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6 IN THE UNITED STATES DISTRICT COURT  
7 FOR THE DISTRICT OF ARIZONA

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9 TSI, Incorporated, a Minnesota  
Corporation,

10 Plaintiff,

11 v.

12 Azbil BioVigilant, Inc., a Delaware  
13 Corporation,

14 Defendant.

No. CV12-0083-PHX-DGC

**ORDER**

15 The Court held a *Markman* hearing on March 18, 2013. This order will set forth  
16 the Court's rulings.

17 A.

18 Plaintiff TSI, Incorporated asks the Court to construe two phrases from Claims 1,  
19 17, and 20 of the '279 Patent: "operative to excite biomolecules contained therein to  
20 produce fluorescence," and "so as to excite biomolecules contained in a contacted  
21 particle to produce fluorescence." Doc 101-1 at 30, 31. TSI asks the Court to construe  
22 the first phrase to mean "operative to excite intrinsically fluorescing biological molecules  
23 native to the contacted particles to produce fluorescence," and the second phrase to mean  
24 "so as to excite intrinsically fluorescing biological molecules native to a contacted  
25 particle to produce fluorescence." The Court agrees with TSI's proposed construction.

26 Claim 1 includes "a solid state excitation source" that contacts "particles or the  
27 particle population" and "is operative to excite *biomolecules contained therein* to produce  
28 fluorescence." *Id.* at 30 (emphasis added). This statement makes clear that the

1 biomolecules are contained within the particles contacted by the light source. The  
2 language cannot reasonably be read to include a biomolecule or other substance outside  
3 of the particle or a non-biomolecule artificially introduced into the particle. Nothing in  
4 the claim language or the specification suggests such artificial introduction. Thus, the  
5 Court concludes that the claim clearly refers to biomolecules that naturally are contained  
6 within the particle contacted by the light source. Claim 17 contains virtually identical  
7 language. *Id.* Claim 20 is even more specific, referring to “biomolecules contained in a  
8 contacted particle.” *Id.* at 31.

9 Other language in the ‘279 Patent supports this conclusion. Language in the  
10 background section explains that a light source is used to detect “a specific biomolecule  
11 present only in bio-viable particles.” *Id.* at 23. The use of the word “only” suggests that  
12 the patent applies to biomolecules naturally occurring with such particles, not  
13 biomolecules artificially introduced into such particles and therefore not “present only” in  
14 the particles. The background section goes on to discuss a biomolecule, NADP, that is  
15 contained in “[m]ost living cells.” This reference, and the language that follows, clearly  
16 shows that the biomolecule occurs naturally within the living cells.

17 The patent later refers to use of a laser to “detect biomolecules *in* particles of  
18 interest.” *Id.* at 29 (emphasis added). This reference, and various references to “intrinsic  
19 fluorescence” in particles, again confirms that the patent is focusing on biomolecules  
20 already contained within particles of interest. *Id.*

21 Finally, the ‘279 patent specifically incorporates the ‘012 Patent. *Id.* at 2. The  
22 ‘012 Patent, in turn, clearly teaches away from tagging, stating that “fluorescent tagging  
23 is not practical for aerosol sampling as one cannot tag all the incoming airborne particles  
24 on a real-time basis.” Doc. 101-3 at 12. The ‘012 Patent further states that “[t]he  
25 invention arises from the discovery that a single particle, comprising one or more  
26 biological cells, bacteria or spores, contains sufficient intrinsically fluorescing biological  
27 matter (biomolecules) to enable one to establish whether the particle is viable  
28 (biologically alive), and thus potentially hazardous.” *Id.* at 12-13. This statement,

1 consistently with the other statements discussed above, clearly shows that the excited  
2 biomolecules at issue in both patents are those naturally occurring within biological  
3 matter and that fluoresce upon contact with a laser.

4 Thus, the Court construes the disputed language in Claims 1 and 17 to mean  
5 “operative to excite intrinsically fluorescing biological molecules native to the contacted  
6 particles to produce fluorescence.” The Court construes the language at issue in  
7 Claim 20 to mean “so as to excite intrinsically fluorescing biological molecules native to  
8 a contacted particle to produce fluorescence.”

9 B.

10 Defendant Azbil Bio Vigilant, Inc. (“BioVigilant”) argues that several phrases in  
11 Claims 1, 17, and 20 – “viable biological particles,” “biologically viable ... particles,”  
12 “biologically viable particle,” and “particle is biologically viable” – should be construed  
13 to mean “biologically alive” particles. TSI argues that no construction of these phrases is  
14 necessary. Similarly, BioVigilant argues that the phrases “biologically inert particles”  
15 and “inert particle” in these same claims mean particles that are “not biologically alive.”  
16 TSI again argues that no construction is necessary.

17 The discussion at the *Markman* hearing made clear that construction of these terms  
18 is necessary. The parties vigorously disagree on the meaning of “viable” and its corollary  
19 “inert.” The parties intend to make various arguments to the jury depending on how  
20 these words are construed. Thus, the Court cannot accept TSI’s argument that no  
21 construction is necessary because these phrases will not be at issue during trial.

22 Nor can the Court accept TSI’s suggestion that these phrases be construed at the  
23 close of trial. Claim construction is necessary for the parties to produce relevant expert  
24 reports, file relevant motions for summary judgment, and prepare relevant evidence and  
25 arguments for trial. Moreover, claim construction must be based on the intrinsic  
26 evidence of the patent, as well as such extrinsic evidence as is appropriate under Federal  
27 Circuit case law. The largely factual and opinion testimony to be given at trial will not  
28 necessarily shed light on this claim-construction task.

1 The Court agrees with BioVigilant’s proposed construction. Indeed, TSI has not  
2 produced an alternative construction of the words “viable” and “inert.” TSI instead urges  
3 the Court to make no construction.

4 Language from the ‘279 Patent makes clear that references to “viable biological  
5 particles” mean living biological particles. The background section states that intrinsic  
6 fluorescence of biological matter can be used “to enable one to establish whether the  
7 particle was viable (biologically alive), and thus potentially hazardous.” Doc. 101-1 at  
8 23. The example section states that “[t]he rate of increase of fluorescence using the  
9 Nichia laser roughly paralleled that of live particles.” *Id.* at 27. Statements by the  
10 inventor of the ‘279 Patent and TSI’s expert similarly equate viable particles with living  
11 particles. *See* Docs. 99-8 at ¶ 44, 99-9 at ¶ 4.

12 The language in Claims 1, 17, and 20 also make clear that an inert particle is the  
13 opposite of a viable particle – the patent uses a microprocessor to make comparisons and  
14 establish “whether that particle is a biologically viable particle or an inert particle.” *Id.* at  
15 30, 31. If a viable particle is an alive particle, then an inert particle would be one that is  
16 not alive. This interpretation is consistent with TSI’s repeated reference to inert particles  
17 as dust, engine exhaust, and water droplets. *See* Docs. 99-8 at ¶ 45, 99-9 at ¶ 5.

18 The Court construes “viable” in Claims 1, 17, and 20 as meaning “alive.” The  
19 Court construes the word “inert” in those claims as meaning “not alive.”

#### 20 C.

21 Claim 1 of the ‘279 Patent includes “a photon counter for measuring the intensity  
22 of fluorescence emitted from each contacted particle and producing a signal indicative  
23 thereof.” *Id.* at 30. Claim 18 states that “the intensity measuring means comprise a  
24 photon counter.” *Id.* TSI contends that the phrase “photon counter” should be construed  
25 to mean “a photon detector such as a PMT.” BioVigilant asserts that “photon counter”  
26 should be construed as a “device that counts photons.”

27 Words of a claim are generally given their ordinary and customary meaning,  
28 which is the meaning the term would have to a person of ordinary skill in the pertinent art

1 at the time of the invention. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir.  
2 2005) (en banc). The ordinary and customary meaning of the word “counter” is  
3 something that counts. A “photon counter,” therefore, would be something that counts  
4 photons.

5 In support of its argument that the phrase “photon counter” is not limited to a  
6 device that counts photons, TSI points to the following sentence in the ‘279 patent:  
7 “Fluorescence is detected using a photon counter such as a PMT.” Doc. 101-1 at 25. The  
8 parties appear to agree that a PMT is a photomultiplier tube, and that some PMTs count  
9 photons while others do not. TSI argues that the ‘279 Patent, by identifying a PMT as a  
10 type of “photon counter,” makes clear that a photon counter can be a device that counts  
11 photons or a device that does not. Given that some types of PMTs count photons,  
12 however, a more natural meaning of the phrase is that photon-counting PMTs are an  
13 example of a kind of “photon counter” described in the patent. Stated differently, the key  
14 phrase to be construed – “photon counter” – has a plain and ordinary meaning that is not  
15 altered by reference to an example – “such as a PMT” – that itself can be configured to  
16 count photons.

17 TSI argues that the very next sentence in the ‘279 Patent refers to “the Ho  
18 Patents,” a reference to, among others, the ‘012 Patent that in turn makes clear that  
19 photon-counting and non-photon-counting devices can be used. Doc. 101-3 at 7-15. But  
20 when the relevant diagram in the ‘012 Patent distinguishes between photon-counting  
21 devices and non-photon-counting devices, it refers to them, respectively, as a “photon  
22 counter” and an “integrator for amplitude.” *Id.* at 7, Fig. 6. Thus, the phrase “photon  
23 counter” in the ‘012 Patent appears to mean a device that counts photons. Although the  
24 text expands on the phrase by referring to a “photon pulse counter” (*Id.* at 15), the ‘012  
25 Patent does not clearly suggest that the phrase “photon counter” also applies to non-  
26 photon-counting devices.

27 TSI argues that the use of a “photon counter” described in Claim 1 is “for  
28 measuring the intensity of fluorescence emitted from each contacted particle.” Doc. 101-

1 1 at 30. TSI agreed at the *Markman* hearing, however, that a photon-counting device  
2 does just that. Thus, the fact that the device is to be used for measuring the intensity of  
3 fluorescence does not make clear that the “photon counter” referred to does something  
4 other than count photons.

5 Finally, the Court notes that the ‘279 Patent, in Claim 20, refers to a “*detector* to  
6 measure the intensity of fluorescence from the contacted particle.” *Id.* at 31 (emphasis  
7 added). Thus, the authors of the ‘279 patent were familiar with the word “detector” and  
8 used it in one of the specific claims. The fact that the authors chose not to use the word  
9 in the phrase “photon counter” appearing in Claims 1 and 17 must be regarded as a  
10 deliberate choice that argues against TSI’s construction of “photon counter” as a “photon  
11 detector” such as a PMT.

12 The Court construes the phrase “photon counter” in Claims 1 and 18 to mean “a  
13 device that counts photons.”

14 D.

15 Claim 17 of the ‘279 Patent includes a “means for measuring the intensity of  
16 fluorescence emitted from each particle and producing a signal indicative thereof.” *Id.* at  
17 30. The parties agree that this term is a means-plus-function term governed by 35 U.S.C.  
18 § 112 ¶ 6. The parties also agree that the function associated with this term is “measuring  
19 the intensity of fluorescence emitted from each particle and producing a signal indicative  
20 thereof,” but disagree as to the corresponding structure for this term. TSI argues that the  
21 corresponding structure is “a photon detector such as a PMT, and equivalents thereof.”  
22 BioVigilant contends that the corresponding structure is “a photo-multiplier tube  
23 configured to count photons.” For the reasons described above with respect to the phrase  
24 “photon counter,” the Court agrees with BioVigilant.

25 E.

26 BioVigilant claims that several phrases in the ‘279 Patent are indefinite. To  
27 prevail on this argument, BioVigilant must present clear and convincing evidence that the  
28 phrases are not amenable to construction or are insolubly ambiguous. *Haemonetics Corp.*

1 *v. Baxter Healthcare Corp.*, 607 F.3d 776, 783 (Fed. Cir. 2010).

2 BioVigilant claims that “means for comparing” in Claim 17 is indefinite because,  
3 although the ‘279 Patent clearly refers to a microprocessor, it fails to disclose the  
4 algorithm that would be used by the microprocessor. The Court does not agree. The  
5 algorithm in a patent may be expressed in any understandable terms including a  
6 mathematical formula, prose, a flow chart, or in any other manner that provides sufficient  
7 structure. *Typhoon Touch Technologies, Inc. v. Dell, Inc.*, 659 F.3d 1376, 1383 (Fed. Cir.  
8 2011). The patent need only disclose sufficient structure for a person of skill in the field  
9 to provide an operative software program for the specified function. *Id.*

10 The description in the ‘279 Patent satisfies this requirement. Claim 17 states that  
11 the required “means” is used to compare each particle’s fluorescence intensity signal  
12 against predetermined criteria. Thus, the microprocessor is to compare the intensity of  
13 the signal received from the photon counter against predetermined criteria such as the  
14 background. Claim 17 goes on to say that the microprocessor thereby establishes  
15 “whether that particle is a biologically viable or an inert particle.” *Id.* at 30. This  
16 determination obviously is made on the basis of whether the measured signal is greater  
17 than or equal to the predetermined value.

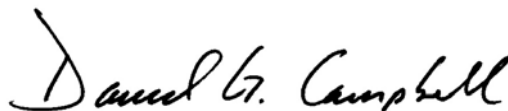
18 The process is explained in greater detail earlier in the ‘279 Patent: “a  
19 microprocessor compared each contacted particle’s fluorescent intensity signal against  
20 predetermined criteria for establishing whether that particle is a biologically viable  
21 particle or an inert particle.” *Id.* at 25. This is not a complicated process. Two values  
22 are compared, and the device reports whether one value exceeds the other. A person of  
23 ordinary learning in the field could readily write computer code to accomplish this  
24 function. BioVigilant has not shown by clear and convincing evidence that the “means  
25 for comparing” in Claim 17 is indefinite.

26 BioVigilant also argues that the reference to “a wavelength above about 320 nm”  
27 in Claims 1 and 17 is indefinite. The Court does not agree. The phrase clearly specifies  
28 wavelengths above 320 nm, and the word “about” merely recognizes that the precise

1 wavelength of the laser may vary somewhere around 320 nm. BioVigilant argues that the  
2 phrase has no upper bound, but the sentence goes on to say that the laser must be  
3 “operative to excite biomolecules contained therein to produce fluorescence.” *Id.* at 30.  
4 Thus, the entire phrase refers to a laser with a wavelength above approximately 320 nm  
5 and within the range sufficient to excite biomolecules to produce fluorescence.  
6 BioVigilant has not shown by clear and convincing evidence that this phrase is indefinite.

7 Finally, BioVigilant argues that the phrase “contacting the laser beam and particles  
8 of the population” in Claim 20 is indefinite. *Id.* at 31. Again, the Court does not find that  
9 BioVigilant has met its burden of proof. The very next phrase in Claim 20 refers to “the  
10 intensity of fluorescence from the contacted particle.” *Id.* It is evident from this phrase,  
11 and from the context of Claim 20 and the ‘279 Patent generally, that the claim is referring  
12 to particles in the relevant population that fluoresce after being contacted by the laser  
13 beam. BioVigilant has not shown by clear and convincing evidence that the phrase in  
14 question is indefinite.

15 Dated this 19th day of March, 2013.

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20 David G. Campbell  
21 United States District Judge  
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