IN THE UNITED STATES DISTRICT COURT

FOR THE WESTERN DISTRICT OF WISCONSIN

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PROMEGA CORPORATION,

Plaintiff,

v.

APPLERA CORPORATION and LIFECODES CORPORATION, and its SUBSIDIARIES CELLMARK DIAGNOSTICS, INC. and GENOMICS INTERNATIONAL CORPORATION,

Defendants.

OPINION and ORDER

01-C-244-C

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This is a civil action for patent infringement involving one patent owned by plaintiff Promega Corporation and one patent owned by defendant Applera Corporation. Plaintiff owns United States Patent No. 5,843,660 (the '660 patent), which discloses a method for the simultaneous amplification of multiple, specific regions of human DNA to facilitate the analysis of distinguishing genetic characteristics. Plaintiff contends that certain DNA amplification kits manufactured by defendant Applera and used by defendant Lifecodes Corporation and its subsidiaries defendants Cellmark Diagnostics, Inc. and Genomics International Corporation infringe the '660 patent. Defendant Applera owns United States

Patent No. 6,200,748 (the '748 patent), which discloses a method for the fluorescent labeling of DNA fragments. Defendant Applera contends that certain products manufactured by plaintiff containing fluorescently labeled DNA components infringe the '748 patent.

A hearing on claim construction was held on December 7, 2001. The case is presently before the court for a ruling on the construction of certain claims in the two patents, and on plaintiff's motion to strike the declaration of defendants' expert. Although plaintiff discusses a third patent in its brief, U.S. Patent No. 6,221,598 (the '598 patent), defendants do not discuss or identify any claim in the '598 patent as ambiguous or in need of construction. At the December 7, 2001 hearing, the parties agreed that they had no dispute about the construction of any claims in the '598 patent. With respect to the '660 patent, I conclude that claim 1 covers only sets of short tandem repeat loci in which all the loci in the set, whether four or more, are selected from the group of loci listed in step (b) of that claim. I conclude further that claims 2, 3, 4, 5 and 16 of the '660 patent cover only sets of short tandem repeat loci identical to the various sets of loci specifically listed in those claims. With respect to the '748 patent, I conclude that the term "primer" as used in that patent's claims refers to primers

> hav[ing] the following characteristics: 1) They must have a free 3' hydroxyl group to allow chain extension by the polymerase. 2) They must be complementary to a unique region 3' of the cloned insert. 3) They must be sufficiently long to hybridize

to form a unique, stable duplex. 4) The chromophore or fluorophore must not interfere with the hybridization or prevent 3'-end extension by the polymerase.

Finally, I conclude that the term "template" as used in the '748 patent's claims refers to a cloning vector.

BACKGROUND

Infringement analysis begins with construction of the claims in issue. Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582 (Fed. Cir. 1996); Markman v. Westview Instruments, Inc., 52 F.3d 967, 979 (Fed. Cir. 1995) aff'd, 517 U.S. 370 (1996). It is a legal determination to be made by the court. Vitronics, 90 F.3d at 1582. "It is well-settled that, in interpreting an asserted claim, the court should look first to the intrinsic evidence of record, *i.e.*, the patent itself, including the claims, the specification and, if in evidence, the prosecution history." Id. Construction of the disputed terms begins with the language of the claims themselves. Generally, "all terms in a patent claim are to be given their plain, ordinary and accustomed meaning to one of ordinary skill in the relevant art." Rexnord Corp. v. Laitram Corp., 2001 WL 1456191 (Fed. Cir. 2001).

In many instances, however, a court must proceed beyond the bare language of the claims and examine the patent specification. The specification serves an important role in arriving at the correct claim construction, because it is in the specification that the patentee

provides a written description of the invention that allows a person of ordinary skill in the pertinent art to make and use the invention. Markman, 52 F.3d at 979. In particular, the specification must be consulted because "patent law permits the patentee to choose to be his or her own lexicographer by clearly setting forth an explicit definition for a claim term that could differ in scope from that which would be afforded by its ordinary meaning." Rexnord, 2001 WL 1456191 at *4; Vitronics, 90 F.3d at 1582 ("a patentee may choose to be his own lexicographer and use terms in a manner other than their ordinary meaning, as long as the special definition of the term is clearly stated in the patent specification or file history.")

After considering the claim language and the specification, a court may consider the final piece of intrinsic evidence, the patent's prosecution history. Vitronics, 90 F.3d at 1582. "[S]tatements made during the prosecution of a patent may affect the scope of the invention." Rexnord, 2001 WL 1456191 at *5. Typically, analysis of the intrinsic evidence will eliminate any ambiguity in the claim terms, rendering unnecessary any reference to extrinsic evidence, such as expert testimony, inventor testimony, dictionaries, technical treatises and articles. Vitronics, 90 F.3d at 1583. However, a court may find it helpful to consult extrinsic evidence to be sure that its claim construction "is not inconsistent with clearly expressed, plainly apposite, and widely held understandings in the pertinent technical field." Pitney Bowes, Inc. v. Hewlett-Packard Co., 182 F.3d 1298, 1309 (Fed. Cir. 1999). On the other hand, courts are "not to *rely* on extrinsic evidence in claim construction to

contradict the meaning of claims discernible from thoughtful examination of the claims, the written description, and the prosecution history." Id. at 1308.

CLAIM CONSTRUCTION

A. '660 Patent

Plaintiff Promega's patent relates to technology involved in the analysis of human DNA. The technology disclosed in the patent, "multiplex amplification of short tandem repeat loci," is used primarily in forensic analysis in criminal investigations and for making paternity determinations. "Short tandem repeat loci" are DNA sections that are "polymorphic," meaning that they vary to some degree from individual to individual. Loci are identified by unique symbols composed of letters and numbers such as D3S1539 or HUMTPOX. Because no single DNA section, or locus, by itself will positively identify an individual, it is important to identify and analyze multiple polymorphic loci in order to insure that a DNA match is statistically significant. Once multiple short tandem repeat loci have been identified and selected for analysis, they must be "amplified" through a process by which multiple copies of the short tandem repeat loci are made so that they can be visualized and measured. (Singly, they are too small to be detected.) Amplifying a single short tandem repeat locus is accomplished through a "monoplex" reaction. However, because a statistically significant analysis always involves multiple loci, it is desirable to

amplify and analyze two or more loci simultaneously in a single reaction. This process is referred to as "multiplexing." For instance, it is more efficient to amplify and analyze eight short tandem repeat loci in a single multiplex reaction than to carry out eight separate monoplex reactions, each amplifying a separate locus. According to plaintiff, multiplex amplification of short tandem repeat loci can be problematic, making it critical to select appropriate procedures and a compatible set of loci to multiplex. Among other things, the '660 patent identifies specific sets of short tandem repeat loci that are compatible for purposes of multiplexing.

Defendants maintain that some claims in the '660 patent were drafted in such a way as to identify specific sets of short tandem repeat loci that are compatible for purposes of multiplex amplification *and* to cover the possible inclusion of additional loci in the amplification process. On the other hand, defendants contend that plaintiff drafted certain other claims in such a way as to effectively close the sets they contain. According to defendants, these latter claims set forth either closed sets of short tandem repeat loci or closed groups of loci from which a set to be multiplexed is chosen and these claims do not contemplate the inclusion of additional loci to the sets or groups identified therein. Therefore, defendants argue, the inclusion of additional loci in these purportedly closed sets would result in sets not covered by the claims in the '660 patent. For instance, a claim that identified a closed set of four loci would not cover a reaction involving those four loci plus

a fifth loci not identified in the claim. Specifically, defendants argue that the scope of independent claims 1 and 16 of the '660 patent must be limited to the short tandem repeat loci specifically identified in those claims and that claims 2 through 15 (which depend from claim 1) and claims 17-24 (which depend from claim 16) should be similarly limited. Plaintiff argues that a proper construction of certain transitional terms or phrases in these claims demonstrate that all the relevant claims describe sets that contemplate the inclusion of other, unidentified short tandem repeat loci in addition to those specifically identified in the patent.

Claim 1

Claim 1 reads as follows, with significant language in bold.

> 1. A method of simultaneously determining the alleles present in at least four short tandem repeat loci from one or more DNA samples, **comprising**:
>
> (a) obtaining at least one DNA sample to be analyzed,
>
> (b) **selecting a set of at least four short tandem repeat loci** of the DNA sample to be analyzed which can be amplified together, **wherein the at least four loci in the set are selected from** the group of loci consisting of: D3S1539, D4S2369, D5S818, D7S820, D9S930, D10S1239, D13S317, D14S118, D14S548, D14S562, D16S490, D16S539, D16S753, D17S1298, D17S1299, D19S253, D20S481, D22S683, HUMCSF1PO, HUMTPOX, HUMTH01, HUMF13A01, HUMBFXIII, HUMLIPOL, HUMvWFA31;
>
> (c) co-amplifying the loci in the set in a multiplex amplification reaction, wherein the product of the reaction is a mixture of amplified alleles from each of the

co-amplified loci in the set; and

(d) evaluating the amplified alleles in the mixture to determine the alleles present at each of the loci analyzed in the set within the DNA sample.

According to defendants, both the '660 patent's prosecution history and the language of other claims in the patent make clear that whether the set of loci used in the multiplex reaction contains four loci or more than four loci, it must be selected *entirely* from the list in step (b). Plaintiff maintains that a reaction including additional, unidentified loci would still fall within the scope of the patent as long as at least four loci in the reaction were chosen from the list. The claim's "plain" language on this score is ambiguous. The claim first indicates that "at least four short tandem repeat loci" must be included in the set and then states that "the at least four loci in the set" must be selected from the listed loci. It is clear from this language that a minimum of four loci are required for the reaction and that the inclusion of additional loci is not ruled out. The ambiguity arises when one attempts to discern whether any additional loci beyond the requisite four must be chosen exclusively from the list contained in step (b). The phrase "wherein the at least four loci in the set are selected from" could be read to indicate that only the requisite four loci need be chosen from the identified group. According to this reading, the emphasis is on the words "at least four." However, the phrase could also be read to refer comprehensively to the group of loci selected, whether that group contains four, five, six or more loci. In this reading, the presence of the

word "the" before "at least four" is critical.

The '660 patent's prosecution history resolves the ambiguity in claim 1. On May 13, 1997, plaintiff filed amendments to their claims with the Patent and Trademark Office. Following the May 1997 amendments, claim 1, step (b) read as follows.

> (b) selecting a set of at least four short tandem repeat loci of the DNA sample to be analyzed which can be amplified together, **wherein at least four of the loci in the set** are selected from the group of loci consisting of:
>
> D3S1539, D4S2369, D5S818, D7S820, D9S930, D10S1239, D13S317, D14S118, D14S548, D14S562, D16S490, D16S539, D16S753, D17S1298, D17S1299, D19S253, D20S481, D22S683, HUMCSF1PO, HUMTPOX, HUMTH01, HUMF13A01, HUMBFXIII, HUMLIPOL, HUMvWFA31;

(emphasis added). In its remarks accompanying the amendments, plaintiff noted that

> claim 1 has . . . been amended . . . to delete one locus (i.e. HUMFESFPS) from [a list] of loci provided therein. However, Applicants submit that the amendments to claim 1 do not change the fact that the claimed method encompasses the co-amplification and evaluation of sets of short tandem repeat loci which include the deleted locus, provided at least four of the loci in the set co-amplified according to the method are selected from the remaining group of loci listed in claim 1.

In other words, plaintiff argued that claim 1 covered the amplification of additional unlisted loci (for example, the deleted HUMFESFPS), as long as four loci from the identified group were included in the co-amplification process. This is a natural reading of the language in step (b) as it read on May 13, 1997: it plainly requires only four loci to come from the identified list. Plaintiff now argues that the remarks accompanying the May 13 amendment

support its broad construction of claim 1. However, subsequent prosecution history indicates otherwise. On January 16, 1998, the examiner rejected claim 1 as being unpatentable over the prior art. Following an interview on March 27, 1998, the examnier allowed claim 1, but only after additional amendments were made. The patent office's summary of that interview pointedly notes that these additional "[a]mendments to the claims were agreed on to place them in condition for allowance." Specifically, the notice of allowability indicates that "[i]n claim 1, (b), line 2, –the– has been inserted after 'wherein' and 'of the' after 'four' has been deleted." Accordingly, after the March 1998 amendments, claim 1 reads as follows, with the inserted language underlined and the deletion bracketed and stricken.

> (b) selecting a set of at least four short tandem repeat loci of the DNA sample to be analyzed which can be amplified together, **wherein <u>the</u> at least four ~~[of the]~~ loci in the set are selected from** the group of loci consisting of:
>
> D3S1539, D4S2369, D5S818, D7S820, D9S930, D10S1239, D13S317, D14S118, D14S548, D14S562, D16S490, D16S539, D16S753, D17S1298, D17S1299, D19S253, D20S481, D22S683, HUMCSF1PO, HUMTPOX, HUMTH01, HUMF13A01, HUMBFXIII, HUMLIPOL, HUMvWFA31;

(emphasis added). Thus, while the pre-amendment claim 1(b) required "at least four of the loci" to be chosen from the listed group, after the March 1998 amendment the same section required "<u>the</u> at least four loci" to be chosen from the listed group.

A patent's prosecution history is often critical in determining the scope and meaning

of claims. Advanced Cardiovascular Systems, Inc. v. Scimed Life Systems, Inc., 261 F.3d 1329, 1339-40 (Fed. Cir. 2001). "Arguments and amendments made during the prosecution of a patent application . . . must be examined to determine the meaning of terms in the claims. . . . Claims may not be construed one way in order to obtain their allowance and in a different way against accused infringers." Southwall Technologies, Inc. v Cardinal IG Co., 54 F.3d 1570, 1576 (Fed. Cir. 1995); Standard Oil Co v. American Cyanamid Co., 774 F.2d 448, 452 (Fed Cir. 1985) ("[T]he prosecution history (or file wrapper) limits the interpretation of claims so as to exclude any interpretation that may have been disclaimed or disavowed during prosecution in order to obtain claim allowance."). In light of claim 1's prosecution history, the highlighted language indicates that the claim was amended to facilitate its allowance in such a way as to specify that whatever number of loci were to be co-amplified, all must be selected from the identified list. See CAE Screenplates, Inc. v. Heinrich Fiedler Gmbh & Co., 224 F.3d 1308, 1317 (Fed. Cir. 2000) (patentee who amended claim in face of rejection over prior art to require "bottom plane," rather than more general "bottom" could not receive benefit of more general term because "[i]n the absence of any evidence to the contrary, we must presume that the use of these different terms in the claims connotes different meanings.").

The language of other claims in the '660 patent supports a construction of claim 1 to require that the entire set be chosen from those listed in the claim. For instance, the

relevant portions of independent claim 32 read as follows.

> 1. A method of simultaneously determining the alleles present in at least four short tandem repeat loci from one or more DNA samples, comprising:
>
> (a) obtaining at least one DNA sample to be analyzed,
>
> (b) selecting a set of at least four short tandem repeat loci of the DNA sample to be analyzed which can be amplified together, wherein three of the loci in the set are D7S820, D13S317, and D5S818;

The plain language of this claim contemplates the inclusion of loci in addition to the three listed loci in a way that the amended language of claim 1 simply does not. "[A] review of other claims in the same patent can aid in deciding the scope of a particular claim." Specialty Composites v. Cabot Corp., 845 F.2d 981, 986 (Fed. Cir. 1988). The fact that the patent's drafters knew how to structure claims broadly to include even unidentified loci suggests that their not doing so in claim 1 was intentional. See CFMT, Inc. v. Yieldup Int'l Corp., 92 F. Supp 2d. 359, 372 (D. Del. 2000) (explicit references to particular term in patent specification suggest that if inventors had meant to refer to that term in patent claims, they knew how to do so).

In arguing for a broad construction of claim 1 that would cover the presence of additional loci not identified in step (b), plaintiff rests primarily on its interpretation of the transitional term "comprising," which joins the claim's preamble with its body. Plaintiff argues that the use of the transitional term "comprising" means that "[a]dditional elements, such as additional loci or sets of loci, may also be present in addition to the claimed

invention." Plt.'s Claim Construction Br. - Promega's Patent, dkt. #29, at 21. It is true that "'[c]omprising' is a term of art used in claim language which means that the named elements are essential, but other elements may be added and still form a construct within the scope of the claim." Genentech, Inc. v. Chiron Corp, 112 F.3d 495, 501 (Fed. Cir. 1997). However, it is equally true that "[t]he open-ended transition 'comprising' does not free [a] claim from its own limitations." Kustom Signals, Inc. v. Applied Concepts, Inc., 264 F.3d 1326, 1332 (Fed. Cir. 2001).

Kustom Signals involved the alleged infringement of a traffic radar gun patent. One of the disputed claims in Kustom Signals' patent read as follows.

> 16. In a traffic radar, apparatus for processing Doppler return information **comprising**:
>
> (a) means for receiving Doppler return information containing at least one return signal derived from a target vehicle, and for presenting said information as digital data . . .
>
> (d) means for searching the components stored in said memory means to identify the component that meets preselected magnitude **or** frequency criteria, and . . . .

(Emphasis added). Kustom Signals argued that its patent was infringed by a rival's radar gun that automatically performed a search of magnitude *and* frequency data rather than searching magnitude *or* frequency data based on a user's preselection. The Court of Appeals for the Federal Circuit disagreed. First, the court noted that during the patent's prosecution Kustom Signals had amended claim 16. As originally filed, its claim 16 referred to "means for

determining the magnitude *and* frequency of each valid component"; after the amendment the claim referred to a search of "magnitude *or* frequency." Next, the court rejected Kustom Signals' argument that use of the term "comprising" in the disputed claim meant that a radar that searched both magnitude and frequency was simply performing an additional function when compared with a radar that searched either magnitude or frequency and would be covered under the claim language. According to Kustom Signals, because use of the term "comprising" allows the inclusion of steps or elements in addition to those stated in the claim, the allegedly infringing radar fell within the scope of the claim. The court of appeals rejected this broad interpretation of the term "comprising," concluding that its use "cannot restore subject matter otherwise excluded from the claim." Id. (citing Spectrum Int'l, Inc. v. Sterilite Corp., 164 F.3d 1372, 1379-80 (Fed Cir. 1998)).

In this case, although claim 1 in the '660 patent originally required only that "at least four of the loci" be chosen from the listed group, it was amended to require that "the at least four loci" be chosen from the listed group. The effect of this amendment was to provide that all loci to be co-amplified, whether four or more, must be selected from the identified list. To conclude otherwise would render meaningless the amendment upon which allowance of claim 1 hinged. As in Kustom Signals, inclusion of the term "comprising" in the claim's preamble cannot restore subject matter that was excluded from the claim. Although use of that open transitional phrase might allow for the inclusion of additional, unidentified steps,

it cannot be used to resurrect a claim scope that was surrendered in order to allow the patent to issue. "'Comprising' is not a weasel word with which to abrogate claim limitations." Spectrum, 164 F.3d at 1380.

Finally, I note that step (b) of claim 1 itself contains a transitional phrase, "consisting of," that immediately precedes the list of loci. In contrast to the open transitional term "comprising," "consisting of" is a closed transitional phrase that is "understood to exclude any elements, steps, or ingredients not specified in the claim." AFG Industries, Inc. v. Cardinal IG Co., Inc., 239 F.3d 1239, 1245 (Fed. Cir. 2001). The most natural reading of step (b), then, is one that recognizes that the list of loci therein is closed and sets that include loci not listed in step (b) are excluded from the scope of claim 1.

I conclude that claim 1 covers only sets of short tandem repeat loci in which all the loci in the reaction, whether four or more, are selected from the group of loci listed in step (b).

Claims 2-15

As noted, defendants observe that claims 2 through 15 depend from claim 1. Without elaborating further on any of these dependent claims, defendants maintain that "because dependent claims contain the limitations of the independent claims from which they depend, each of the dependent claims are so limited as well." Regrettably, defendants

do not say exactly what effect this observation has on claims 2 through 15. In any case, only dependent claims 2 through 5 appear to need further elaboration, because these are the only claims depending from claim 1 that, like claim 1, contain specifically identified lists of loci. For instance, claim 2 depends on "[t]he method of claim 1" but specifies that for purposes of claim 2, "the set of at least four loci" referred to in claim 1 is to be considered a set of *exactly* four loci. The four loci, in turn, are to be chosen from a menu of sets, each containing precisely four loci. Claims 3, 4 and 5 are structured identically, except the sets referred to in those claims involve six, seven and eight loci, respectively. I understand defendants to argue that because these claims specify the precise number of loci to be included in a set, they should not be construed to cover sets that include additional loci. For instance, claim 2 identifies the following set of four loci: D3S1539, D7S820, D13S317, D5S818. Defendants concede that a reaction involving these four loci alone is within the scope of the claim, but they argue that if a fifth locus was added to these four, the resulting reaction would be beyond the claim's scope.

In turn, plaintiff argues that because claims 2 through 5 depend from claim 1, the transitional term "comprising" from claim 1 is incorporated into the dependent claims. For instance, claim 2, written in independent form, would begin with the following preamble: "A method of simultaneously determining the alleles present in a set of four loci from one or more DNA samples, *comprising* . . . ." According to plaintiff, because the open

transitional phrase "comprising" links the preamble to the body of the claim, the claim's scope covers sets that include additional, unrecited loci. Therefore, plaintiff concludes, the presence of an open transitional term means that simply including additional loci along with those specifically detailed in claims 2 through 5 does not serve to take the resulting reaction outside the scope of those claims.

I do not agree with plaintiff's construction. The dependent claims' plain language requires a precise number of loci: four in the case of claim 2; six in the case of claim 3; seven in the case of claim 4; and eight in the case of claim 5. Again, I recognize that "comprising" can be read to mean that a claim's named elements are essential, but that other elements may be added and still form a construct within the scope of the claim. Genentech, 112 F.3d at 501. However, the mere use of that term as a transition does not allow a patentee to run roughshod over the explicit limitations that follow it. An instructive case in this regard is Moleculon Research Corp v. CBS, Inc., 793 F.2d 1261 (Fed. Cir. 1986), a case involving an infringement claim by Moleculon against CBS, maker of the Rubik's Cube puzzle. Moleculon held a patent for a cube puzzle, claim 3 of which read as follows.

> 3. A method for restoring a preselected pattern from sets of pieces . . . which sets when in random engagement fail to display said preselected pattern **which comprises**:
>
> a. engaging eight cube pieces as a composition cube;
>
> b. rotating a first set of cube pieces . . .

(emphasis added). CBS argued that claim 3 implicated only a puzzle with eight cube pieces (a 2 x 2 x 2 puzzle) and did not read on a puzzle, like its Rubik's Cube, that involved 27 cube pieces (a 3 x 3 x 3 puzzle). Moleculon disagreed, arguing that its use of "the transitional phrase 'which comprises' not only opens the claim to additional steps, but also opens the claim and its individual method steps to additional structural elements." The Court of Appeals for the Federal Circuit rejected Moleculon's argument as "far too broad." Id. at 1271. Framing the question as whether step (a), "which recites engaging 'eight cube pieces as a composite cube' reads on a step which engages more than eight cube pieces as in the 3 x 3 x 3 Rubik's Cube," the court ruled that the district court had "erred . . . in using the transitional phrase 'which comprises' to expand the scope of the recited 'eight cube pieces.'" Id. Mere use of a transitional phrase did not allow Moleculon to expand the scope of its claim, which specified eight cube pieces, to cover a puzzle that involved more than eight cube pieces.

As in Moleculon, plaintiff's use of "comprising" in this case cannot expand the scope of dependent claims 2, 3, 4 and 5, which involve sets of precisely four, six, seven and eight loci, respectively. As defendants note, use of that term may allow for additional *steps* involving, say, purification or treatment of the sample or set, but use of the transitional term "comprising" cannot free a claim of its own explicit limitations. Kustom Signals, 264 F.3d at 1332; Spectrum, 164 F.3d at 1380.

Finally, I note that the menu of sets in claims 2 through 5 are all preceded by the closed transitional phrase "consisting of." This suggests that the listed sets of loci are closed and do not permit the addition of other unidentified loci. See AFG Industries, 239 F.3d at 1254.

Accordingly, I conclude that dependent claims 2, 3, 4 and 5 cover only sets of short tandem repeat loci identical to the various sets of loci listed in those claims. Because the parties have not advanced any arguments regarding dependent claims 6 through 15, I will not address those claims.

Claim 16

Defendants argue that independent claim 16 must be limited to the short tandem repeat loci specifically set forth in that claim. Claim 16 reads as follows:

> 16. A method of simultaneously determining the alleles present in three short tandem repeat loci from one or more DNA samples, comprising:
>
> (a) obtaining at least one DNA sample to be analyzed,
>
> (b) selecting a set of three short tandem repeat loci of the DNA sample to be analyzed which can be amplified together, wherein the set of three loci is selected from the group of sets of loci consisting of:
> DSS1539, D19S253, D13S317;
> D10S1239, D9S930, D20S481;
> D10S1239, D4S2368, D20S481;
> D10S1239, D9S930, D4S2368;
> D16S539, D7S820, D13S317; and

D10S1239, D9S930, D13S317.

(c) co-amplifying the three loci in the set in a multiplex amplification reaction, wherein the product of the reaction is a mixture of amplified alleles from each of the co-amplified loci in the set; and

(d) evaluating the amplified alleles in the mixture to determine the alleles present at each of the loci analyzed in the set within the DNA sample.

Like dependent claims 2 through 5, claim 16 involves amplification of a precise number of loci (in this case three), which are to be chosen from a menu of sets, each of which contains precisely three loci. The menu of sets is preceded by the closed transitional phrase "consisting of," indicating that additional loci or sets of loci are excluded. Plaintiff relies again on the presence of the open transitional term "comprising" between the preamble and the body of the claim to argue that reactions involving additional loci are covered as long as one of the sets of three loci listed is present. I rejected that argument above. For substantially the same reasons discussed earlier, I conclude that claim 16 covers only sets of short tandem repeat loci identical to the various sets of loci listed in step (b) of claim 16. None of the parties have addressed any arguments to claims 17 through 24, which depend from claim 16. Accordingly, I will not address those claims.

B. '748 Patent

The '748 patent, assigned to defendant Applera, discloses a method for enhancing the

analysis of DNA fragments using fluorescent labeling. In the past, the standard technology used for DNA labeling was radioactivity. The use of radioactive labels is problematic for a variety of reasons, including the safety concerns attendant to the handling and disposal of radioactive material. At issue is whether the invention disclosed in the '748 patent is directed primarily toward a method for enhancing DNA sequence analysis using fluorescent labeling or is directed more broadly toward enhancing additional types of nucleic analysis using fluorescent labeling. It appears from the parties' briefs and presentations at the December 7, 2001 hearing that resolution of this dispute requires the construction of the claim terms "primer" and "template."

1. Primer

In defendants' invention, fluorescent tags are attached to primers in order to facilitate analysis of DNA fragments. Defendants argue that the term "primer" should be defined broadly as "a short nucleic acid of defined sequence that serves as a locus for initiation of polymerization at a predetermined site on a template." On the other hand, plaintiff argues that "primer" is more particularly defined in the '748 patent's specification at column 4, lines 29 through 36 and this definition is controlling. I conclude that plaintiff is correct in arguing that the more specific definition of "primer" in the specification should be applied to that term as it is used in the '748 patent's claims.

"[A]s a general rule, all terms in a patent claim are to be given their plain, ordinary and accustomed meaning to one of ordinary skill in the relevant art" and "unless compelled to do otherwise, a court will give a claim term the full range of its ordinary meaning as understood by an artisan of ordinary skill." Rexnord Corp., 2001 WL 1456191 at *3. However, "patent law permits the patentee to choose to be his or her own lexicographer by clearly setting forth an explicit definition for a claim term that could differ in scope from that which would be afforded by its ordinary meaning." Id. at *4. When a patent applicant chooses to wear the lexicographer hat, "the definition selected by the patent applicant controls." Renishaw PLC v. Marposs Societa' Per Azioni, 158 F.3d 1243, 1249 (Fed. Cir. 1998).

In the case of the '748 patent, the applicants chose to be their own lexicographers. In the first paragraph under the specification heading "detailed description of the invention," the applicants explain that use of a radioactive label was necessary "[i]n previous methods of DNA sequencing, including those based on Sanger," but that "[t]his problem is overcome in the present invention" by the use of fluorescent labels attached to primers. The second paragraph proceeds to set out the specific characteristics the primers must have for purposes of the invention disclosed in the '748 patent.

> The primers must have the following characteristics: 1) They must have a free 3' hydroxyl group to allow chain extension by the polymerase. 2) They must be complementary to a unique region 3' of the cloned insert. 3) They must be

> sufficiently long to hybridize to form a unique, stable duplex. 4) The chromophore or fluorophore must not interfere with the hybridization or prevent 3'-end extension by the polymerase.

'748 Patent at Col. 4, lines 29-36. This definition describes clearly four distinct characteristics that "[t]he primers must have," repeatedly using the word "must" before each of the four characteristics, apparently to emphasize their essential nature. Defendants argue strenuously that the enumeration of the primers' required characteristics and the repeated references to DNA sequencing amount to no more than a discussion of a preferred embodiment or an example of one possible application of the invention. I disagree. Defendants are correct that "an attribute of [a] preferred embodiment cannot be read into [a] claim as a limitation," Burke, Inc. v. Bruno Independent Living Aids, Inc., 183 F.3d 1334, 1341 (Fed. Cir. 1999), but this is not a case of limiting broad claims to a narrower preferred embodiment. Indeed, the definition of primers in the specification is followed three paragraphs later, in the fifth paragraph of the "detailed description of the invention," by the *first* mention of a preferred embodiment. The preferred embodiment involves coupling "a set of four fluorophores with different emission spectra, respectively" to the primers. '748 Patent at Col. 4, lines 45-46. The term "primers" is clearly defined before the preferred embodiment of the invention is discussed and well before any examples are given. There is no indication that the specification's copious references to DNA sequencing are merely part of a discussion of a preferred application or that the specification's definition of

primers is merely a component of a preferred embodiment. Rather, it is the use of four different emission spectra (presumably one for each of the four nucleotides that make up nucleic acid molecules) that constitutes the preferred embodiment.

This conclusion is bolstered by a reading of other sections of the specification, which are replete with discussions of sequencing analysis. The section titled "background of the invention" closes by noting that "[t]he invention of the present patent application addresses . . . problems associated with DNA sequencing procedures and is believed to represent a significant advance in the art." '748 Patent at Col. 3, lines 1-4. The section titled "summary of the invention" opens by noting that "this invention comprises a novel process for the elctrophoetic [sic] analysis of DNA fragments produced in DNA sequencing operations wherein chromophores or fluorophores are used to tag the DNA fragments produced by the sequencing chemistry." '748 Patent at Col. 3, lines 8-12. It goes on to note that "[i]t is an object of this invention to provide a novel process for the sequence analysis of DNA." '748 Patent at Col. 3, lines 41-42. And, as noted, before any discussion of examples or a preferred embodiment appears, the term "primers" is defined unequivocally. '748 Patent at Col. 4, lines 29-36. This defeats defendants' argument that plaintiff is attempting to improperly import into the claims a definition of "primers" from a mere preferred embodiment dealing with DNA sequencing.

The prosecution history also supports this construction, as defendants relied on the

definition of "primers" in the specification for a variety of purposes, including support of the claim language when it was originally submitted. For instance, on March 19, 1996, defendants submitted a second preliminary amendment adding new claims that eventually matured into the issued claims of the '748 patent. In order to demonstrate that these new claims found support in the specification, defendants pointed the examiner to the definition of "primers" that now appears at column 4, lines 29 through 36 of the '748 patent.

> Claims 75, 76, 81, 82, 92, 98 and 101 recite primers, oligonucleotides, oligonucleotide fragments, or portions of oligonucleotides that have been base-paired or hybridized to a template or a complementary sequence. Support is found in the specification on [Col. 4, lines 31-32] ('They [the primers] must be complementary to a unique region . . .') and at [Col. 4, lines 34-36] ('The chromophore or fluorophore must not interfere with the hybridization . . .').

Thus, in seeking approval of their claims, defendants relied on the very definition of "primers" that they now seek to disavow.

Defendants also relied on the definition of "primers" to overcome objections by the patent examiner. On March 23, 1998, the examiner rejected certain claims "as indefinite over the recitation 'said chromophore and fluorophore attached' because it is unclear as to where, how and to what the label is attached." In response, defendants submitted amendments dated June 23, 1998, to make clear that the primers and the chromophores or fluorophores of the invention are chemically coupled. Citing again to the definition of "primers" in the specification, defendants

> note[d] that [Col. 4, lines 34-36] recites that '[t]he chromophore or fluorophore must not interfere with the hybridization or prevent 3'-end extension by the polymerase' which is consistent with the Examiner's interpretation of the claim. Accordingly, one of skill in the art, upon reading the claim and the specification would known [sic] how and where the chromophore or fluorophore should be attached to the primer, i.e., so that it would not interfere with 3'-end extension.

Here again, defendants pointed to the definition of "primers" in the specification, and observed that by reading the definition of primers in the specification in conjunction with the claims, one of skill in the art would be able to understand how the invention functions.

Defendants point also to the special requirements of the "primers" outlined in the specification to distinguish the primers of the '748 patent from those of the prior art. On May 1, 1997, defendants responded to the examiner's rejection of certain claims as anticipated by Draper, arguing that the primers of the claimed invention differed from the primers taught by the Draper reference. According to defendants, "Draper et al. does not teach a primer as defined herein and therefore, also does not teach a primer hybridized to a template. . . . [T]he polynucleotides of Draper et al. are not always capable of forming stable duplexes with the template." On the other hand, the primers defined in the '748 patent's specification "must be sufficiently long to hybridize to form a unique, stable duplex." '748 Patent at Col. 4, lines 32-34. Therefore, defendants relied on the unique requirements of the primers defined in the specification to escape the reach of the prior art.

In summary, a review of the intrinsic evidence, including the claims, specification and

prosecution history, makes clear that the primers of the '748 patent are defined expressly in the specification. '748 Patent at Col. 4, lines 29-36. "The specification acts as a dictionary when it expressly defines terms used in the claims or when it defines terms by implication." Vitronics, 90 F.3d at 1582. The '748 patent's specification expressly defines "primers" at column 4, lines 29 through 36 in the "detailed description of the invention." Further, the prosecution history, which "is often of critical significance in determining the meaning of the claims," id., reveals that the defendants relied on the express definition of "primers" in the specification to support the claim language it submitted to the Patent and Trademark Office, to overcome objections by the patent examiner and to escape the constraints of the prior art. "Claims may not be construed one way in order to obtain their allowance and in a different way against accused infringers." Southwall, 54 F.3d at 1576. I conclude that plaintiff's construction of the term "primer" is correct.

Defendants put much emphasis on the fact that one of ordinary skill in the art would understand "primer" to be a broad term meaning "a short nucleic acid of defined sequence that serves as a locus for initiation of polymerization at a predetermined site on a template," and argue that this definition is borne out by technical dictionaries, the declaration of its expert, Dr. Peter Gilham, and even a glossary of terms on plaintiff's own website. This argument is unpersuasive for several reasons. First, as plaintiff argued at the December 7 hearing, the dictionary definitions defendants point to differ from the proposed construction

of the term "primer" offered by defendants and their expert. For instance, defendants point to the definition of "primer" in the Concise Dictionary of Biomedicine and Molecular Biology 752 (1996): "A short sequence of RNA or DNA that serves as a starting point for DNA synthesis," and to the definition in the Dictionary of Biochemistry and Molecular Biology, 381 (2d ed. 1989): "In nucleic acid chemistry, a primer is a short, single-stranded RNA or DNA segment that functions as the starting point for the polymerization of nucleotides." Unlike defendants' proposed construction, these definitions do not require that the requisite segment or sequence of DNA be "defined" or that the starting point for polymerization be a "predetermined site on a template." As plaintiff points out, these additional limitations appear only in the defendants' proposed construction of "primers" and would exclude classes of primers that fall within the dictionary definitions, including random primers and primers that are extended by non-template dependent polymerases. Decl. of David A. Casimir in Supp. of Plt.'s Rebuttal of Defs.' Claim Construction Submission Regarding U.S. Patent No. 6,200,748, Ex. 1 at 6. This indicates that defendants are not seeking to adopt the general meaning of the term "primer" as found in the technical dictionaries they cite. It also calls into question whether one skilled in the art would understand the term "primer" in the '748 patent's claims to be consistent with the defendants' proposed construction.

Defendants argue also that plaintiff's proposed construction of "primers" cannot be

correct because the invention claimed in the '748 patent is not limited to DNA sequencing. In support of this argument, defendants point to the "summary of the invention" section of the specification and highlight the following passage:

> It is an object of this invention to provide a novel process for the sequence analysis of DNA.
>
> It is another object of our invention to provide a novel system for the analysis of DNA fragments.

Accordingly, defendants argue, the invention is not limited to use in DNA sequencing but applies more broadly to a wide range of nucleic analysis. I am not persuaded by this argument. The first cited sentence refers to a "novel *process*" for DNA sequence analysis, while the second sentence refers to a "novel *system*" for analyzing DNA fragments. Plaintiff argues persuasively that the "novel *system*" referred to in the second sentence is the "automated DNA sequencer gel electrophoretic *system,*" a device that is illustrated in Figure 2 of the patent and is identified in the specification in the section titled "brief description of the drawings." Therefore, the novel system referred to in the second sentence is a DNA sequencer and the DNA fragments referred to are fragments from a sequencing reaction. Accordingly, the specification's "summary of the invention" does not support defendants' argument that the invention of the '748 patent applies broadly to a wide range of nucleic analysis. Indeed, the specification is replete with references to DNA sequencing. As noted above, there is no indication that these references to sequencing are intended as a discussion

of a mere preferred embodiment. Accordingly, I conclude that the "primers" of the 748 patent's claims

> must have the following characteristics: 1) They must have a free 3' hydroxyl group to allow chain extension by the polymerase. 2) They must be complementary to a unique region 3' of the cloned insert. 3) They must be sufficiently long to hybridize to form a unique, stable duplex. 4) The chromophore or fluorophore must not interfere with the hybridization or prevent 3'-end extension by the polymerase.

'748 Patent at Col. 4, lines 29-36.

2. Template

For similar reasons, I conclude that the term "template" should be construed to mean a cloning vector, as plaintiff suggests. The only reference to a template in the specification identifies it as a cloning vector. '748 Patent at Col. 1, lines 61-65. Again, this is not a case of limiting broad claims to a narrower preferred embodiment. Rather, the sole reference to the term "template" in the specification is found, predictably, in a discussion of DNA sequencing. The specification's near total fixation on DNA sequencing is not merely a discussion of a preferred application or embodiment. "The Federal Circuit has repeatedly emphasized that claim language is to be interpreted in light of the fundamental purpose and significance of the invention and in a manner consistent with and furthering the purpose of the invention." Purdue Pharma L.P. v. Boehringer Ingelheim GmbH, 98 F. Supp 2d. 362, 375 (S.D.N.Y. 2000) (internal quotations omitted); Markman, 52 F.3d at 979 ("Claims

must be read in view of the specification, of which they are a part."). This construction of the term "template" is harmonious both with the fundamental purpose and significance of the invention and with the construction of the term "primer" set forth above.

MOTION TO STRIKE

At the December 7 hearing, plaintiff moved to strike the declaration of defendants' expert, Dr. Peter T. Gilham, regarding the '748 patent. Plaintiff argued that because the disputed terms could be construed conclusively by reliance on the intrinsic evidence, it would be improper for the court to consult extrinsic evidence in the form of the declaration and the dictionary definitions contained therein. Plaintiff's motion will be denied. Courts are not prohibited "from examining extrinsic evidence, even when the patent document is itself clear." Pitney Bowes, 182 F.3d at 1308. Rather, courts may not "*rely* on extrinsic evidence in claim construction to contradict the meaning of claims discernible from thoughtful examination of the claims, the written description, and the prosecution history – the intrinsic evidence." Id. I have not relied on Dr. Gilham's declaration to contradict the meaning of the disputed terms otherwise apparent from the intrinsic evidence. Rather, I have considered it and the declaration of plaintiff's expert, Dr. Randall L. Dimond, and the dictionary definitions the declarations contain in an effort to understand the technology underlying the '748 patent and to insure that disputed terms have been construed in a manner not

inconsistent with the understanding of one skilled in the relevant art.

ORDER

IT IS ORDERED THAT

1. Claim 1 of U.S. Patent No. 5,843,660 covers only sets of short tandem repeat loci in which all the loci in the set, whether four or more, are selected from the group of loci listed in step (b) of that claim.

2. Claims 2, 3, 4, 5, and 16 of U.S. Patent No. 5,843,660 cover only sets of short tandem repeat loci identical to the various sets of loci specifically listed in those claims.

3. The term "primer" as used in the claims of U.S. Patent No. 6,200,748 refers to primers

> hav[ing] the following characteristics: 1) They must have a free 3' hydroxyl group to allow chain extension by the polymerase. 2) They must be complementary to a unique region 3' of the cloned insert. 3) They must be sufficiently long to hybridize to form a unique, stable duplex. 4) The chromophore or fluorophore must not interfere with the hybridization or prevent 3'-end extension by the polymerase.

4. The term "template" as used in the claims of U.S. Patent No. 6,200,748 refers to a cloning vector.

5. Plaintiff Promega Corporation's motion to strike the declaration of Peter T. Gilham regarding U.S. Patent No. 6,200,748 is DENIED.

Entered this 2nd day of January, 2002.

BY THE COURT:

BARBARA B. CRABB
District Judge