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THE GHOST IS THE MACHINE: PROTECTION OF PROCESS PATENTS UNDER 35 U.S.C. § 271(F)

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Table of Contents

*124 I. Introduction

Among the various sources of liability for patent infringement, 35 U.S.C. § 271(f) is the second youngest and the least well understood, but it is emerging as one of the most significant because of its potential impact on international trade. Enacted in 1984, §-271(f) allows a holder of an American patent to limit exploitation of the patented invention elsewhere in the world, regardless of whether the invention is also patented outside the United States.[1] This new patent right has enormous disruptive potential. It may cause conflicts with other national patent regimes,[2] interfering with basic tools of national economic policy.[3] It may also impose a serious disadvantage on American businesses competing in foreign markets.[4] In addition, by giving U.S. patents extraterritorial reach, § 271(f) represents a break with the long-standing tradition of territorial patent rights.[5]

***125** The scope of this right is therefore important to understand. This Note will focus on one aspect of § 271(f)--its possible application to process inventions.[6] Although it had been assumed that § 271(f) simply does not apply to processes,[7] the Federal Circuit[8] recently negated, or at least confused, that assumption in four cases in rapid succession. On March 2, 2005, in Eolas Technologies Inc. v. Microsoft Corp. (Eolas III), and on July 13, 2005, in AT&T Corp. v. Microsoft Corp. (AT&T II), a panel of the court imposed liability under § 271(f) for foreign sales of software.[9] On October 3, 2005, in Union Carbide Chemicals & Plastics Technology Corp. v. Shell Oil Co. (Union Carbide IV), another panel held that export of a non-patented catalyst for foreign use in the inventive process may infringe § 271(f).[10] Conversely, on August 2, 2005, in NTP, Inc. v. Research In Motion, Ltd. (NTP III), a panel of the Federal Circuit declared that processes are not, in general, covered by § 271(f).[11] Taken together, these four decisions have left a great deal of confusion over whether and to what extent § 271(f) covers process or method inventions.[12]

***126** The four cases are difficult to reconcile.[13] I will show that the disagreements arise because the opinions represent opposing views on how to construe patent law in general and thus § 271(f) in particular. Opinions such as Eolas III and Union Carbide IV demonstrate a preference for category-neutral,[14] technology-neutral patent law. Not only would such law make no distinction between industries (thus being technology-neutral), it also makes no distinction between kinds or categories of invention. From this point of view, it is natural to apply § 271(f) to processes the same as to other kinds of inventions. On the other hand, NTP III represents a view of patent law as not only category-specific but also technology-specific. In the course of the debate, the opinions themselves argue that the middle ground--law that is specific in one sense but neutral in the other--is not feasible.

Ultimately, the four opinions argue about the proper rules for interpreting patent statutes. This Note will conclude that using the best rule, Union Carbide IV was correctly decided--processes are subject to § 271(f). The statute does not expressly include or exclude processes, and I will argue that the Federal Circuit should interpret statutes in a category-neutral fashion whenever possible. The sources for this rule include the Trade-Related Aspects of Intellectual Property Rights (TRIPS) agreement, which has been implemented in U.S. law,[15] and a variety of prudential considerations. As an example of those prudential considerations, the facts of the Union Carbide case itself demonstrate the futility of a category-specific approach.

The Note is divided into three parts. Part I reviews the history of § 271(f) up to the period just before these four opinions. This review should provide some familiarity with the statute itself and indicate why it has become so important. Part II introduces the concepts of category-neutral and technology-neutral law before presenting and analyzing the four cases. In Part III, I will join the argument, recommending that the Eolas III court, among the four, used the best statutory interpretation rule.

*127 II. History of § 271(f)

Component export under § 271(f) is the second-newest mode of patent infringement, dating from the Patent Law Amendments Act of 1984.[16] The statute was Congress's attempt to eliminate a loophole created by the Supreme Court's decision in Deepsouth Packing Co. v. Laitram Corp.[17] It was modeled on the already existing provisions for indirect infringement, § 271(b)-(c), but there are important differences. As interpreted by the Federal Circuit, § 271(f) has acquired a stature greater than its origins might suggest.

A. Deepsouth and the Congressional Response

Section 271(f) originated as Congress's response to Deepsouth.[18] In that case, the Supreme Court refused to hold a defendant liable for either direct or contributory infringement because the final assembly of all the elements of the patented invention

took place outside the United States.[19] Laitram, the plaintiff, owned a patent on a shrimp deveining machine, an inventive combination of commonly known parts.[20] It had already obtained an injunction barring Deepsouth from selling such machines in the United States.[21] To preserve at least its foreign sales, Deepsouth planned to manufacture the machines almost completely in the United States but ship them abroad in three parts.[22] Foreign customers would be able to assemble the complex machines in under an hour.[23] On Deepsouth's request, the trial court modified the injunction to make clear that Deepsouth's plan would not violate it.[24]

The Supreme Court supported this change, concluding that direct infringement of a U.S. patent requires that the complete invention exist within the United States.[25] Since Deepsouth made, within the United States, a combination that fell just short of the invention, it did not "make" or "use" the invention, as required ***128** by 35 U.S.C. § 271(a).[26] The Court held that Deepsouth did not "sell" the invention itself, but rather a kit from which customers could assemble the invention.[27] Finally, the Court refused to find Deepsouth liable for contributory infringement. Since assembling the complete machine abroad was not an infringement, the Court argued that Deepsouth's conduct could not meet the required predicate for contributory infringement.[28] In sum, the Court held that U.S. patents have force strictly within the United States.[29] Acknowledging that this conclusion could appear to be too literal an interpretation of the patent statute, the Court invited Congress to provide a "clear and certain signal" if U.S. patents should have extraterritorial reach.[30]

Congress responded in 1984 by enacting 35 U.S.C. § 271(f), containing two paragraphs modeled after the existing indirect infringement provisions.[31] The first paragraph was "drawn from existing subsection 271(b),"[32] which governs induced infringement:[33]

Whoever without authority supplies or causes to be supplied in or from the United States all or a substantial portion of the components of a patented invention, where such components are uncombined in whole or in part, in such manner as to actively induce the combination of such components outside of the United States in a manner that would infringe the patent if such combination occurred within the United States, shall be liable as an infringer.[34] However, § 271(f) appears to require much more for a finding of infringement than § 271(b).[35] For example, the accused infringer must actually have supplied ***129** at least "a substantial portion" of the components of the invention.[36] The second paragraph came from "existing section 271(c)," governing contributory infringement:[37]

Whoever without authority supplies or causes to be supplied in or from the United States any component of a patented invention that is especially made or especially adapted for use in the invention and not a staple article or commodity of commerce suitable for substantial noninfringing use, where such component is uncombined in whole or in part, knowing that such component is so made or adapted and intending that such component will be combined outside of the United States in a manner that would infringe the patent if such combination occurred within the United States, shall be liable as an infringer.[38] Again, though, Congress modified the language of § 271(c).[39] For example, where that provision speaks of "a component of a patented machine, manufacture, combination or composition, or a material or apparatus for use in practicing a patented process,"[40] the new section mentions "any component of a patented invention."[41] At the same time, Congress did not require that the component be "a material part of the invention," as in § 271(c). On the other hand, § 271(f)(2) is more restrictive than § 271(c) in that the accused infringer must "intend [] that such component will be combined."[42]

There is no evidence in the legislative history for why Congress chose not to adopt the same language as in § 271(b)-(c). However, it does appear that the move to "patented invention" instead of "patented machine" was not intended to provide broader coverage. Rep. Kastenmeier, in his floor remarks introducing the bill to the House, stated that the new § 271(f) was intended to "prevent copiers from avoiding U.S. patents by supplying components of a patented product in ***130** this country so that the assembly of the components may be completed abroad."[43] By contrast, § 271(g), which was discussed at the same time, was intended to protect "process patents."[44] Thus, Congress distinguished process and product patents, and was able to address process patents when it wanted. This evidence could suggest that § 271(f) was intended to cover only product patents.

B. § 271(f) in the Courts

Perhaps because of the textual differences, the Federal Circuit has ignored the analogies between § 271(f) and the indirect infringement provisions. As a consequence, § 271(f) has become a powerful new tool for U.S. patentees, the scope of which cannot be predicted from knowledge of indirect infringement law. Two cases will illustrate this trend.

First, in Pellegrini v. Analog Devices, Inc., the court construed "causes to be supplied in or from the United States" in such a way as to eliminate any analogy between § 271(f)(1) and § 271(b).[45] Analog Devices had designed the potentially infringing integrated circuit in the United States, ordered subcontractors overseas to make the chips, managed that production from American offices, received foreign customers' orders and payments, and coordinated shipping in the United States.[46] Nevertheless, the Federal Circuit held that the company had not infringed under § 271(f)(1), ruling that "'supplying or causing to be supplied' . . . clearly refers to physical supply of components."[47] Neither instructions, ordering, nor control over production would trigger liability, even under the language "causing to be supplied."[48] By comparison, under § 271(b), instructions, designs, or even advertising for an infringing product can constitute inducement.[49] In this important respect, infringement by component export is more limited than infringement by active inducement. At the same time, the court thus signaled that it would interpret § 271(f) without reference to the law of indirect infringement.

In a second case, the Federal Circuit differentiated § 271(f)(2) from § 271(c) by significantly expanding its reach. In Waymark Corp. v. Porta Systems Corp., the court ruled that liability under this provision does not depend on a predicate ***131** infringement-like act.[50] Although defendant Porta Systems had shipped components of the patented battery system to Mexico intending to assemble them there, it abandoned the project.[51] It shipped the components back to the United States without ever having assembled a single system.[52] If the analogy to contributory infringement had held, Waymark's suit would have failed because it would be required to prove a predicate direct infringement.[53] However, the Federal Circuit deliberately rejected the analogy. It focused on a difference in language, with § 271(f)(2) saying "shall be liable as an infringer" and § 271(c) saying "shall be liable as a contributory infringer," to conclude that "§ 271(f)(2) does not incorporate the doctrine of contributory infringement."[54] Therefore, the court ruled, § 271(f)(2) does not "require[] an actual combination of shipped components."[55] Thus, the court found Porta Systems to have infringed by exporting components, even without any final assembly. Note that without final assembly, Porta Systems could legally have sold the components within the United States. After Waymark, U.S. patents have, in this sense, more reach outside the United States than within.

The economic consequences of this new infringement mode are hard to predict, but they will likely be significant. In 1996, Professor Chisum argued that § 271(f) would "create one more incentive for U.S. companies who compete in foreign markets to move their manufacturing facilities abroad."[56] This incentive is even stronger after Pellegrini and Waymark. A company might readily observe that the defendant in Waymark was liable, even though all it did was ship non-infringing components outside the United States, while the defendant in Pellegrini was not liable, even though it manufactured complete products that duplicated the invention. The difference was that the Pellegrini defendant manufactured entirely abroad, doing no more in the United States than designing and managing the production.[57] To the extent that § 271(f) penalizes companies for manufacturing any portion of their foreign products in the United States, it may significantly affect ***132** global distribution of production. Certainly, Professor Chisum's second complaint, that § 271(f) "has not been of major importance,"[58] is no longer valid.

III. Recent Cases: Four Ways to Interpret a Patent Statute

Given the potential power of § 271(f), it is important to understand its scope. It was once presumed that it does not apply to process patents.[59] The closest the Federal Circuit had come to saying so was a single terse sentence rejecting damages on lost foreign sales of processing equipment: "We do not find the provisions of § 271(f) implicated."[60] However, four recent Federal Circuit cases have overturned that presumption without leaving a clear answer about the state of the law.[61]

As the following analysis will show, the confusion stems from the panels' different views of patent law as neutral or specific with respect to categories and/or technologies. To begin, I will introduce the concepts of category-neutral patent law, an idea that arose in several Federal Circuit cases in the 1990s, and technology-neutral patent law. Next, among the four cases, Eolas III treats the issue of process infringement under § 271(f) the most extensively. In concluding that the statute covers process patents, the opinion refuses to countenance different rules for different classes of patents. AT&T II differs from Eolas III in that it professes law that is technology-specific while being category-neutral. The third case, NTP III, is an example of the technology-specific and category-specific approach. Finally, Union Carbide IV demonstrates that patent law cannot be both technology-neutral and category-specific.

A. Background

The idea that patent law does not distinguish between technologies is an old one,[62] but it may be breaking down. Congress

enacted numerous provisions in the last twenty years aimed at particular technologies or industries, such as ***133** 35 U.S.C. § 271(e), the experimental use exception for pharmaceuticals.[63] Also, the Federal Circuit has developed certain rules that seem to apply only to certain industries, such as special rules governing the obviousness of biotechnology inventions.[64] Various scholars have encouraged this trend, arguing that different conditions of innovation apply in different industries.[65] The formerly technology-neutral patent law may be fragmenting, and scholars and courts are divided over whether this is a good or bad development.

Category-neutral patent law is a relatively new idea. Before the 1960s, the availability and scope of patent rights depended on which statutory category described an invention.[66] The categories are those specified in 35 U.S.C. § 101: "Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, . . . may obtain a patent therefor . . . ." The most important distinction was that between processes and the other categories.[67]

The Federal Circuit began to express an ideal of category-neutral law in the seminal software patenting cases of the 1990s. Those cases germinated the idea that patent law should not distinguish between categories of invention, so far as patentability is concerned. For example, in In re Alappat the court held a circuit for smoothing waveforms on an oscilloscope to be patentable subject matter.[68] Previous opinions had agonized over whether such inventions were machines, thus clearly patentable, or processes, thus vulnerable to being rejected as unpatentable algorithms.[69] In In re Alappat, Judge Rader, concurring, wrote that the conclusion of patentability "does not hinge on whether Alappat's invention is classified as machine or process."[70] He cited the Supreme Court's opinion in ***134** Diamond v. Chakrabarty[71] for the proposition that "courts should not read into the patent laws limitations and conditions which the legislature has not expressed."[72] A division between machines and processes, Judge Rader argued, would be such an unfounded condition.[73] In State Street Bank & Trust Co. v. Signature Financial Group, Inc., while declaring a system for managing finances to be patentable subject matter, the Federal Circuit reiterated this argument verbatim.[74] In AT&T v. Excel Communications, the court solidified the doctrine by declaring a method for phone call routing to be just as patentable as a system for the same purpose.[75]

At the same time, a strand of category-specific law has continued through the Federal Circuit's cases. As an example, a panel of the court decided that a patentee had not triggered the on-sale bar to patentability of his process when he taught a licensee how to perform it.[76] The court chastised the Board of Patent Appeals and Interferences for "failing to recognize the distinction between a claim to a product, device, or apparatus, all of which are tangible items, and a claim to a process, which consists of a series of acts or steps."[77] The court created a rule about what constitutes a sale of a process, as distinct from a sale of other kinds of invention.[78]

Thus, these two dimensions of variability are the source of some tension in Federal Circuit jurisprudence. In principle they are independent. A rule could be applied in a way that is category-specific but either technology-specific or category-neutral. Conversely, a technology-neutral patent law could be either category-neutral or, as in the past, category-specific. The four cases, Eolas III, AT&T II, NTP III, and Union Carbide IV illustrate the different combinations.

B. Eolas Technologies, Inc. v. Microsoft Corp.: Category-Neutral, Technology-Neutral

***135** In the first of the four cases, Eolas Technologies, Inc. v. Microsoft Corp., the Federal Circuit decided that all inventions, including computer software, can be the subject of § 271(f) infringement.[79] Eolas accused Microsoft of infringing U.S. Patent No. 5,838,906, covering technology for launching plugins within web browsers.[80] The case attracted a great deal of attention because the web community regarded the technology as essential for all browsers, indeed for the web itself.[81] Eolas won damages of $521 million, at the time the second-largest patent jury award ever.[82] This figure included royalties for foreign sales of Internet Explorer because the trial court ruled that computer hardware with Internet Explorer installed is a product and is therefore covered by § 271(f).[83] On appeal, the Federal Circuit agreed on this point but remanded the case for reconsideration of Microsoft's defenses of invalidity and unenforceability of the patent.[84]

The facts in Eolas III presented two questions of relatively narrow scope. First, it was unclear whether § 271(f) covered software inventions like the one at issue. Previous Federal Circuit decisions had skirted the issue of whether process inventions in general and software in particular are subject to § 271(f).[85] In Eolas III, the '906 patent claimed a "computer program product comprising," among other things, "a computer usable medium" and "computer readable program code."[86] The case required the Federal Circuit to decide, at least, whether § 271(f) covers computer program products. Second, it was uncertain, even assuming that the invention was covered, that Microsoft's activity constituted export of a component of the invention. To disseminate its browser, Microsoft sent a "golden master disk" containing the code for the browser to each

foreign computer manufacturer.[87] Each manufacturer then replicated the browser code on ***136** the hard drive of each computer it made.[88] Arguably, the code was merely a formula or instructions for making computers containing the patented invention, which under Pellegrini could not be a "component."[89]

Leaping over these narrow questions, the Federal Circuit panel created a far broader rule than the case required, announcing not only that § 271(f) covers software but also that it covers all patents, process as well as product. Ignoring the specifics of the claim language, it proclaimed that "every form of invention eligible for patenting falls within the protection of § 271(f)."[90] The panel's argument illustrates how strongly the Eolas III court favored a unitary patent law. Rather than analyzing the special role of software for computer machines, it used a three-step, circumlocutory argument to reach the same conclusion. Along the way, it held that processes are covered under § 271(f), just like all other inventions.

First, the court brought software within § 271(f) by means of a simple syllogism. The court observed that the statute "uses the broad and inclusive term 'patented invention.'"[91] Under 35 U.S.C. § 101, a "patented invention" is any "process, machine, manufacture, or composition of matter," and the Federal Circuit had already decided that software code can be a "patented invention."[92] In support of its broad reading of § 101, the panel cited In re Alappat and AT&T v. Excel Communications, two of the cases in which the category-neutral approach originated.[93] The court refused to say clearly what type of invention software is: "This software code claimed in conjunction with a physical structure, such as a disk, fits within at least those two categories [of process and machine]."[94] Therefore, the court reasoned, software code was covered by § 271(f).[95]

Next, having just made a distinction for physical structures, the court erased that distinction. Appealing again to the breadth of the language in § 271(f), the court said that "the statute did not limit section 271(f) to 'machine' components or ***137** 'structural or physical' components."[96] This statement is key, for it contains the sleight of hand that enabled the court to argue that the information on the master disk was a "component." The court here equated "machine" to "physical," but processes can be physical or non-physical. Thus, the court converted its assumption that § 271(f) covers processes as well as machines into a conclusion that it covers non-physical as well as physical subjects.

Finally, the Eolas III court discussed the case at bar, deciding that the software on the golden master disk was a component of a computer containing the software. Because it said that § 271(f) is not limited to physical subjects, it followed that "every component of every form of invention deserves the protection of section 271(f)."[97] Therefore, the court did not have to determine the nature of computer program code or ask whether it consists of instructions or physical electronic bits. The fact that software "drives the functional nucleus of the finished computer product" sufficed to make it a component.[98]

By this roundabout route, the Federal Circuit produced two far-reaching new rules to explain the narrow result that Microsoft's master disks were components of an invention covered by § 271(f). First, the court proclaimed that § 271(f) makes no distinction between categories of invention. Second, it said that §-271(f) does not distinguish physical from non-physical subject matter. In the context of the computer code in Eolas III, this rule implies that what Microsoft exported illegally was "the software code on the golden master disk . . ., the key part of this patented invention."[99] Significantly, the component was the software itself, i.e., the computer instructions.[100]

C. AT&T Corp. v. Microsoft Corp.: Category-Neutral, Technology-Specific

In the second case, AT&T Corp. v. Microsoft Corp., the court extended its Eolas III ruling to reach software communicated electronically as well as on physical disks.[101] The case was another software patent lawsuit against Microsoft, ***138** this time involving AT&T's United States Reissue Patent 32,580, a patent that covers digital encoding of speech.[102] The trial court refused to grant Microsoft partial summary judgment that its foreign sales were immune from the patent.[103] On appeal, the Federal Circuit affirmed the district court's ultimate judgment holding Microsoft liable for its foreign sales under § 271(f).

Here, the Federal Circuit construed the phrase "supplies . . . from the United States."[104] Although it followed from Eolas III that Microsoft's software was a "component,"[105] the company distributed its software in more complicated ways than in Eolas III.[106] Microsoft shipped golden master disks for Windows to only some foreign computer manufacturers.[107] To others, it sent the entire Windows code by electronic transmission.[108] Yet other manufacturers received golden master disks from foreign "replicators" who copied Windows--with Microsoft's permission--from disks that Microsoft supplied.[109] In the second and third modes of distribution, the foreign manufacturers received only information from Microsoft, not physical objects that had ever been in the United States.[110] Microsoft argued that transmitting the software electronically did not constitute "suppl[ying] from the United States."[111]

By imposing liability for all Microsoft's foreign sales, the Federal Circuit provided a technology-specific interpretation of "supplies from." Reasoning that Microsoft's mode of transmitting Windows was common in the software industry, the court concluded that § 271(f) was intended to reach it. "[A]n interpretation that allows liability to attach only when a party acts in an unrealistic manner is unlikely to be correct."[112] The court construed "supplies" to depend on the manner of supplying that is typical in an industry.[113] In the case of software, that could mean shipping a single disk abroad for distribution to all the computer ***139** manufacturers or even electronic transmission.[114] Finally, the court reiterated that "components" in § 271(f) are "not limited to 'structural or physical' components."[115]

Thus, the AT&T II panel took an approach opposite to Eolas III, deciding that electronic transmission of instructions constitutes "suppl[ying]" only when the instructions are software.[116] The difference in philosophy is obvious from the beginning of the argument. Rather than beginning with § 101 and citing In re Alappat,[117] the AT&T II court only discussed § 271(f).[118] It presumed that it had to interpret the word "supplies" according to "its ordinary, contemporary, common meaning, which is necessarily context-dependent."[119] In the context of software, the court observed that supplying programs usually means copying them: "Uploading a single copy to the server is sufficient to allow any number of exact copies to be downloaded, and hence 'supplied.'"[120] By means of this simple argument, the court concluded that "the act of copying is subsumed in the act of 'supplying.'"[121] This definition of "supplying" does not work outside the software industry; for example, as Microsoft pointed out, sending one master key abroad would lead to § 271(f) liability for every key that foreign locksmiths duplicated from it.[122] The Federal Circuit was fully aware that it was constructing a statutory interpretation of limited scope. Indeed, it proclaimed that "[s]ection 271(f), if it is to remain effective, must therefore be interpreted in a manner that is appropriate to the nature of the technology at issue."[123] Thus, the AT&T II court clearly rejected the ideal of a technology-neutral patent law.

At the same time, the court embraced the category-neutral ideal. At the outset, the panel quoted the proclamation in Eolas III that the language of § 271(f) is not limited to particular categories such as "'machines' or patented 'physical structures.'"[124] Further, the court cited the same congressional testimony as did the Eolas III court, inferring similarly that § 271(f) is to be "construed broadly to ***140** effectuate its purposes."[125] Also, in refusing to distinguish between shipping master disks and transmitting electronic copies, the court emphasized that "every component of every form of invention deserves the protection of section 271(f)."[126]

In his AT&T II dissent, Judge Rader complained that the court's attempt to write a category-neutral, technology-specific rule was flawed.[127] He argued the court tried to distinguish software from other inventions on the ground that "the 'supplying' of software commonly involves generating a copy."[128] Although he granted that "copies of software components are easier to make and transport" than copies of "physical components," he charged that this was "not a proper basis for making distinctions."[129] In essence, he argued that this distinction amounted to imposing "section 271(f) liability . . . if this court perceives that the patented component is cheaper or more convenient to replicate abroad than to ship from the United States."[130] Thus, the distinction required the court to impose its evaluation of business conditions before deciding whether to apply § 271(f). Thus, Judge Rader argued that once a rule is category-neutral--embracing machines, processes, and software (whether it is machine or process)--there is no principled basis on which to draw lines for technology-specific rules.

D. NTP, Inc. v. Research in Motion, Ltd.: Category-Specific, Technology-Specific

The third case, NTP, Inc. v. Research In Motion, Ltd.,[131] ultimately turned on the interpretation of § 271(a), but the Federal Circuit panel also ruled that § 271(f) does not apply to processes. NTP asserted both product and process claims against Research In Motion's Blackberry service, a system that allows users to send and receive email with specially made wireless devices.[132] Research In Motion (RIM) argued that the system couldn't infringe a U.S. patent because a ***141** certain "interface switch," needed for all of the claims, was located in Canada.[133] Despite the territoriality principle of Deepsouth, the Federal Circuit held that the system was used in the United States, thus infringing the product claims.[134] It was therefore unnecessary to discuss the process claims.[135] Nevertheless, in an unusual substituted opinion (NTP III), the Federal Circuit panel addressed and discarded several theories of liability for the process claims--including infringement under § 271(f).[136]

In the new discussion, the panel was explicit about its preference for category-specific, technology-specific law.[137] First, while acknowledging that the language of § 271(f) is broad, the NTP III court proclaimed that "the very nature of the invention may compel a difference."[138] Discussing Eolas III, the court stressed that the claim there was drawn to "a software product," and thus did not "impact the application of section 271(f) to the method claims in the present appeal."[139] Thus, the

court emphasized the difference between categories of invention, precisely the distinction that Eolas III had deliberately elided. In support of this distinction, the court cited In re Kollar, the case in which the Federal Circuit created a definition of "sale" specifically for processes.[140] Thus, for the NTP III court as for the Eolas III court, the question of category-neutral or category-specific law runs all the way back to patentability.

Second, the court further distinguished the Eolas III concept of "components" on the basis of technology. Instead of reading the term broadly, the NTP III court insisted that the components of a process or method are the steps involved in the process or method.[141] Since "it is difficult to conceive of how one might supply or cause to be supplied all or a substantial portion of the steps of a patented method," the NTP III court denied that § 271(f) covers process or method claims.[142] The court distinguished Eolas III by describing it as a case involving ***142** a "computer usable medium," rather than a process, thus limiting Eolas III to the software context.[143] The court recast the Eolas III holding in its narrowest sense, taking it to mean "that software code--even if intangible--is a component of a patented product."[144] In sum, the NTP III court viewed Eolas III as creating a rule for the export of software as distinct from other categories of invention and from other technologies.

E. Union Carbide Chemicals & Plastics Technology Corp. v. Shell Oil Co.: Category-Specific, Technology-Neutral?

In Union Carbide Chemicals & Plastics Technology Corp. v. Shell Oil Co., the Federal Circuit, confronting a claim to a process without software, rejected the possibility of category-specific, technology-neutral law.[145] The patent in suit, U.S. Pat. No. 4,916,243 (the '243 patent), was the only survivor of three patents that Union Carbide initially asserted against Shell.[146] These patents described a new catalyst and catalytic process for making ethylene oxide, an important bulk chemical.[147] Through the course of two jury trials and a first appeal to the Federal Circuit,[148] all of the claims directed to the composition of the catalyst and systems for using it were held invalid for lack of enablement.[149] The only remaining claim, Claim 4 of the '243 patent, recited a process using the catalyst at issue.[150] Shell's subsidiary manufactured the catalyst material for Shell to use in synthesizing ethylene oxide. Therefore, Shell infringed under § 271(a), and the subsidiary infringed under § 271(c) when it sold the catalyst for customers to use.[151] The trial court imposed $111 million in damages.[152] On the question of whether Shell ***143** was also liable (under § 271(f)) for its foreign sales of the catalyst, the Federal Circuit concluded that "§ 271(f) governs method/process inventions."[153]

The claim at issue in Union Carbide IV was a perfect example to show the difficulty of category-specific law. The salient portions of the complex, 500-word claim read as follows:

> 1. In the continuous process for the production of ethylene oxide . . . in the presence of a supported, silver-containing catalyst . . . the improvement in which the catalyst comprises [various prescribed chemical constituents] . . . wherein the combination of silver, cesium and alkali metal in said catalyst is characterizable by an efficiency equation.[154] After the other claims were found invalid for lack of enablement,[155] all that remained was a claim that was drawn to a process in which the invention was simply the use of a new catalyst. The catalyst itself, in turn, was partly characterized by its performance in the process. The recursive structure of the claim tied both the parties and the courts in knots. Shell argued that Union Carbide failed to prove infringement because its expert, in testing Shell's catalysts, did not actually use Shell's process equipment.[156] Therefore, Union Carbide had failed to prove that Shell's catalyst met the limitation of having sufficient performance in the process and, consequently, had failed to show that Shell used the new catalyst. There was no dispute that Shell was operating a process that met every other claim limitation.[157] In sum, infringement of the process turned on the identity of the catalyst, a catalyst that was first disclosed in the application that matured into the very patent in suit. Thus, while the claim was not a composition claim, it was not entirely a process claim either.

In holding that Shell could have infringed the claim under § 271(f), the Federal Circuit focused on the ambiguous nature of the claim.[158] Of course, the court began by affirming that § 271(f) "makes no distinction between patentable method/process inventions and other forms of patentable inventions."[159] Beyond ***144** that, it emphasized the factual parallels to Eolas III: "Thus, both this case and Eolas feature the exportation of a component . . . used in the performance of a patented process or method."[160] This comparison recalls the point in Eolas III that software "drives the functional nucleus of the finished computer product," and that "[w]ithout this aspect of the patented invention, the invention would not even work at all and thus would not even qualify as new and useful."[161] Similarly, the new composition was the crux of Union Carbide's patented process.

The court distinguished NTP III in two ways. First, it observed that in NTP III, "RIM itself did not supply any component to a foreign affiliate," and that the only 'export' was by customers who traveled abroad.[162] This was ample reason for the NTP III court not to have imposed § 271(f) liability.[163] Second, and more importantly, the Union Carbide IV court responded to the NTP III court's argument that it is impossible to export components of processes. The NTP III court had written that the components of a method are its steps and that "it is difficult to conceive of how one might supply or cause to be supplied all or a substantial portion of the steps of a patented method."[164] By contrast, the Union Carbide IV court asserted that the catalyst was in fact "a 'component'[] used in the commercial production of [ethylene oxide]."[165]

The Union Carbide IV opinion highlighted an inconsistency that would be present in a category-specific, technology-neutral law. The court considered the facts at issue to be more similar to Eolas III than to NTP III. Note, though, that there is a basic fact that Union Carbide IV shares with NTP III and not Eolas III--the claim at issue is literally drawn to a process. In Eolas III, the claim was to a computer program product. In some other respects, as the court pointed out, the Union Carbide IV claim resembles the Eolas III claim--both feature a clearly inventive core, and it is natural to consider that core to be the key "component" of the complete claimed invention. Thus, if software is not a special case, Shell should pay for its foreign sales just as Microsoft did. A technology-neutral law would impose liability in Union Carbide IV. A category-specific law, however, if it did not include processes in the coverage of § 271(f), would lead to the opposite result.

*145 F. Analysis

The fight about how to interpret § 271(f) is essentially an argument about the proper rule of statutory construction. As these four decisions demonstrate, § 271(f) is indeed an ambiguous statute. To be sure, Congress clearly intended to reverse Deepsouth.[166] Section 271(f) might, therefore, be limited to situations like that case. However, neither of the concerns motivating Deepsouth can actually help in interpreting the new provision. First, the Deepsouth Court focused on its perception of the deveining machine as a combination invention; exporting the components was not infringement because "the combination patent covers only the totality of the elements in the claim."[167] The concept of combinations as a distinct class of inventions was common in Supreme Court cases at the time,[168] but the Federal Circuit long ago disavowed it.[169] Now that the court recognizes all patents to be combinations of elements,[170] the old distinction is not useful for interpreting the words "combination" and "component" in § 271(f). Second, Deepsouth reflected a strong presumption against giving extraterritorial effect to American law: "Our patent system makes no claim to extraterritorial effect; these acts of Congress do not, and were not intended to, operate beyond the limits of the United States."[171] Surely such a presumption does not help in interpreting § 271(f), which was intended precisely to have extraterritorial effect.

Without these tools for interpreting § 271(f), these four opinions appealed to more basic ideals of patent law as rules of construction. Because the panels disagreed on these ideals, they reached dramatically different interpretations of the statute. The Eolas III court professed category-neutral, technology-neutral law, while the AT&T II court espoused category-neutral, technology-specific law. As Judge Rader observed in his dissent, the latter approach may be difficult to implement. By contrast, the NTP III court preferred category-specific, technology-specific law. It was thus inevitable that it read § 271(f) narrowly as covering only machinery. These three decisions illustrate three of the four possible approaches--the fourth being category-specific, technology-neutral law, which, as the Union Carbide IV court showed, is fatally flawed.

*146 IV. Recommendation

For several reasons, I will argue, the correct rule is to interpret patent statutes in a category-neutral and technology-neutral fashion. The TRIPS agreement, which establishes international standards for intellectual property protection, commits the United States to neutral law. Furthermore, the ideal of technology-neutral law is an old one, and it has now become clear that, in practice, technology-neutral law implies category-neutral law. Thus, § 271(f) should be interpreted to cover processes to the same extent that it covers other inventions. That prospect has excited fears and criticisms that U.S. patents will govern too much international trade. However, such criticisms ignore the intellectual property regime that the international community chose when it negotiated TRIPS.

A. Neutrality in TRIPS

Overshadowing the argument over how to interpret § 271(f) is the TRIPS agreement, which was part of the 1994 General Agreement on Tariffs and Trade (GATT).[172] The United States acceded to the TRIPS agreement, and Congress amended the

patent statutes to conform to it in the same year.[173] A key provision of TRIPS, Article 27(1), requires that "patents shall be available for any inventions, whether products or processes, in all fields of technology" and that "patent rights [shall be] enjoyable without discrimination as to the place of invention, the field of technology and whether products are imported or locally produced."[174] The Eolas III court relied on TRIPS as its reason for "accord[ing] the same treatment to all forms of invention."[175] As discussed above, this principle was the basis of the Eolas III court's construction of § 271(f); the court sought a way to interpret the ambiguous statute to be category-neutral and technology-neutral. The court cited Article 27 as the source for this principle.[176] Conversely, the NTP III court, interpreting § 271(f) in a category-specific and technology-specific way, did not cite Article 27 at all.[177]

Thus, TRIPS provides strong legal support for interpreting patent statutes in a technology-neutral way. In addition, scholars have put forth numerous theoretical arguments for technology-neutral law.[178] However, TRIPS does not favor ***147** category-neutral law as clearly. Another provision, Article 28, sets different minimum standards for the rights attached to product and process patents.[179] For a product patent, the owner may "prevent third parties . . . from . . . making, using, offering for sale, selling, or importing . . . that product."[180] The owner of a process patent may "prevent third parties. . . from . . . using the process, and . . . using, offering for sale, selling, or importing . . . at least the product obtained directly by that process."[181] The difference may only be slight and may simply reflect an opinion that "importing" a process is not a sensible concept. Nevertheless, the NTP III court made much of the difference. In a section of the opinion that I have not discussed, the court cited Article 28 to show that processes are not covered by the "offer to sell" clause of § 271(a).[182]

B. Neutrality in Practice

It might seem that a category-specific, technology-neutral patent law would comport with TRIPS and satisfy the theoretical objections to a technology-specific law. In practice, this kind of law is not a feasible option. As the Union Carbide IV case shows, it can be just as difficult to draw a line between process and product as between different technologies.[183] Moreover, modern claim drafting techniques make the line even harder to draw because the same invention can be claimed simultaneously in many formats. Finally, since State Street declared that § 101 is category-neutral, claims made possible by that decision have become ubiquitous.[184] Trying to segregate them into process and product claims could eliminate important patent protection.

First, there is often no principled basis for distinguishing processes from products. The Eolas III court pointed this out with respect to software: "process and product--software and hardware--are practically interchangeable in the field of computer technology."[185] This problem has been identified in business patents as well.[186] For example, one patent arbitrarily pulled from among the business ***148** patents claims "a unitary note investment, comprising," among other things, "a performance portfolio."[187] It is hard to know whether to classify this as a "process, machine, manufacture, or composition of matter."[188] As another example, it is famously difficult in biotechnology to distinguish between a newly isolated biochemical and the process used to produce it.[189] It is not only a problem of new technology, however. Union Carbide IV involved catalysts for synthesizing a relatively old chemical compound, ethylene oxide.[190] As discussed above, it is somewhat arbitrary to classify that invention as a process since the central feature of the invention is the use of a new material. Yet it would be equally false to classify the invention as a composition of matter. After all, the new material was only fully characterized as distinct from previously known compositions by observing its performance in the process. In sum, the boundary between processes and other categories of invention is blurry in old industries and new.

Modern techniques for drafting claims blur the distinction further. As Professor Thomas observed, "Even the most novice claims drafter would encounter scant difficulty in converting a patent claim from artifact to technique and back again."[191] Indeed, numerous authors have offered advice on how to describe an invention in as many ways as possible.[192] For example, a process may be claimed as an apparatus for performing the process, comprising means for performing the various steps of the process.[193] Conversely, an apparatus can be claimed as the process that it is designed to perform.[194] Patents that use these techniques are common. For example, one randomly selected patent on controlling engine knocking contains both apparatus and method claims.[195] One of the apparatus claims recites such elements as "knock determining means for determining an occurrence of knock."[196] The corresponding method claim recites steps such as "determining an occurrence of knock."[197] As this example illustrates, ***149** patent drafters and applicants are no longer obligated to categorize their inventions as process or product. If there are to be category-specific rules, then the courts will have to classify inventions without the aid of the claims themselves.

Finally, since there is certainly no distinction between software processes and products, any category-specific patent law

would have to treat software separately. Since State Street, a software patent may include claims drawn to the method implemented by the software, the computer program product that is the software, the computer readable medium that is a disk or memory containing the software, and the apparatus that is a computer running the software.[198] In light of the ongoing debate at the Federal Circuit over whether products and processes receive similar levels of protection, every competent patent drafter would include claims in all of these formats.[199] This behavior obviates the debate, at least with respect to software.

Thus, a category-specific patent law must be a technology-specific law, at least with respect to software. However, it is doubtful whether software patents can in fact be treated separately. The nature of modern technology is that every industry uses computers and software intensively. Hunt and Bessen, studying the incidence of software in patents, found that in 1997 software publishers accounted for only 5% of patents involving software to some degree.[200] Manufacturers acquired 75% of such patents, with chemical manufacturers acquiring 5%.[201] Indeed, the seminal software patent that the Supreme Court approved in Diamond v. Diehr was a patent on molding rubber.[202] Similarly, the engine knocking patent discussed above relied on "a microcomputer . . . [that] executes a memorized program . . . for performing the engine control."[203] As a result, software patents are now ubiquitous. Hunt and Bessen reported that software patents had spread to become 15% of all U.S. patents granted in 2002.[204] By 2005, the rate had increased ***150** to 21%.[205] Thus, more and more inventions rely in part on computers and software. A software-specific rule would capture a significant plurality of patents.

C. Neutrality in § 271(f)?

In sum, in the light of TRIPS and of the nature of the modern patent system, courts should interpret statutes to be category-neutral as much as possible. When this rule is applied to § 271(f), the result is extraterritorial effect for a broad swath of U.S. patents. Uncomfortable with this result, many observers have urged that it is even more important to be conservative about laws that implicate conduct abroad.[206] Professor Bradley has noted a "longstanding canon of construction that federal statutes are to be construed, where fairly possible, so as not to violate international law."[207] Such critics argue that the reach of U.S. patents must be strictly limited out of respect for other nations' policy choices,[208] for the sake of international comity,[209] or to honor international trade obligations.[210]

These reasons have little force with respect to the question whether § 271(f) should apply to process inventions. The TRIPS agreement constrains other nations' choices of patent regimes, just as it does decisions in the United States. This agreement represents the most recent international consensus on how to manage intellectual property in the international system. Conspicuously, the agreement does not restrain states from giving patents extraterritorial force. Instead, it prescribes minimum levels of protection that patents shall enjoy everywhere, "for any inventions."[211] TRIPS represents (among other things) a negotiated judgment that, between the presumption of limited territorial scope and the presumption of category-neutrality and technology-neutrality, the latter is more important.

*151 V. Conclusion

The debate over § 271(f) exposed a rift at the Federal Circuit over the basic nature of patent law. The terms of the argument are fundamental: should patent law be category-neutral or category-specific, technology-neutral or technology-specific? Several panels, including Eolas III and Union Carbide IV, have interpreted the statute as broadly as possible, creating a category-neutral and technology-neutral patent law.[212] The NTP III panel rejected this approach, preferring to tailor the law for different technologies and categories.[213]

Throughout the debate, little consideration has been given to the ramifications of § 271(f) for international trade and foreign patent law. TRIPS, the most significant recent international agreement on intellectual property, favors the category-neutral approach.[214] TRIPS explicitly prescribes technology-neutral patent law and sets broadly similar minimum standards for the rights attached to product and process patents.[215] In practice, technology-neutral patent law should be category-neutral as well, because any rules to distinguish processes from products would have to be extremely technology-specific.

In the end, the last word was probably the best. By allowing damages for exports of a unique catalyst used in a patented process, the Union Carbide IV panel refused to be trapped by formal distinctions between statutory categories.[216] This decision will not settle the larger dispute, but given the importance of § 271(f), it is a significant step.

Footnotes

[a1] Dr. Bradley will graduate from Columbia Law School in May 2007. He is a registered patent agent and a former physicist with expertise in nanotechnology and materials science. Any questions or comments concerning this note may be addressed directly to Dr. Bradley via e-mail at: kb2188 @columbia.edu.

[1] "Whoever without authority supplies or causes to be supplied in or from the United States any component of a patented invention [subject to further conditions] ... intending that such component will be combined outside of the United States in a manner that would infringe the patent if such combination occurred within the United States, shall be liable as an infringer." 35 U.S.C. §271(f)(2) (2000).

[2] For example, most other countries grant patents to the first filers, not the first inventors. Gideon Parchomovsky, Publish or Perish, 98 Mich. L. Rev. 926, 929 n.9 (2000). As a result, it is not uncommon for an invention to be patented by different entities in the United States and elsewhere. As another example, some countries limit the scope of patents in certain areas, such as agriculture in developing countries, Michael R. Taylor & Jerry Cayford, American Patent Policy, Biotechnology, and African Agriculture: The Case for Policy Change, 17 Harv. J.L. & Tech. 321, 375 (2004), or biotechnology in the European Union, Donna M. Gitter, International Conflicts over Patenting Human DNA Sequences in the United States and the European Union: An Argument for Compulsory Licensing and a Fair-Use Exemption, 76 N.Y.U. L. Rev. 1623, 1644-49 (2001). Section 271(f) would restrict American participation in such an industry, despite the policy choices of the foreign government involved. In addition, substantive patent rights differ substantially between nations. Pamela Samuelson, Intellectual Property Arbitrage: How Foreign Rules Can Affect Domestic Protections, 71 U. Chi. L. Rev. 223, 225 (2004).

[3] Graeme W. Austin, The Role of National Courts: Valuing "Domestic Self-Determination" in International Intellectual Property Jurisprudence, 77 Chi.-Kent L. Rev. 1155, 1156-57 (2002).

[4] Joan E. Beckner, Patent Infringement by Component Export: Waymark Corp. v. Porta Systems Corp. and the Extraterritorial Effect of U.S. Patent Law, 39 Hous. L. Rev. 803, 832-33 (2002).

[5] Curtis A. Bradley, Territorial Intellectual Property Rights in an Age of Globalism, 37 Va. J. Int'l L. 505, 510-13 (1997).

[6] "The statutory class of 'process' differs fundamentally from the other three classes (machine, manufacture, and composition of matter). A process is not a structural entity but rather an operation or series of steps leading to a useful result. Over the years, the courts have had more conceptual problems with process claims than with product claims." 1-1 Donald S. Chisum, Chisum on Patents § 1.03 (Matthew Bender 2005). One court defined process to mean "a mode of treatment of certain materials to produce a given result ... an act, or a series of acts, performed upon the subject-matter to be transformed and reduced to a different state or thing." Cochrane v. Deener, 94 U.S. 780, 788 (1876). The patent statute unhelpfully defines "process" to "mean[ ] process, art, or method, and include[ ] a new use of a known process, machine, manufacture, composition of matter, or material." 35 U.S.C. §100(b) (2000).

[7] Donald S. Chisum, Normative and Empirical Territoriality in Intellectual Property: Lessons from Patent Law, 37 Va. J. Int'l L. 603, 607 (1997).

[8] Congress created the Federal Circuit in 1982 to have exclusive jurisdiction of patent appeals. 28 U.S.C. § 1295 (2000).

[9] Eolas Techs., Inc. v. Microsoft Corp. (Eolas III), 399 F.3d 1325, 1331-32, 1340-41 (Fed. Cir. 2005), cert. denied, 126 S.Ct. 568 (2005); AT&T Corp. v. Microsoft Corp. (AT&T II), 414 F.3d 1366, 1367-68 (Fed. Cir. 2005). For a discussion contemporaneous with these decisions, see generally William Thornewell II, Note, Patent Infringement Prevention and the Advancement of Technology: Application of 35 U.S.C. § 271(f) to Software and "Virtual Components," 73 Fordham L. Rev. 2815 (2005).

[10] Union Carbide Chems. & Plastics Tech. Corp. v. Shell Oil Co. (Union Carbide IV), 425 F.3d 1366, 1370, 1380 (Fed. Cir. 2005).

[11] NTP, Inc. v. Research In Motion, Ltd. (NTP III), 418 F.3d 1282, 1322 (Fed. Cir. 2005), cert. denied, 126 S. Ct. 1174 (2006).

[12] See, e.g., James W. Walworth Jr., Recent Federal Circuit Decisions Address Extraterritorial Limits of United States Patent Law, Jones Day Commentaries (Jones Day, Cleveland, Ohio), Jan. 2006, available at http://www.jonesday.com/pubs/pubs_detail.aspx?pubID=S3065 ("what remains unsettled, however, is ... what offshore conduct constitutes infringement when method claims are at issue").

[13] Union Carbide Chems. & Plastics Tech. Corp. v. Shell Oil Co. (Union Carbide V), 434 F.3d 1357, 1358 (Fed. Cir. 2006) (Lourie, J., dissenting) (panel decision was "contrary ... to recent case law").

[14] The concept of "category" arises in 35 U.S.C. § 101, which permits patents for "any new and useful process, machine, manufacture, or composition of matter." Historically, inventions in different categories received different kinds of protection. See, e.g., John R. Thomas, Of Text, Technique, and the Tangible: Drafting Patent Claims Around Patent Rules, 17 J. Marshall J. Computer & Info. L. 219, 221 (1998) ("substantive rights hinge upon whether the claimed invention comprises artifact or technique").

[15] General Agreement on Tariffs and Trade, Annex 1C, Agreement on Trade-Related Aspects of Intellectual Property art. 27(1), Apr. 15, 1994, 33 I.L.M. 1125, 1208 [hereinafter TRIPS]. TRIPS provides several exceptions within which countries may discriminate in granting patent rights. These include, for example, agricultural products and surgical methods. The exceptions are relatively narrow and are not within the scope of this paper.

[16] Patent Law Amendments Act of 1984, Pub. L. No. 98-622, § 101, 98 Stat. 3383, 3383 (1984).

[17] Deepsouth Packing Co. v. Laitram Corp., 406 U.S. 518 (1972).

[18] Id.

[19] Id. at 531-32.

[20] Id. at 520-21.

[21] Id. at 523.

[22] Id. at 524.

[23] Deepsouth, 406 U.S. at 524.

[24] Id.

[25] See id. at 526-27.

[26] Id. at 527. 35 U.S.C. § 271(a) is the main infringement provision, imposing liability on "whoever without authority makes, uses, offers to sell, or sells any patented invention, within the United States." 35 U.S.C. § 271(a) (2000).

[27] 406 U.S. at 523 ("Deepsouth ... seeks to make the parts of deveining machines ... and to have the buyers assemble the parts and use

the machines abroad.").

[28] Id. at 526. A defendant is not liable for contributory infringement unless the plaintiff proves that someone has committed a direct infringement. 5 Chisum, supra note 6, § 17.03(1) (citing Aro Mfg. Co. v. Convertible Top Replacement Co., 365 U.S. 336, 341-42 (1961), reh'g denied, 365 U.S. 890 (1961)).

[29] 406 U.S. at 531.

[30] Id.

[31] Patent Law Amendments Act of 1984 § 101.

[32] Rep. Kastenmeier's floor remarks on H.R. 6286, 28 Pat. Trademark & Copyright J. (BNA) 645, 648-49 (1984).

[33] Section 271(b) reads, "Whoever actively induces infringement of a patent shall be liable as an infringer." 35 U.S.C. § 271(b) (2000).

[34] 35 U.S.C. § 271(f)(1) (2000).

[35] See 35 U.S.C. § 271(b) (2000) (any active inducement of infringement leads to liability for infringement).

[36] 5 Chisum, supra note 6, § 17.04(4) (A defendant can incur liability under § 271(b) simply for repairing, designing, or advertising an infringing product. Supplying components is not necessary.).

[37] Rep. Kastenmeier's floor remarks on H.R. 6286, 28 Pat. Trademark & Copyright J. (BNA) 645, 649 (1984).

[38] 35 U.S.C. § 271(f)(2) (2000).

[39] Section 271(c) reads, "Whoever offers to sell or sells within the United States or imports into the United States a component of a patented machine, manufacture, combination, or composition or a material or apparatus for use in practicing a patented process, constituting a material part of the invention, knowing the same to be especially made or especially adapted for use in an infringement of such patent, and not a staple article or commodity of commerce suitable for substantial non-infringing use, shall be liable as a contributory infringer." 35 U.S.C. § 271(c) (2000).

[40] Id.

[41] 35 U.S.C. § 271(f)(2) (2000).

[42] Id. In contrast, liability under § 271(c) depends on knowledge, not intent. 5 Chisum, supra note 6, §17.03(2).

[43] Rep. Kastenmeier's floor remarks on H.R. 6286, 28 Pat. Trademark & Copyright J. (BNA) 645, 648 (1984).

[44] Section 271(g) prohibits importing, selling, offering to sell, or using "a product which is made by a process patented in the United States." 35 U.S.C.A. § 271(g) (2006).

[45] Pellegrini v. Analog Devices, Inc., 375 F.3d 1113, 1116 (Fed. Cir. 2004).

[46] Id. at 1116.

[47] Id. at 1118.

[48] Id.

[49] 5 Chisum, supra note 6, §§ 17.01-04. Cf. Water Techs. Corp. v. Calco, Ltd., 850 F.2d 660, 668 (Fed. Cir. 1988) (Design of infringing product and writing of instructions for its use are active inducement.).

[50] Waymark Corp. v. Porta Sys. Corp., 245 F.3d 1364, 1367-68 (Fed. Cir. 2001).

[51] Id. at 1365.

[52] Id.

[53] Epcon Gas Sys., Inc. v. Bauer Compressors, Inc., 279 F.3d 1022, 1033 (Fed. Cir. 2002) ("a finding of contributory infringement likewise requires underlying proof of direct infringement").

[54] Waymark, 245 F.3d at 1368.

[55] Id. Note that the plaintiff was still required to prove the defendant's intent to combine the components.

[56] Chisum, supra note 7, at 607.

[57] Pellegrini, 375 F.3d at 1118.

[58] Chisum, supra note 7, at 607.

[59] Chisum, supra note 7, at 607.

[60] Standard Havens Prods., Inc. v. Gencor Indus., Inc., 953 F.2d 1360, 1374 (Fed. Cir. 1991). Some district courts took this sentence to mean that the Federal Circuit had in fact decided the question. See, e.g., Enpat, Inc. v. Microsoft Corp., 6 F. Supp. 2d 537, 538 (E.D. Va. 1998) ("[C]ourts have declined to apply the provision to patents that do not describe a product or apparatus that may be assembled abroad."); Synaptic Pharm. Corp. v. MDS Panlabs, Inc., 265 F. Supp. 2d 452, 464 (D.N.J. 2002) (assay process not covered by § 271(f)).

[61] Eolas III, 399 F.3d 1325 (Fed. Cir. 2005), cert. denied, 126 S. Ct. 568 (2005); AT&T II, 414 F.3d 1366 (Fed. Cir. 2005); NTP III, 418 F.3d 1282 (Fed. Cir. 2005), cert. denied, 126 S.Ct. 1174 (2006); Union Carbide IV, 425 F.3d 1366 (Fed. Cir. 2005).

[62] Dan L. Burk & Mark A. Lemley, Is Patent Law Technology-Specific?, 17 Berkeley Tech. L.J. 1155, 1156 (2002) ("With very few

exceptions, the statute does not distinguish between different technologies in setting and applying legal standards.").

[63] See also Andres Rueda, Cataract Surgery, Male Impotence, Rubber Dentures, and a Murder Case--What's So Special About Medical Process Patents?, 9 U. Balt. Intell. Prop. L.J. 109 (2001) (discussing 35 U.S.C. § 287, the exemption for doctors performing medical procedures); Jeffrey R. Kuester & Lawrence E. Thompson, Risks Associated with Restricting Business Method and E-Commerce Patents, 17 Ga. St. U. L. Rev. 657 (2001) (criticizing 35 U.S.C. §273, a special defense for prior inventors of business methods).

[64] Burk & Lemley, supra note 62, at 1156.

[65] See, e.g., Robert P. Merges & Richard R. Nelson, On the Complex Economics of Patent Scope, 90 Colum. L. Rev. 839, 908-916 (1990) (recommending a different scope for patents in "cumulative" industries and science-based industries).

[66] E.g., In re Tarczy-Hornoch, 397 F.2d 856, 857 (C.C.P.A. 1968) (discussing "function of a machine" doctrine, according to which a process claim was not available if the patent "discloses apparatus which will inherently carry out the recited steps").

[67] See John R. Thomas, Of Text, Technique, and the Tangible: Drafting Patent Claims Around Patent Rules, 17 J. Marshall J. Computer & Info. L. 219, 221 (1998) ("[S]ubstantive rights hinge upon whether the claimed invention comprises artifact or technique.").

[68] In re Alappat, 33 F.3d 1526 (Fed. Cir. 1994).

[69] E.g., Arrhythmia Research Tech., Inc. v. Corazonix Corp., 958 F.2d 1053 (Fed. Cir. 1992).

[70] In re Alappat, 33 F.3d at 1581 (Rader, J., concurring). Note that Judge Rader also wrote the Eolas III opinion.

[71] Diamond v. Chakrabarty, 447 U.S. 303, 308 (1980).

[72] In re Alappat, 33 F.3d at 1583 (Rader, J., concurring).

[73] Id.

[74] State St. Bank & Trust Co. v. Signature Fin. Group, Inc., 149 F.3d 1368, 1372-73 (Fed. Cir. 1998) ("[R]epetitive use of the term 'any' in § 101 shows Congress's intent not to place any restrictions."). Judge Rich wrote State Street for a panel comprising himself, Judge Plager, and Judge Bryson.

[75] AT&T Corp. v. Excel Commc'ns, Inc., 172 F.3d 1352, 1357-58 (Fed. Cir. 1999) ("[W]e consider the scope of § 101 to be the same regardless of the form--machine or process--in which a particular claim is drafted.").

[76] In re Kollar, 286 F.3d 1326 (Fed. Cir. 2002).

[77] Id. at 1332.

[78] Id. at 1332-33.

[79] Eolas III, 399 F.3d 1325, 1339 (Fed. Cir. 2005), cert. denied, 126 S.Ct. 568 (2005). Judge Rader wrote the opinion for a panel comprising himself and Senior Judges Friedman and Plager. Notably, Judge Plager previously wrote AT&T Corp. v. Excel Communications, Inc. for a panel that also included Judge Rader. AT&T, 172 F.3d at 1353.

[80] U.S. Patent No. 5,838,906 (filed Oct. 17, 1994); Eolas III, 399 F.3d at 1328-29.

[81] See, e.g., Barbara Rose, Microsoft Enjoined From Using Technology, Chi. Trib., Jan. 15, 2004, at C3 ("dispute has caused an uproar in the Web community").

[82] Victoria Slind-Flor, Microsoft Takes a Hit, 3 Intell. Prop. L. & Bus., Dec. 2003, at 27.

[83] Eolas Techs., Inc. v. Microsoft Corp. (Eolas II), 70 U.S.P.Q.2d (BNA) 1939 (N.D. Ill. Jan. 14, 2004), vacated in part, 399 F.3d 1325 (Fed. Cir. 2005).

[84] Eolas III, 399 F.3d at 1341. Microsoft also persuaded the U.S. Patent & Trademark Office to open a reexamination of the '906 patent. In an action issued June 6, 2006, the office announced its conclusion that the patent is valid. U.S. Patent No. 5,838,906, U.S. Pat. & Trademark Office Off. Gaz. Notices (June 6, 2006) (Reexamination Certificate No. 90/007,863).

[85] Standard Havens Prods., Inc. v. Gencor Inds., Inc., 953 F.2d 1360, 1374 (Fed. Cir. 1991) (court did "not find the provisions of § 271(f) implicated" in a case involving a chemical method); cf. Sw. Software, Inc. v. Harlequin Inc., 226 F.3d 1280, 1290 (Fed. Cir. 2000) (permitting a plaintiff to recover under § 271(f) for foreign software sales because the defendant failed to raise the issue).

[86] U.S. Patent No. 5,838,906 col.17 ll.62-66 (filed Oct. 17, 1994).

[87] Eolas Techs., Inc. v. Microsoft Corp. (Eolas I), 274 F. Supp. 2d 972, 973 (N.D. Ill. 2003), aff'd, 399 F.3d 1325 (Fed. Cir. 2005).

[88] Id.

[89] Id. at 974. The ruling in Pellegrini v. Analog Devices, Inc., 375 F.3d 1113 (Fed. Cir. 2004), that instructions or designs are not components, would have been invaluable to Microsoft, but that case had not yet been decided.

[90] Eolas III, 399 F.3d 1325, 1339 (Fed. Cir. 2005), cert. denied, 126 S. Ct. 568 (2005).

[91] Id. at 1338.

[92] Id. at 1339.

[93] Id.

[94] Id.

[95] Eolas III, 399 F.3d 1325, 1339 (Fed. Cir. 2005), cert. denied, 126 S. Ct. 568 (2005).

[96] Id.

[97] Id.

[98] Id. (internal quotations omitted).

[99] Id.

[100] There is a potential conflict here with Pellegrini, which said that instructions are not components under § 271(f). Pellegrini v. Analog Devices, Inc., 375 F.3d 1113, 1118 (Fed. Cir. 2004). The Eolas III court's attempt to distinguish Pellegrini is beyond the scope of this paper.

[101] AT&T II, 414 F.3d 1366, 1370 (Fed. Cir. 2005). Judge Lourie wrote the opinion for himself and Judge Mayer with Judge Rader dissenting. Note that Judge Lourie had previously written In re Kollar, creating a special rule for sales of processes. In re Kollar, 286 F.3d 1326 (Fed. Cir. 2002). Judge Rader wrote Eolas III, allowing a patentee damages on Microsoft's foreign sales. See Eolas III, 399 F.3d 1325 (Fed. Cir. 2005), cert. denied, 126 S. Ct. 568 (2005).

[102] U.S. Patent No. RE32,580 (filed Sept. 18, 1986); AT&T Corp. v. Microsoft Corp. (AT&T I), 71 U.S.P.Q.2d (BNA) 1118 (S.D.N.Y. Mar. 5, 2004), aff'd, 414 F.3d 1366 (Fed. Cir. 2005).

[103] AT&T I, 71 U.S.P.Q.2d at 1126.

[104] 35 U.S.C. § 271(f) (2000).

[105] AT&T II, 414 F.3d at 1369. Note that the infringing software in AT&T II was Windows rather than Internet Explorer as in Eolas III. See id.; Eolas III, 399 F.3d 1325.

[106] See AT&T II, 414 F.3d 1366; Eolas III, 399 F.3d at 1328-32.

[107] AT&T I, 71 U.S.P.Q.2d at 1119-20.

[108] Id. at 1120.

[109] Id.

[110] Id.

[111] Id. (internal quotations omitted).

[112] AT&T II, 414 F.3d 1366, 1370 (Fed. Cir. 2005).

[113] Id.

[114] Id. at 1371.

[115] Id.

[116] Id. at 1371-72.

[117] In re Alappat, 33 F.3d 1526 (Fed. Cir. 1994).

[118] See AT&T II, 414 F.3d 1366.

[119] Id. at 1369 (internal quotations and citations omitted).

[120] Id. at 1370.

[121] Id.

[122] Id. at 1371-72.

[123] Id. at 1371.

[124] AT&T II, 414 F.3d at 1369.

[125] Id. at 1371. Both the AT&T II and the Eolas III court quoted Rep. Kastenmeier's statement, see supra note 43, that the new law would "prevent copiers from avoiding U.S. patents by supplying components of a patented product." Both courts ignored the fact that the statement mentions only products.

[126] Id. (citing Eolas III, 399 F.3d at 1339, cert. denied, 126 S. Ct. 568 (2005)).

[127] AT&T II, 414 F.3d at 1372-76 (Rader, J., dissenting).

[128] Id. at 1373 (Rader, J., dissenting).

[129] Id. at 1374.

[130] Id.

[131] NTP, Inc. v. Research In Motion, Ltd. (NTP II), 392 F.3d 1336 (Fed. Cir. 2004), withdrawn and superseded by 418 F.3d 1282 (Fed. Cir. 2005). Judge Linn wrote the opinion for a panel comprising himself, Chief Judge Michel, and Judge Schall.

[132] NTP, Inc. v. Research In Motion, Ltd. (NTP I), 261 F. Supp. 2d 423, 426 (E.D. Va. 2002), aff'd in part, rev'd in part, vacated in part, 418 F.3d 1282 (Fed. Cir. 2005), cert. denied, 126 S. Ct. 1174 (2006).

[133] Id. at 435. Ordinarily a claim is infringed only if all elements of a claim are present in the accused product. 5A Chisum, supra note 6, at § 18.03(4)(a).

[134] NTP II, 392 F.3d at 1367-69.

[135] Id. at 1366-67.

[136] NTP III, 418 F.3d 1282, 1317-24 (Fed. Cir. 2005), cert. denied, 126 S. Ct. 1174 (2006).

[137] As I have discussed, in the new opinion the court went out of its way to answer questions that were not asked. Indeed, the parties themselves made only "arguments ... directed to the system claims but do not address infringement of the method claims under section 271(f)." Id. at 1321.

[138] Id. at 1322.

[139] Id.

[140] Id. (citing In re Kollar, 286 F.3d 1326, 1332 (Fed. Cir. 2002)). In re Kollar was written by Judge Lourie, who also wrote the technology-specific AT&T opinion.

[141] NTP III, 418 F.3d at 1322.

[142] Id.

[143] Id.

[144] Id. The court justified its approach by citing Minton v. Nat'l Ass'n of Sec. Dealers, 336 F.3d 1373, 1378 (Fed. Cir. 2003), in which the Federal Circuit created a definition of "sale" specific to the software industry. Judge Lourie, who wrote In re Kollar and AT&T, also wrote Minton.

[145] Union Carbide IV, 425 F.3d 1366, 1366 (Fed. Cir. 2005). Judge Rader wrote the opinion for himself, Judge Mayer, and Judge Prost.

[146] Union Carbide Chems. & Plastics Tech. Corp. v. Shell Oil Co. (Union Carbide II), 308 F.3d 1167, 1171 (Fed. Cir. 2002).

[147] Union Carbide Chems. & Plastics Tech. Corp. v. Shell Oil Co. (Union Carbide I), 163 F. Supp. 2d 426, 429-30 (D. Del. 2001), aff'd in part, rev'd in part, 308 F.3d 1167 (Fed. Cir. 2002).

[148] Id. Union Carbide Chems. & Plastics Tech. Corp. v. Shell Oil Co. (Union Carbide III), No. 99-CV-274-SLR, 2004 U.S. Dist. LEXIS 10730, at *3 (D. Del. June 9, 2004), aff'd in part, vacated in part, rev'd in part, 425 F.3d 1366 (Fed. Cir. 2005); Union Carbide II, 308 F.3d 1167.

[149] Union Carbide II, 308 F.3d at 1167.

[150] Union Carbide IV, 425 F.3d at 1369.

[151] Union Carbide III, 2004 U.S. Dist. LEXIS 10730 at *17, *25-26.

[152] Union Carbide IV, 425 F.3d at 1369.

[153] Id. at 1380.

[154] U.S. Patent No. 4,916,243 (filed Apr. 1, 1987). The Claim actually at issue was dependent Claim 4, which further specified that the "alkali metal" should be lithium. Since Claim 4, as a dependent from Claim 1, contained all of its limitations, the court focused on Claim 1.

[155] See generally Union Carbide II, 308 F.3d 1167 (Fed. Cir. 2002) (trial judge properly reversed jury verdict of invalidity on all arguments except lack of enablement).

[156] Union Carbide IV, 425 F.3d at 1376.

[157] The Federal Circuit's tortuous route out of this briar patch is not important for my argument. It is ironic, however, that part of the solution was to declare that the nature of "characterizing" was not a matter of interpreting the claim language. Therefore, unlike claim construction, it was a matter of fact on which the Federal Circuit could simply trust the trial court. Id. at 1377.

[158] Union Carbide IV was written by Judge Rader (who also wrote Eolas III) for himself, Judge Mayer, and Judge Prost.

[159] Union Carbide IV, 425 F.3d at 1379.

[160] Id.

[161] Eolas III, 399 F.3d 1325, 1339 (Fed. Cir. 2005) (internal quotations omitted), cert. denied, 126 S. Ct. 568 (2005).

[162] Union Carbide IV, 425 F.3d at 1380.

[163] NTP III, 418 F.3d 1282, 1322 (Fed. Cir. 2005), cert. denied, 126 S. Ct. 1174 (2006).

[164] Id.

[165] Union Carbide IV, 425 F.3d at 1379.

[166] Rep. Kastenmeier's floor remarks on H.R. 6286, 28 Pat. Trademark & Copyright J. (BNA) 645, 648 (1984).

[167] Deepsouth Packing Co. v. Laitram Corp., 406 U.S. 518, 528 (1972) (quoting Aro Mfg. Co. v. Convertible Top Replacement Co., 365 U.S. 336, 344 (1961)).

[168] 2 Chisum, supra note 6, at § 5.04(5)(c)(ii).

[169] 2 Chisum, supra note 6, at § 5.04(5)(c)(iii)(E) (citing Fromson v. Advance Offset Plate, Inc., 755 F.2d 1549, 1556 (Fed. Cir. 1985) ("no basis in the law ... for treating combinations of old elements differently in determining patentability")).

[170] 2 Chisum, supra note 6, at § 5.04(5)(c)(iii)(E).

[171] Deepsouth, 406 U.S. at 531 (internal citations omitted). Professor Bradley has analyzed the presumption of territoriality in Deepsouth and other cases extensively. See Bradley, supra note 5, at 510-22.

[172] TRIPS, supra note 15.

[173] Act of Dec. 8, 1994, Pub. L. No. 103-465, 108 Stat. 4809, 4982-90 (1994).

[174] TRIPS, supra note 15.

[175] Eolas III, 399 F.3d 1325, 1339 (Fed. Cir. 2005), cert. denied, 126 S. Ct. 568 (2005).

[176] Id.

[177] See NTP III, 418 F.3d 1282 (Fed. Cir. 2005), cert. denied, 126 S. Ct. 1174 (2006).

[178] E.g., Dan L. Burk & Mark A. Lemley, Policy Levers in Patent Law, 89 Va. L. Rev. 1575, 1637-38 (2003) (reviewing the arguments for technology-neutral law).

[179] TRIPS, supra note 15, art. 28.

[180] TRIPS, supra note 15, art. 28(1)(a).

[181] TRIPS, supra note 15, art. 28(1)(b).

[182] NTP III, 418 F.3d at 1318-20. The court actually mischaracterized Article 28 as providing protection "only from the act of using the process." Id. at 1320. In fact, Article 28 specifies minimum levels of protection. See TRIPS, supra note 15, art. 28.

[183] See Union Carbide IV, 425 F.3d 1366 (Fed. Cir. 2005).

[184] See State St. Bank & Trust Co. v. Signature Fin. Group, Inc., 149 F.3d 1368 (Fed. Cir. 1998).

[185] Eolas III, 399 F.3d 1325, 1339 (Fed. Cir. 2005), cert. denied, 126 S. Ct. 568 (2005).

[186] Richard H. Stern, Scope-of-Protection Problems with Patents and Copyrights on Methods of Doing Business, 10 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. 105, 148 n.168 (1999). Stern notes that when Congress attempted to cut back on the

business patents allowed by State Street, it ironically failed to overturn State Street itself. Id. The new 35 U.S.C. § 273 explicitly applies only to "methods," and the claims at issue in State Street were drawn to an apparatus. Id.

187 U.S. Patent No. 6,856,971 (filed Mar. 12, 1999).

188 35 U.S.C. § 101 (2000). Since it doesn't sound like a machine, manufacture, or composition, one might at first guess it is a method. However, the patent later claims a method of using the unitary note investment, thus suggesting the investment is supposed to be within the "thing" category.

189 Jeremy (Je) Zhe Zhang, In re Ochiai, In re Brouwer, and the Biotechnology Process Patent Act of 1995: The End of the Durden Legacy?, 37 IDEA 405, 416 (1997).

190 Union Carbide IV, 425 F.3d 1366, 1369 (Fed. Cir. 2005).

191 Thomas, supra note 67, at 225. Professor Thomas reviews the changes in case law that give patent drafters this flexibility.

192 See, e.g., JEFFREY G. SHELDON, HOW TO WRITE A PATENT APPLICATION § 6.5.4 (Practicing Law Institute 2005) (advocating claiming an invention in multiple statutory categories); id. §6.5.5 (giving advice on converting process claims into machine claims).

193 Thomas, supra note 67, at 247.

194 This has only been possible since In re Tarczy-Hornoch, 397 F.2d 856 (C.C.P.A. 1968).

195 U.S. Patent No. 6,688,286 (filed May 29, 2002).

196 '286 Patent col.17 l.44.

197 '286 Patent col.21 l.20.

198 Jeffrey R. Kuester, Scott A. Horstemeyer & Daniel J. Santos, A New Frontier in Patents: Patent Claims to Propagated Signals, 17 J. Marshall J. Computer & Info. L. 75, 79-82 (1998).

199 Sheldon, supra note 192, § 6.5.4.

200 Robert Hunt & James Bessen, The Software Patent Experiment, Bus. Rev., Q3 2004, July 1, 2004, at 22, 26.

201 Id.

202 Diamond v. Diehr, 450 U.S. 175, 179-82 (1981).

203 U.S. Patent No. 6,688,286 col.5 ll.40-43 (filed May 29, 2002).

[204] Hunt & Bessen, supra note 200, at 25. The authors defined a software patent to be one which contained the words "software," "computer," or "program" in the specification, did not have "circuit" or similar words in the title, and did not have "antigen" or certain related words in the specification. Hunt & Bessen, supra note 200, at 25.

[205] I performed a similar search using the Delphion patent database. See Delphion, http://www.delphion.com (last visited February 7, 2006).

[206] See, e.g., Brief for Am. Intellectual Prop. Law Ass'n & Fed. Cir. Bar Ass'n as Amici Curiae Supporting Appellants' Combined Petition for Rehearing at 9, Union Carbide Chems. & Plastics Tech. Corp. v. Shell Oil Co., 434 F.3d 1357 (Fed. Cir. 2006) (No. 04-1475) ("by effectively regulating foreign activity, Section 271(f) raises concerns about international comity"); Andrew F. Knight, Software, Components, and Bad Logic: Recent Interpretations of Section 271(f), 87 J. Pat. & Trademark Off. Soc'y 493, 512 (2005) (arguing that extending § 271(f) to software will erase patent territoriality).

[207] Bradley, supra note 5, at 514-15.

[208] Austin, supra note 3, at 1204.

[209] Bradley, supra note 5, at 514-15.

[210] Burk, supra note 7, at 58.

[211] TRIPS, supra note 15, art. 27(1).

[212] See Eolas III, 399 F.3d 1325 (Fed. Cir. 2005), cert. denied, 126 S. Ct. 568 (2005); Union Carbide IV, 425 F.3d 1366 (Fed. Cir. 2005).

[213] See NTP III, 418 F.3d 1282 (Fed. Cir. 2005), cert. denied, 126 S. Ct. 1174 (2006).

[214] See TRIPS, supra note 15.

[215] See TRIPS, supra note 15.

[216] See Union Carbide IV, 425 F.3d 1366.