given embodiment would simultaneously infringe and not infringe the claims, depending on the particular bacteria chosen for analysis.” Id. We concluded that such a construction that results in an artisan not knowing from “one bacterium to the next whether a particular composition standing alone is within the claim scope or not” was “the epitome of indefiniteness.” Id.

As in Geneva Pharmaceuticals, under Halliburton’s proposed construction in this case, an artisan would not know from one well to the next whether a certain drilling fluid was within the scope of the claims because a wide variety of factors could affect adequacy (formation geology, wellbore size, depth, angle, etc.). In other words, a given fluid might be adequate to suspend drill cuttings in some formations and/or well configurations, whereas in others it would not be. When a proposed construction requires that an artisan make a separate infringement determination for every set of circumstances in which the composition may be used, and when such determinations

are likely to result in differing outcomes (sometimes infringing and sometimes not), that construction is likely to be indefinite.

We also note that the two parts of Halliburton's proposed definition discussed above (ability of the fluid to transition quickly from gel to liquid, and the ability of the fluid to suspend drill cuttings at rest) are functional, i.e., the fluid is defined "by what it does rather than what it is." In re Swinehart, 439 F.2d 210, 212 (CCPA 1971). The Supreme Court in two early cases identified the dangers of using only functional claim limitations to distinguish the claimed invention from the prior art. In General Electric, the Court held that a vice of functional claiming occurs "when the inventor is painstaking when he recites what has already been seen, and then uses conveniently functional language at the exact point of novelty." General Electric, 304 U.S. at 371 (holding claims invalid where the grains of the claimed lighting filament were distinguished from the prior art only because they were "of such size and contour as to prevent substantial sagging and offsetting" of the filament during the commercially useful life of the lamp). Likewise, in United Carbon, the Court held indefinite claims that recited only "inaccurate suggestions of the functions of the product." United Carbon, 317 U.S. at 234 (holding indefinite patent claims that recited, for example, "sustantially (sic) pure carbon black in the form of commercially uniform, comparatively small, rounded smooth aggregates having a spongy or porous exterior").

Although our predecessor court later recognized that "there is nothing intrinsically wrong with" using functional language in claims, it noted that in some instances, use of functional language can fail "to provide a clear-cut indication of the scope of subject matter embraced by the claim" and thus can be indefinite. Swinehart, 439 F.2d at 212-

13 (holding that the term “transparent” was definite because the disclosure, which showed that a substantial amount of infrared radiation was always transmitted even though the precise degree of transparency varied depending on certain factors, was sufficiently clear).

When a claim limitation is defined in purely functional terms, the task of determining whether that limitation is sufficiently definite is a difficult one that is highly dependent on context (e.g., the disclosure in the specification and the knowledge of a person of ordinary skill in the relevant art area). We note that the patent drafter is in the best position to resolve the ambiguity in the patent claims, and it is highly desirable that patent examiners demand that applicants do so in appropriate circumstances so that the patent can be amended during prosecution rather than attempting to resolve the ambiguity in litigation.

A patent drafter could resolve the ambiguities of a functional limitation in a number of ways.<sup>6</sup> For example, the ambiguity might be resolved by using a quantitative metric (e.g., numeric limitation as to a physical property) rather than a qualitative functional feature. The claim term might also be sufficiently definite if the specification provided a formula for calculating a property along with examples that meet the claim limitation and examples that do not. See Oakley, Inc. v. Sunglass Hut Int’l, 316 F.3d

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<sup>6</sup> Although not determinative on the definiteness issue, it seems clear that the patent drafter could have provided more specifics in this case, either with quantitative metrics as to how quickly the gel must break (time to break at given conditions) and how strong the gel must be (strength at given conditions), or with sufficient examples of fragile gels of the invention to show which such fluids fell within the scope of the claims. Exxon Research, 265 F.3d at 1376 (stating that the patent was lacking in “specificity that in some instances would have been easy to provide and would have largely obviated the need to address the issue of indefiniteness” but holding that the flaws ultimately were not “fatal”).

1331, 1341 (Fed. Cir. 2003) (holding that, at the preliminary injunction stage, the accused infringer had not shown a substantial question of indefiniteness, where the claims and specification linked the claim term “vivid colored appearance” to a calculation for differential effect and then provided examples of when differential effect values were and were not sufficient for a “vivid colored appearance”); see also In re Marosi, 710 F.2d 799, 803 (Fed. Cir. 1983) (finding claims definite where the applicant’s disclosure provided “a general guideline and examples sufficient” to teach an artisan when the claim limitation was satisfied).<sup>7</sup>

In this case, Halliburton differentiated its invention from the prior art because it was a “fragile gel.” As discussed above, Halliburton’s proposed definition of that term is not sufficiently definite because it does not adequately distinguish the fragileness of the invention from disclosed prior art, it is ambiguous as to whether an upper bound of fragileness is contemplated, and it is ambiguous as to its requisite ability to suspend drill cuttings. In other words, Halliburton’s proposed construction of “fragile gel” as used in the claims of the ’832 patent is indefinite because it is ambiguous as to the requisite degree of the fragileness of the gel, the ability of the gel to suspend drill cuttings (i.e., gel strength), and/or some combination of the two. We discern no other construction that can properly be adopted that would render the claims definite.

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<sup>7</sup> Of course, in the 1952 Patent Act, Congress authorized functional claiming, but with limits, in 35 U.S.C. § 112, ¶ 6. For so-called means-plus-function limitations, claim scope is limited to structure disclosed in the specification and equivalents. And if no structure is disclosed, the claim is indefinite. Biomedino, 490 F.3d at 950. This statutory provision was meant to preclude the overbreadth inherent in open-ended functional claims, such as those presented in this case which effectively purport to cover any and all means so long as they perform the recited functions.

Thus, we hold that M-I did provide clear and convincing evidence that the term “fragile gel” was indefinite, and that the district court correctly held the claims invalid on that basis.

III.

For these reasons, the district court’s grant of summary judgment of invalidity for indefiniteness is

AFFIRMED.