COMMENTS

COMPULSORY PATENT LICENSES AND ENVIRONMENTAL PROTECTION

I. INTRODUCTION

National governments have granted monopolies for hundreds of years.[1] The primary purpose of these monopolies was to give the

1. "Monopolies were known to the ancients and were in general vogue during the Middle Ages. A sovereign or a state granted a monopoly for one of several reasons,

grantee an incentive to fully exploit the resource for which the monopoly applied.[2] While the monopoly was usually in the form of an exclusive authorization to import or export a certain product, or to perform a certain process, occasionally the monopoly was to reward a scientist or inventor for a new innovation. The innovation monopolies developed into a patent system such as the one existing today in the United States, and throughout much of the developed world.[3]

The primary goal of the patent regime is to encourage public disclosure of inventions.[4] The patent laws of the United States, and of most other industrial nations, provide an economic incentive to the inventor for this disclosure, in the form of a monopoly.[5] As an economic tool, the patent system itself is environmentally neutral, having little concern for environmental protection or degradation. Similarly, the patentee's agenda and priorities might not consider the interests of the environment. However, the invention or process will often have environmental impacts which are either beneficial or harmful.[6] This comment asserts that the patent system should take advantage of a mechanism to ensure that this incentive system is sensitive to the environment. An opportunity exists to encourage environmentally useful patent practices, and to discourage those which are environmentally harmful. This opportunity involves the application of compulsory license practices, both within the United States and on a global scale.

This paper begins with a discussion of the compulsory license mechanism and addresses the delicate balance between ensuring that

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including the establishment of commerce, trade and industry . . . ." ERNEST BAINBRIDGE LIPSCOMB III, LIPSCOMB'S WALKER ON PATENTS § 1:1 (3d ed. 1984).

2. *Id.* (noting the message of Chancellor Moreton to King Henry VII of England in which the Chancellor alluded that the purpose of the monopoly is to create employment and to encourage exploitation of the monopolized resource within England).

3. *See generally id.* at §§ 1:1-1:9 (tracing the development of monopolies from ancient times to the present day).

4. *See* EARL KINTNER & JACK LAHR, AN INTELLECTUAL PROPERTY PRIMER 10-11 (2d ed. 1982). This goal followed from the desire to encourage technological progress. *Id.* at 6.

5. *Id.* at 11.

6. For an explanation of the significance of the distinction between technology as a danger to the environment, and technology as helpful to the environment, see Michael A. Gollin, *Using Intellectual Property to Improve Environmental Protection*, 4 HARV. J.L. & TECH. 193, 194-96 (1991).

environmentally beneficial technology is available to those who might use it, while ensuring that the incentive for innovation remains. Part II also discusses the way in which compulsory licenses can be used to discourage environmentally harmful activities. Part III evaluates the impact of the compulsory license on two particular areas of environmental law: reducing air pollution and protecting biodiversity. Finally, Part IV analyzes the advantages and difficulties of a compulsory license system, and proposes that compulsory licenses be viewed as a useful mechanism in the quest for a better environment.

II. COMPULSORY PATENT LICENSES

The Framers of the Constitution realized the importance of technological progress as a vehicle for improving the status of their new nation. They understood that wealth flows from scientific progress, and that an effective way to encourage invention was to grant limited monopolies to inventors. Thus, the Constitution provides:

> The Congress shall have power . . .
> (8) To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.[7]

This clause allows for a patent scheme which provides inventors with an incentive to create new products and processes. Rather than grant a perpetual monopoly, however, Congress limited the duration of the monopolistic protection which a patent provides.[8] In return for the monopoly, the inventor must disclose to the Patent Office, and to the general public, the means to replicate the invention, making the invention part of the public domain. The patent system thus serves two related purposes. First, it encourages innovation by allowing the inventor the sole opportunity to take advantage of his work for a period of time. Second, it ensures that useful technology becomes accessible to the general public by putting it in the public domain.

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7. U.S. CONST. art. I, § 8, cl. 8.

8. Patents last for seventeen years. 35 U.S.C. § 154 (1988).

An inventor who receives a patent[9] has essentially complete control over the subject of that patent. Under the current United States patent scheme, this control lasts for seventeen years.[10] During this period, the patentee has the right to "exclude others from making, using or selling the invention,"[11] and may exploit the invention both by manufacturing and selling the product, and by licensing it to others. If another person or company, by producing or selling the same product as that protected by the patent, infringes on the rights of the patent holder, the patent statute provides certain remedies. These remedies include injunction[12] or damages,[13] or both.

While the patent system provides economic incentives for innovation, it also provides incentives for abuse. Through the years, there have been numerous instances when a patentee has used the monopoly to increase its control over the marketplace. For instance, a common antitrust violation concerns practices referred to as "tying arrangements."[14] Under these arrangements, the patent holder conditions the grant of a license upon the licensee's commitment to use the licensor's unpatented product. Typically, the unpatented product is one which the applicant could manufacture itself.[15] These tying arrangements are just one example of patent abuse.[16]

It is important to note that in the United States, the patent scheme focuses almost exclusively on the aspect of economic incentive to the inventor. Unlike many other countries, United States patent and antitrust laws do not require: (1) that the inventor "work" the patent; or (2) that the inventor grant a license to work the patent.[17]

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9. In the United States, the inventor applies for a patent by following the process outlined in 35 U.S.C. §§ 111-122. The inventor applies through the U.S. Patent Office, and must show that the invention meets the requirements of 35 U.S.C. sections 101-03. If the invention meets the requirements, the Patent Office grants a patent.

10. 35 U.S.C. § 154 (1988).

11. *Id.*

12. *Id.* § 283 (1988).

13. If the court wishes, it may impose treble damages. *Id.* § 284 (1988).

14. *See, e.g.,* William J. Gilbreth & William H. Steinmetz, *Patent Misuse*, INTELLECTUAL PROPERTY/ANTITRUST 150 (1992).

15. *Id.*

16. For other types of patent abuse, see *id.* at 150-78.

17. Thomas A. Dieterich, *Interface Between Antitrust and Intellectual Property Law*, INTELLECTUAL PROPERTY/ANTITRUST 28 (1992) (citations omitted). In the United Kingdom, by contrast, there is a requirement that the inventor work the patent. If the inventor fails to

Indeed, the Patent Act specifically states that it is not a misuse of the patent to "refuse[] to license or use any rights to the patent."[18] It is therefore permissible for an inventor in the United States to patent an invention or process, and prevent others from using it for the entire seventeen years of the patent grant. Inventors will clearly do so if they benefit economically from withholding the invention.

Instances where an inventor may reap economic benefits by withholding a license are not common, but they do exist.[19] For example, it is beneficial to withhold the patent when the inventor uses the invention as a means to reduce costs to eliminate its competitors in the market. Competitors might be willing to pay a great deal of money to use such technology, so it might seem that the greatest economic gain is to sell or license the invention. However, the long term gains of securing a greater market share, or even of driving a competitor out of business, might well be of far greater benefit to the patent holder.

In a general sense, ignoring environmental concerns at this point, the problem remains that the current United States patent system may be contrary to the public interest. The patent grant is intended to provide the inventor with incentives to develop new technologies and make them available to the public. There is no benefit to the public when the system serves only one part of this purpose.

Foreign countries address such concerns, as does the United States to a very limited extent, with compulsory license schemes.[20]

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do so, the Comptroller of the patents may grant a compulsory license. C. T. TAYLOR & Z.A. SILBERSTON, THE ECONOMIC IMPACT OF THE PATENT SYSTEM 16 (1973).

18. 35 U.S.C. § 271(d)(4)(1988).

19. An example in the context of the Clean Air Act is discussed *infra* in section III. *See also* Kenneth J. Burchfiel, *Patent Misuse and Antitrust Reform: "Blessed Be the Tie,"* 4 HARV. J. L. & TECH. 1, 7 & n.30 (noting cases which confirm "the right to suppress an invention for economic advantage"). *See also* Gollin, *supra* note 6, at 213-14. Gollin discusses the use of public relations tools such as "green labeling." He also points out that the European Community is considering a label which businesses must put on *environmentally damaging* products. The symbol proposed is a "dead fish washed up at the foot of a barren tree. Such a symbol could drastically reduce demand for a consumer product." *Id.* at 214, n.113.

20. For example, in the United Kingdom, if the Comptroller of the patents determines that "a patented invention is not being commercially worked 'to the fullest possible extent that is reasonably practicable'" the Comptroller may grant a compulsory license. "Other

These schemes typically provide that if the inventor fails to "work" the invention (*i.e.* fails to allow access to the invention through manufacture or licensing), third parties may apply to the national government for a license to use that same invention.[21] In some situations, foreign intellectual property laws do not even require the potential licensee to show that the patent holder has failed to exploit the patent.[22] It is sufficient that the product is of a type covered by a compulsory license statute. For example, the Canadian government routinely grants compulsory licenses in the context of pharmaceutical patents.[23] Canadian laws allow manufacturers of generic drugs to develop medicines which are protected by patents granted to other manufacturers. The generic manufacturer may then sell the patented drugs upon payment of a royalty to the patent holder. Courts set the royalty, which is typically lower than those negotiated freely in the United States.[24] Canadian law is unusual in that a potential licensee is not required to show that the patent holder is abusing the monopoly in order to obtain a license.

The principle argument against a compulsory license scheme is that it may result in the patent holder not being able to fully recoup the costs of the research and development expended on the product. This concern is particularly acute in the pharmaceutical field, where research and development costs are extremely high, and where actual production and raw materials costs may be quite low. Compulsory licenses may lead to reduced incentives for investment in researching new drugs. Conversely, a compulsory license allows public access to new medicines at a market price, instead of at the monopolistic price which the United States consumer pays. Critics of United States' patent scheme cite examples of drugs which are inexpensive to

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grounds for granting a compulsory license include the failure to meet U.K. demand on reasonable terms . . . ." TAYLOR & SILBERSTON, *supra* note 17, at 16.

21. *Id.*

22. In Canada and India, the compulsory license mechanisms ensure that the patent holder cannot exclude others from using the invention. In these countries, the patent systems merely give the patent holder the right to be compensated. PHILIP W. GRUBB, PATENTS IN CHEMISTRY AND BIOTECHNOLOGY 276 (1986).

23. Gollin, *supra* note 6, at 221 n.31.

24. *Id.*

produce, but are sold for high prices because the manufacturer has a patent monopoly.[25]

In the more specific area of environmental protection, compulsory licenses have two particularly useful applications. First, as discussed in the next section, these licenses make it possible for regulators, such as the Environmental Protection Agency, to mandate the use of technology protected by a patent.[26] Absent the compulsory license, a polluter could validly claim that a certain required technology is not available. By using these licenses, however, the agency can insist that the polluter use a method or product which is patent-protected. Second, the compulsory license can be a crucial element in protecting biodiversity. A serious concern in protecting the diversity of life on this planet involves the incentives to preserve the valuable natural habitats of locations such as tropical rain forests. As discussed *infra,* the incentives presently encourage short term exploitation of resources, such as logging and mining. The rain forests, however, and many other types of habitat, harbor invaluable natural resources in the form of plant and animal species. If the citizens of the nations in which these biological resources are located have an incentive to preserve the diversity of life, they will do so. An opportunity to provide such an incentive exists by virtue of the intense research in the biotechnology field. The central issue in this area is that while industrial nations are the leaders in biotechnology development, most of the natural resources necessary for this technology are located in developing nations.[27] The usual result is that biotechnology companies buy natural resources at a low price,

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25. For example, the AIDS drug, AZT, is patented by Burroughs-Wellcome. The treatment currently costs about $3000 per year, and the directors of the National Institutes of Health believe the price of the drug would be reduced by one-half to two-thirds if there was no patent protection. *Agency Wants to End AIDS Drug Monopoly*, N.Y. TIMES, May 29, 1991, at 24. Similarly, the drug levamisole is very successful for treating colon cancer. For years, however, it was used to treat sheep for worm infestations. Johnson & Johnson now markets two versions of the drug, each identical. However, it costs one hundred times more for the human version than for the animal version. Gina Kolata, *U.S. is Asked to Control Prices of Drugs it Develops*, N.Y. TIMES, April 25, 1993, at 36. Furthermore, a cancer researcher is outraged that the human version is to be sold in Europe at a considerably lower price. *Id.*

26. *See* Section III(A)(ii), *infra*.

27. *See infra* note 99 (discussing the breadth of diversity in developing nations and contrasting this with the fact that most biotechnology firms are from the developed world).

process them, sell the products and reap large profits. The nation which is the source of the raw material gains nothing from the ensuing profits from the products. International treaties have attempted to address this issue through various types of technology transfer provisions.[28] Such provisions would enable the developing nation to reap some of the economic benefit of the technology. The most notable, most recent, and certainly most controversial of these treaties is the United Nations Framework Convention on Biological Diversity (hereinafter the Treaty).[29] At the time of the Convention, the biotechnology industry trade associations in the United States strongly opposed signing the Treaty and convinced President Bush that the Treaty would greatly reduce their rights as patent holders. Based on the industry association's claims, the President refused to sign.[30] President Clinton, however, encouraged by a reversal in the biotechnology industry position, signed the Treaty in June, 1993.[31]

A crucial aspect of a compulsory license is that it does not deprive the inventor of all benefits of the invention. The inventor will still receive royalties from the individual or entity granted the compulsory license.[32] The purpose of the compulsory license is not to punish the inventor, only to make it more likely for licenses to be granted in certain limited areas, such as those in which environmental values are at stake.

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28. *See* Gollin, *supra* note 6, at 214-15 and n.116 (discussing international treaties and conventions, such as the Patent Cooperation Treaty of 1970 and the Paris Convention of 1883 which attempt technology transfer to developing nations).

29. United Nations Framework Convention on Biological Diversity, June 5, 1992, 31 I.L.M. 818 (1992) [hereinafter *Treaty*]. Presently, over 150 nations have ratified the Treaty. Ken Miller, *Clinton's First Environment Issue Will be Treaty Rejected by Bush*, Gannett News Service, December 11, 1992, *available in* LEXIS, Environment Library, GNS File.

30. *Biotechnology: Industry Trade Groups Laud President Bush for Decision not to Sign Biodiversity Treaty*, 16 Chem. Reg. Rep. (BNA) 571 (June 12, 1992).

31. *U.S. Signs Biodiversity Treaty, Urges Global Patent Protection for Biotech*, 16 Int'l Envtl. Rep. (BNA) 432 (June 16, 1993).

32. A recurring criticism of compulsory licenses is that courts are not qualified to determine what is the proper royalty to be paid. At least one commentator believes that "[s]uch criticism is without merit because courts, when according relief for patent infringement, have for many years been assessing 'reasonable royalties.'" RAYMOND C. NORDHAUS & EDWARD F. JUROW, PATENT-ANTITRUST LAW 510, n.23 (2d ed. 1972).

III. THE IMPACT OF COMPULSORY LICENSES ON ENVIRONMENTAL REGULATION

There are two distinctly different fields in which compulsory license provisions will prove to be particularly useful as environmental safeguards. The first is the Clean Air Act ("the Act"), aspects of which necessitate a compulsory license mechanism. The second is the area of biological diversity, which requires compulsory licenses to encourage its protection.

A. Prevention of Pollution: The Clean Air Act

The basic purpose of the Clean Air Act is to "protect and enhance the quality of the Nation's air resources."[33] In an effort to achieve this goal, the Act provides industry with economic encouragement. Proponents of the 1990 Clean Air Act Amendments[34] have praised the manner in which the amendments combine environmental regulation with economic incentives.[35] One commentator claimed that this carrot and stick type of motivation will "signal a new era of integration between environmental and economic values."[36] However, within the regulatory and incentive aspects of the Act, areas exist where patent rights conflict, or at least intersect, with environmental goals. One such conflict arises when the Environmental Protection Agency (EPA) sets technology standards.[37] In doing so, the agency is often constrained by a determination as to "availability" or "achievability."[38] Because it can use a statutory compulsory license provision,[39] the EPA should not consider whether a technology is patented in either determination. A second area of concern involves the general incentives an inventor might have to keep a product or process inaccessible to others.[40] If such incentives exist, and if the invention is one which will help reduce pollution,

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33. 42 U.S.C. § 7401(b)(1) (1988).

34. *Id.* §§ 7401-7642 (1988).

35. Gollin, *supra* note 6, at 226-27.

36. *Id.* at 227.

37. *See infra* notes 45-46 and accompanying text.

38. For example, the EPA must require the states to insist on the "Lowest Achievable Emission Rate" when they grant a permit in a nonattainment area. 42 U.S.C. § 7503(a)(2) (1988).

39. The Clean Air Act compulsory license scheme is explained fully in this section.

40. *See infra* notes 59-62 and accompanying text.

then there is an environmental concern which can be addressed through compulsory licensing. Again, the agency should use this provision freely to ensure access to pollution reduction technology.

1. The Clean Air Act Compulsory License Provision

Section 308 of the Clean Air Act provides:

> Whenever the Attorney General determines, upon application of the Administrator [of the EPA]—
> (1) that—
> (A) in the implementation of the requirements of section 7411 [standards of performance for new stationary sources], 7412 [hazardous air pollutants], or 7521 [emission standards for new motor vehicles or new motor vehicle engines] of this title, a right under any United States letters patent, which is being used or intended for public commercial use and not otherwise reasonably available, is necessary to enable any person required to comply with such limitation to so comply, and
> (B) there are no reasonable alternative methods to accomplish such purpose, and
> (2) that the unavailability of such right may result in a substantial lessening of competition or tendency to create a monopoly . . ., the Attorney General may so certify to a district court of the United States, which may issue an order requiring the person who owns such patent to license it on such reasonable terms and conditions as the court . . . may determine.[41]

This provision is referred to in the statute as a "mandatory licensing" provision. The essence of the provision is that whenever the EPA can show that an invention or process is necessary for compliance with an emissions limitation, a federal court may grant a compulsory license. The license is not a complete eradication of patent property rights,

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41. 42 U.S.C. § 7608 (1988).

however, as the inventor is entitled to "reasonable" terms.[42] This qualification should ensure that inventors receive an adequate royalty.

When Congress enacted the Clean Air Act, commentators criticized the mandatory license provision, fearing that its invocation would reduce the incentive to innovate in the field of pollution control technology.[43] These concerns have proved to be unfounded, as the EPA has never used the provision.[44]

2. Determining Whether The Technology Is "Available"

When the EPA sets technology standards such as the "best available control technology" (BACT) or "lowest achievable emission rate" (LAER) standards, it is constrained somewhat by the statutory requirement that the technology must be "achievable" or "available."[45] The Agency must consider to what extent the technology will be available at the time a new facility begins production, and must also consider economic effects.[46] In evaluating the economic effects, at least one commentator suggests that the EPA must be sensitive to patent issues, and fears the situation in which the government requires as a technological standard a patented product or process which the patent owner refuses to license.[47] In such circumstances "[a] bind can result for a permit applicant who is required by regulators to use a technology, but is prevented by the patent owner from doing so."[48]

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42. Under the Clean Air Act, the license must be on reasonable terms. 42 U.S.C. § 7608. This requirement presumably refers to a standard patent damages doctrine which allows the inventor a reasonable royalty. LIPSCOMB, *supra* note 1, at § 27:23. Pursuant to this doctrine, the courts typically look at the royalty to which a willing licensor and a willing licensee would have agreed at the time of the infringement. *Id.* at 80-81.

43. *See, e.g.,* Warren F. Schwartz, *Mandatory Patent Licensing of Air Pollution Control Technology*, 57 VA. L. REV. 719, 743-44 (1971).

44. Gollin, *supra* note 6, at 223.

45. *A Critical Review of the Environmental Protection Agency's Standards for "Best Available Control Technology" Under the Clean Air Act,* [1990] 20 Envtl. L. Rep. (Envtl. L. Inst.) 10067, 10069.

46. In an evaluation as to what constitutes the BACT, for example, economic impacts are explicitly mentioned. 42 U.S.C. § 169(3) (1988).

47. Michael A. Gollin, *Patent Law and the Environment/Technology Paradox*, [1990] 20 Envtl. L. Rep. (Envtl. L. Inst.) 10171, 10173.

48. *Id.*

The compulsory license provision avoids the inequitable and environmentally unacceptable consequences of such a situation by allowing the applicant to use patented technology necessary to meet an applicable emissions standard.[49] Because the EPA can use the compulsory license provision to allow access to any patented invention or process, the technology is achievable because the Agency can make it so.[50] The point here is that the Agency should not, in setting an emissions standard pursuant to the Clean Air Act, consider whether a technology is patented. Because the EPA can make any technology "available" or "achievable," it should not determine that a method or procedure is unsuitable as a federal standard on the basis of its patent-protected status.

This, however, is precisely what the Agency does. For example, in October 1992 the EPA reviewed the best way to regulate perchloroethylene emissions from dry cleaners.[51] During its analysis, the Agency noted that one potential control device was patented.[52] EPA decided that the patent "would make such controls 'unachievable' for existing transfer machines."[53] The regulations for perchloroethylene standards, however, are promulgated pursuant to section 112 of the Act (regulating Hazardous Air Pollutants).[54] These standards therefore fall squarely within the scope of the statute's compulsory license provision.[55]

Because the EPA has the authority to apply for a compulsory license, it should not look into the patented nature of a technology when setting emissions standards. If the agency does take into consideration that an innovation is patented, and declines to demand

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49. 42 U.S.C. § 7608 (1988).

50. The provision appears to be restricted to technology standards set pursuant to sections 7411, 7412 and 7521 (new stationary sources, hazardous air pollutants and motor vehicle emissions). 42 U.S.C § 7608. However, the stricter BACT and LAER standards are promulgated pursuant to the standards of performance for new stationary sources (section 7411). Therefore, the compulsory license provision applies to technologies needed for compliance with BACT and LAER standards.

51. *Comment Sought on Two Unregulated Sources of Dry Cleaning Perchloroethylene Emissions*, 23 Envtl. Rep. (BNA) 1542 (October 9, 1992).

52. *Id.*

53. *Id.*

54. 42 U.S.C. § 7412 (1988).

55. *Id.* § 7608.

that innovation as the required standard, the environment does not receive the full level of protection Congress envisioned when it enacted the statute.

3. Making The Technology Available

In order to evaluate the impact of the Clean Air Act compulsory license provision on the availability of technology, this section will use the example of the technology standards for hazardous air pollutants. Under the Clean Air Act, new or existing sources which emit hazardous pollutants must comply with the strictest technology standard under the Act: the "maximum degree of reduction in emissions of the hazardous air pollutants . . . that the Administrator . . . determines is achievable."[56] For a new source, this standard "shall not be less stringent than the emission control that is achieved by the best controlled similar source . . . ."[57] Thus, if a company develops and implements a new technique for its facility which results in reduced emissions, the statute requires any new facilities emitting that pollutant to reach the same standard.[58] The inventing company will then have a guaranteed market for its method or invention. This guaranteed market certainly includes all new facilities within the category affected by the control technology, and could also include existing facilities if the EPA were to exercise the authority granted it through the compulsory license provision of the Act.[59]

While an inventor has the potential to receive huge profits in licensing a technology that the government requires polluting sources to use, there are at least three instances where the patent holder of an environmental technology may not wish to make that technology available to others in the industry. First, the inventing company may prefer to see others in the industry harmed by an inability to use the new process. Such harm could result in one of several ways under the

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56. *Id.* § 7412(d)(2).

57. *Id.* § 7412(d)(3).

58. *Id.* § 7412(d)(2).

59. For existing sources, there is a cost element which is absent in the determination of the standard for new sources. This "cost" element might consider the patented nature of a technology. However, this comment asserts that the patented nature of the technology is irrelevant, because the agency can seek a compulsory license. There is, therefore, no additional cost of any kind just because the product or process is patented.

Clean Air Act. Most obviously, the statute might require a competing facility to comply with a standard which is impossible to meet because the technology is not for sale. Penalties, legal fees and delays in production might ensue, giving the monopoly holder a competitive advantage. The inventing company might also inflict harm on the competition by using the patented process to reduce production costs. This circumstance would arise if the inventing company developed a process which simultaneously reduced emissions and increased plant efficiency. Increased efficiency leads to greater profits or lower production costs (or both), which in turn allows the inventing company to sell its product for a lower price than competitors. In such situations the patent holder would be able to undercut the costs, and therefore the prices, of competing facilities. In either of these cases there is potential for direct financial gain in not allowing a patent to become available to competing companies.

Second, the patent holder may wish to prevent others from using the patented process in order to create a negative public image of its competitors. Such a negative image would result if the patent holder were able to publicize itself as an environmentally responsible company, while competitors continue to belch dangerous fumes. With heightened public awareness of environmental concerns, corporate decision makers are according significant weight to the public's perception of a company. A corporation's reputation as being environmentally harmful could have distinct negative impacts on the balance sheet. If the strategy is successful, the competitors' sales may decline, resulting in a financial benefit for the patent holder. This benefit could be more valuable than royalty payments.[60]

Finally, certain regulatory mechanisms may provide the patent holder with an incentive to withhold technology from the public. The emissions trading scheme of the Clean Air Act is an example of such a regulatory mechanism. While trading is available under several sections of the Act, the most relevant example applies to the requirements for nonattainment plans:

> Such plan provisions shall include enforceable emission limitations, and other such control measures,

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60. *See, e.g.,* Gollin, *supra* note 6, at 221 (noting that a company holding a patent might refuse to allow a competitor a license in order to bring economic or public relations ruin upon that competitor).

> means or techniques (including economic incentives such as . . . auctions of emissions rights) . . . as may be necessary or appropriate to provide for attainment.[61]

Under this system, the EPA allocates a certain level of allowable emissions each year to certain pollution sources. The Agency then periodically reduces these allowances, compelling the facility to decrease its output of pollution. The economic incentive is that if the facility reduces its pollution output to a level below its allocation, it may sell the excess credits to other sources of pollution. Conversely, if it does not adequately reduce the emissions, it will be forced to buy credits. The emissions trading scheme provides an interesting mechanism for pollution reduction, and is potentially quite profitable for firms which are able to reduce their pollution production by an amount greater than the EPA requires. Congress has therefore incorporated mechanisms into the Act whereby the operators of sources of pollution which have the ability to go beyond the mandated reductions in emissions have an incentive to do so.

Currently, the Clean Air Act emissions trading programs are still developing. While emitters are trading allowances on the market, prices have not reached a point where there is a great incentive for polluters to enter the market.[62] As allowable emission levels are lowered, however, the value of the emission credits will increase, providing a greater incentive for the patent holder to accrue large reductions, while ensuring that competitors are not able to do so. As this situation develops, it is likely that the patent holder of a

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61. 42 U.S.C. § 7502(c)(6) (1988).

62. On the Chicago Board of Trade, the first round of public trades saw pollution credits being exchanged for $120 to $400 per ton. *See* Fred Munson, *Pollution For Sale, Only $120 Per Ton*, SACRAMENTO BEE B7, April 21, 1993. There have also been negotiations for at least two major private transactions at this price. First, Long Island Lighting Company is trying to sell 40,000 to 50,000 tons of credits each year to an undisclosed buyer, suspected to be in the midwest. The transaction is valued at between $10-20 million per year. The trade may be blocked by the state legislature, which is opposed to the idea of pollution credits going to the midwest, and then the resulting pollution blowing back into New York. Furthermore, Governor Cuomo of New York has filed suit to block the transaction. *See* Matthew L. Wald, *Suit Attacks Swap Plan on Pollution*, N.Y. TIMES, March 14, 1993, at 35. Second, the Wisconsin Power and Light Company has agreed to sell 10,000 tons of sulphur dioxide credits to the Tennessee Valley Authority for $2.5 million ($250 per ton). *See Utilities Swap Right to Pollute*, USA TODAY, at A1, May 13, 1992.

technology which results in reduced emissions will wish to withhold his product or process from the operators of other facilities. The owner of the patent monopoly will be able to exploit his invention at the expense of environmental progress.

The aforementioned illustrations are by no means exhaustive. There are many other justifications for patent abuse,[63] but these examples illustrate the basic point: there are circumstances where environmental protection will suffer because patent holders see greater economic benefit in withholding technology from others.

Supporters of the patent scheme argue that these concerns are a necessary incident to an intellectual property regime.[64] In order to encourage invention it is necessary to allow inventors the freedom to exercise their property rights as they wish. The exercise of these rights includes the right to withhold the patented material from the competition.[65] But this position presents particularly pressing conflicts in the area of federal environmental policy, such as a serious concern that patent rights may inhibit the attainment of air quality standards. Companies holding monopolies on technology which prevents or reduces air pollution have the incentive, and the ability, to seriously retard progress toward cleaner air.

The compulsory license is an important safeguard which the EPA should use more aggressively. As discussed previously, most countries require that a patented invention be "worked."[66] Unfortunately, there is no such requirement in the United States, so instead we must rely primarily on the statutory compulsory license provision.[67] Although the EPA has never exercised the provision, it

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63. *See, e.g.,* William J. Gilbreth & William F. Steinmetz, *supra* note 14, at 150-78 (1992).

64. In the specific area of biotechnology patents, some commentators have argued that broad patent protection furthers public policy because it results in increased investment in research and development. Kevin J. McGough & Daniel P. Burke, *A Case for Expansive Patent Protection of Biotechnology Inventions*, 6 HARV. J.L. & TECH. 85, 101 (1992).

65. Note that withholding the patent from others is a right only in the United States. *See* Report by the Committee of Experts on Restrictive Business Practices, *Restrictive Business Practices Relating to Patents and Licenses* 9-10 (Organization for Economic Cooperation and Development 1973) [hereinafter *Restrictive Business Practices*]. *See also* C.T. TAYLOR & Z.A. SILBERSTON, THE ECONOMIC IMPACT OF THE PATENT SYSTEM 16 (1973).

66. *See supra* note 17 and accompanying text.

67. *See supra* notes 41-42.

is likely that the compulsory license scheme nevertheless has an effect on patent holders. In 1982 the American Bar Association section of Patent, Trademark and Copyright Law conducted a survey in an attempt to ascertain the effects of the compulsory licensing provision of the Clean Air Act.[68] In this survey, the ABA found that the mandatory licensing provision did have an effect on one type of decision made by companies involved with innovation in the pollution control market. The affected decision was the determination as to whether to invest resources into a particular idea. In such decision making, of the companies aware of the mandatory licensing section, 16.13% took it into account.[69]

Another type of decision made by companies was whether to actually grant a license once a product has been developed. In such situations, the survey indicated that the provision for mandatory licensing was not a factor.[70] Interestingly, however, these statistics were compiled before implementation of the emissions trading program, when incentives to withhold licenses were not as strong.[71] Furthermore, because EPA has not invoked the compulsory license provision, it is difficult to understand how a company would take it into consideration. By 1982, when the ABA conducted its study, industry knew that it had little to fear from this portion of the statute.

Similarly, a 1973 report on patent abuse noted that since mandatory licensing procedures have seldom been used, their effectiveness is difficult to evaluate.[72] The report goes on to state, however, that "the very fact that such measures exist has a positive influence on the way in which patentees work their patents or grant licenses."[73] The report later notes that regulators must pay close attention to the patent system because corporate inventors can, by granting or refusing licenses, "exercise excessive economic power."[74]

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68. *Report of Subcommittee B, Committee 405 on its January 1982 Survey Relating to Section 308 of the Clean Air Act of 1970*, 1982 ABA Sec. Pat., Trademark and Copyright Law Rep. 222 (August, 1982) *available in* LEXIS, Trademark Library, PTCLAW File.

69. *Id.* at LEXIS p.11.

70. *Id.*

71. The Committee Report was presented to an annual meeting of intellectual property attorneys in California in August, 1982. *Id.*

72. *Restrictive Business Practices*, *supra* note 65, at 19-21.

73. *Id.* at 20.

74. *Id.* at 21.

4. The Equitable Compulsory License

Under United States patent law, the holder of a patent is allowed to seek certain remedies in an infringement action. These remedies include the possibility of an injunction prohibiting the infringer from using the patented product or process.[75] The courts "may grant injunctions in accordance with the principles of equity."[76] Interestingly, courts are not obligated to grant injunctions. They are free to balance the equities and grant an injunction if it is appropriate.

So how should a court handle a situation in which an industrial emitter of a pollutant uses, without authorization, a patented process to reduce those emissions? If the emitter had made a good faith effort to obtain a license, and possibly even if it had not, it seems that the equities would prevent the court from granting an injunction preventing the use of the technology. Indeed, there is at least one case in which a court noted a concern for public health, and felt "impelled" to deny the request for injunctive relief.[77] In *City of Milwaukee v. Activated Sludge,* the patent holder developed a new process for treating raw sewage. The infringer was a city sewage treatment plant. The United States Court of Appeals for the Seventh Circuit found that there was clearly infringement, but would not enjoin the city from using the process.[78] The court noted that if it were to uphold the injunction granted by the trial court, "it would close the sewage plant, leaving the entire community without any means for the disposal of raw sewage other than running it into Lake Michigan, thereby polluting its waters and endangering the health and lives of that and other adjoining communities."[79]

This reasoning is equally applicable where a technology is needed to help a facility comply with an EPA emission requirement. Given the nature and toxicity of modern emissions, the case of air emissions is at least equally as compelling as the grim scenario envisioned by the court in *City of Milwaukee*. If the EPA is unwilling to use its statutory grant of power to apply for a compulsory license, courts should be liberal in their application of the rules of

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75. 35 U.S.C. § 283 (1988).
76. *Id.* § 283.
77. City of Milwaukee v. Activated Sludge, 69 F.2d 577, 593 (7th Cir. 1934).
78. *Id.*
79. *Id.*

equity when determining whether to enjoin use of an environmentally beneficial technology. The "public interest" is still a factor in determining whether to grant an injunction in patent cases.[80] However, unless the factor is given more weight, there will be little incentive for a patent holder to freely grant licenses of its own accord.

B. Maintaining Biological Diversity

1. Biological Riches

> Every country has three forms of wealth: material, cultural and biological. The first two we understand well because they are the substance of our everyday lives. The essence of the biodiversity problem is that biological wealth is taken much less seriously.[81]

It is difficult to accurately determine how many species of living creatures inhabit this earth, and estimates range from several millions to one hundred million.[82] This diversity of life is absolutely necessary for the healthy development of the planet on which we live.[83] It is also difficult to estimate at what rate these species are

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80. *See e.g.* E.I. du Pont de Nemours & Co. v. Phillips Petroleum, 659 F. Supp. 92, 94 (D. Del. 1987) (citing Roche Prods. v. Bolar Pharmaceutical Co., 733 F.2d 858, 865-66 (Fed. Cir. 1984)).

81. EDWARD O. WILSON, THE DIVERSITY OF LIFE 311 (1992).

82. "No one knows, even to the nearest order of magnitude, how many life forms share the planet with humanity: roughly 1.4 million species have been identified, but scientists now believe the total number is closer to 10 million, and it may be as high as 80 million." JOHN C. RYAN, LIFE SUPPORT: CONSERVING BIOLOGICAL DIVERSITY 5 (WORLDWATCH PAPER NO. 108 1992). *See also* WILSON, *supra* note 81, at 132-33 (noting that the number might be as high as one hundred million species). Wilson points out that evolutionary biologists generally agree that the number of species currently identified is less than one tenth of what actually lives on earth. *Id.* at 133. *See also* Robert C. Cowen, *U.S. Should Take Lead in Preserving Biological Diversity*, TECH. REV., August 1987, at 25.

83. The United States National Academy of Sciences, in conjunction with the British Royal Society, recently identified four principal arguments for maintaining biological diversity: (1) the moral argument that each generation has a moral obligation to pass on the biological diversity it inherited to the next generation; (2) the uncertainty argument, focusing on our ignorance of the relationship between species diversity and ecosystem; (3) the agricultural necessity of maintaining wild strains as a gene pool; and (4) the economic argument that there may be many species as yet unidentified which could have enormous

becoming extinct. But it is clear that the rate of extinction is increasing exponentially.[84] This tremendous rate of extinction has a serious impact on the biological diversity of the planet.[85]

Biological diversity faces its most severe crisis in the tropical rain forests.[86] Tropical rain forests are essential to the health of the planet because they contain one half of the planet's life forms.[87] But by 1989 ranchers, loggers and miners destroyed the rain forests at the rate of 142,000 square kilometers per year.[88] The crux of the problem is that the "poorest people with the fastest growing

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potential for medical or industrial applications. *Royal Society/ NAS on Biodiversity*, BIOTECHNOLOGY BUSINESS NEWS, July 31, 1992. For a fuller discussion of the necessity to preserve wild agricultural strains, *see* AL GORE, EARTH IN THE BALANCE 126-44 (1992). *See generally* WILSON, *supra* note 81, at 311-12 (arguing that it is both beneficial and necessary to preserve diversity to the greatest extent possible).

84. "Extinction has been much greater even among larger, more conspicuous organisms than generally recognized." WILSON, *supra* note 81, at 244. Wilson believes that a conservative number of the species lost each year is 27,000. *Id.* at 280. Human activity has increased the extinction rate by between 1,000 and 10,000 times over the normal "background" extinction rate. *Id.* Vice-President Gore writes that "living species of animals and plants are now vanishing around the world *one thousand times faster* than at any time in the past 65 million years." GORE, *supra* note 83, at 24 (emphasis in original). At this rate of extinction, he believes that by the year 2000, one hundred thousand species will be lost each year. *Id.* at 24. Another writer suggests that "several species are now vanishing every day. This extinction rate is expected to climb to several hundred a day in the next two decades." Cowen, *supra* note 82, at 25.

85. The Treaty defines biological diversity as "the variability among living organisms from all sources including, *inter alia*, terrestrial, marine or other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems." *Treaty, supra* note 29, at art. 2. Biological diversity has also been defined as "the ecosystems, species and genes that together constitute the living world." RYAN, *supra* note 82, at 5. "Biological diversity . . . is collapsing at rates that can only be described as mind-boggling." *Id.*

86. In the tropical rain forests alone, tens of thousands of species are "extinguished or condemned to eventual extinction by the destruction of their habitat." *Id.*

87. *Id.* at 7. *See also* WILSON, *supra* note 81, at 198-99. The reasons for the high concentration in the tropical rain forests include, among other things, the high energy level (heat energy), greater biomass production, the narrowing of geographical ranges, and a stable climate. WILSON at 201.

88. WILSON, *supra* note 81, at 275 (noting that in 1989 the surviving rain forests occupied an area about the size of the 48 states, and was being reduced each year by an area the size of Florida).

populations live next to the richest deposits of biological diversity."[89] For example, Brazil, a country considered to have the highest species diversity on earth, has a debt burden of $120 billion, staggering poverty, and one of the most unequal wealth distributions in the world.[90] And while Brazil's rain forests are hubs of diversity, they are also rich in timber[91] and minerals.[92] Because Brazil is so poor, the inhabitants are by necessity driven by economies which require immediate returns on investment. Brazilians therefore engage in destructive activities such as mining, logging and ranching in order to feed their families.

2. Banking the Wealth

In order to facilitate the protection of areas such as the tropical rain forests, and the biological diversity therein, it is essential to provide some form of economic benefit[93] to the developing nations within whose borders the forests lie.[94] As the biotechnology industry reaches maturity, a unique opportunity presents itself.

Biotechnology involves the "production of useful products by living micro-organisms and cell cultures."[95] Man has used the basic concept for centuries, by producing ethanol from yeast cells, for example.[96] However only in very recent years has the technology been available to even begin to take full advantage of the natural

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89. *Id.* at 282.

90. Marguerite Holloway, *Sustaining the Amazon*, SCIENTIFIC AMERICAN 90, 92 (July 1993).

91. Mahogany is an example of a particularly valuable commodity. *Id.* at 93.

92. *Id.*

93. This comment does not address another important argument for the preservation of biological diversity—the ethical argument that man is obligated to preserve the biological riches entrusted to his care. This comment is concerned solely with the economic motives and incentives for preservation of this priceless resource. For a brief discussion of the ethical considerations, see, e.g., WILSON, *supra* note 81, at 346-51.

94. For a general evaluation of how the needs of local inhabitants can be successfully merged with conservation in Africa, see generally RAYMOND BONNER, AT THE HAND OF MAN (1993).

95. GRUBB, *supra* note 22, at 150. Similarly, the Treaty itself defines biotechnology as "any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific use." *Treaty, supra* note 29, art. 2.

96. GRUBB, *supra* note 22, at 150.

wealth of the planet.[97] Today, biotechnology companies are making huge strides in pharmaceuticals, agriculture and industrial production.[98] Industrial nations, the United States in particular, are investing time and other resources at a growing rate in such technologies. The United States remains the clear leader in the field and has a strong desire to remain in this position.[99]

While the major biotechnology companies are located in the industrialized nations, the resources and raw materials they utilize are found in the developing world.[100] This situation presents itself as an ideal opportunity for cooperation between the wealthiest and the poorest nations on earth. However, while biotechnology firms have had unlimited access to the developing world's genetic diversity on the theory that the natural resources are a "common heritage of mankind,"[101] these companies have been unwilling to share the benefits of technological advances derived from research into tropical

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[97]. *Id.* at 64. For example, "[d]rugs derived from anticoagulants produced by snakes, ticks and vampire bats [could] soon help prevent clogged arteries." RYAN, *supra* note 82, at 25. Similarly, the rosy periwinkle, a small plant from Madagascar, can cure most victims of two types of cancer, Hodgkin's disease, and a type of leukemia. WILSON, *supra* note 81, at 283. Additionally, "[i]t can be safely assumed that a vast array of other beneficient but still unknown species exist." WILSON, *supra* note 81, at 281.

[98]. It is in these fields in particular that the greatest progress has been anticipated. *See, e.g.,* United Nations Centre on Transnational Corporations, TRANSNATIONAL CORPORATIONS AND THE TRANSFER OF NEW AND EMERGING TECHNOLOGIES TO DEVELOPING COUNTRIES 1990, 64, U.N. Doc. ST/CTC/98, U.N. Sales No. E.90.II.A.20 (1990) [hereinafter TRANSNATIONAL CORPORATIONS]. *See also* WILSON, *supra* note 81, at 283-87 (discussing the medicinal value of various plant species).

[99]. Ken Miller, *Clinton's First Environment Issue Will be Treaty Rejected by Bush*, Gannett News Service, December 11, 1992, *available in* LEXIS, Environment Library, GNS File.

[100]. For example, Costa Rica, a small nation in Central America, is estimated to contain almost five percent of all species in the world. *Deal Between Drug Firm, Costa Rica Called Example of What Treaty Would Do*, [1992] 15 INT'L L. REP. (BNA) 398 (June 17, 1992). Similarly, Herman Verbeek, the Dutch Member of the European Parliament recently pointed out that "90 percent of the genetic resources which are used in our agricultural production come from the Third World." *Patent Directive Moves Ahead*, BIOTECHNOLOGY NEWSWATCH, October 16, 1992. A major reason that the developing countries do not participate directly in the biotechnology industry is that while they "account for 77 percent of the world's population, they have only 6 percent of the world's scientists and engineers." *Royal Society/NAS on Biodiversity*, BIOTECHNOLOGY BUSINESS NEWS, July 31, 1992.

[101]. RYAN, *supra* note 82, at 33.

life forms. Instead, the major biotechnology companies have preferred to use intellectual property rights to ensure large profits.[102] Needless to say, the developing nations are unwilling to continue protecting their genetic resources when the benefits, economic and otherwise, are realized only in the industrialized world.[103] The result has been continued eradication of the tropical rain forest for the sake of logging, grazing and mining. Even state-designated "protected areas" are not adequately conserved. For example, the Indonesian government permits logging in National Parks.[104] Similarly, Ecuador's Podocupus National Park, one of the most important centers for biological diversity, is almost completely leased to mining companies.[105]

3. Encouraging Protection: The Biodiversity Convention

> If dwindling wildlands are mined for genetic material rather than destroyed for a few more boardfeet of lumber and acreage of farmland, their economic yield will be vastly greater over time.[106]

Recognizing that market forces will not adequately protect biological diversity, the United Nations Environment Programme (UNEP) has spent several years coordinating negotiations for an international agreement designed to protect this priceless global asset.[107] These negotiations culminated in the United Nations Framework Convention on Biological Diversity (Treaty) which was

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102. "Increased use is being made of patents . . . to maintain a dominant role in the production and marketing of the research results." TRANSNATIONAL CORPORATIONS, *supra* note 98, at 65. *See also* RYAN, *supra* note 82, at 33-34.

103. RYAN, *supra* note 82, at 20. African conservationists face a similar problem, in that it is difficult to convince local tribesmen to protect elephants when these huge beasts cause damage to personal property and crops with no countervailing benefit. Recently, however, there has been some success in programs designed to create incentives for tribes situated in sensitive areas. Although these programs may even allow limited exploitation of resources, including hunting, they seem to have potential to improve conservation in Africa. *See* BONNER, *supra* note 94, at 276-78.

104. RYAN, *supra* note 82, at 19-20.

105. *Id.*

106. WILSON, *supra* note 81, at 282.

107. *Patent Attorneys See No Immediate Threat In Rio Treaty*, BIOTECHNOLOGY NEWSWATCH, June 15, 1992.

opened for signature in Rio de Janeiro on June 12, 1992.[108] A broad goal of the Treaty is to "protect species and ecosystems by allowing biologically rich nations, most of which are developing nations, to restrict the use of their resources, especially by technologically rich Northern nations."[109]

To date, well over one hundred and fifty nations have signed the Treaty,[110] including the United States.[111] However, it was not always clear that the United States would be a party to the Treaty. President Bush had refused to sign, at the request of the major American biotechnology industry associations.[112] The principle objection made by the Bush Administration echoed the concern of the United States biotechnology industry: the Treaty would harm the United States' lead in biotechnology innovation by eroding the incentive to engage in genetic research.[113] This erosion would occur by virtue of provisions designed to allow for technology transfer to developing nations, and which would permit the use of compulsory licenses.[114]

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[108]. *See, supra* note 29.

[109]. *Leak of Reilly Cable on Biodiversity Treaty Said to Eliminate Possibility of U.S. Signature*, [1992] 23 Environment Reporter (BNA) 646, 647 (June 12, 1992). The Treaty itself states its goals as "the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources . . . ." *Treaty*, *supra* note 29, art. 1.

[110]. Ken Miller, *Clinton's 1st Environment Issue Will Be Treaty Rejected by Bush*, Gannett News Service, December 11, 1992, *available in* LEXIS, Environment Library, GNS File.

[111]. *U.S. Signs Biodiversity Treaty, Urges Global Patent Protection for Biotech*, 16 Int'l Envtl. Rep. (BNA) 432, June 16, 1993.

[112]. *Industry Trade Groups Laud President Bush for Decision Not to Sign Biodiversity Treaty*, [1992] 16 Chem. Reg. Rep. (BNA) 571 (June 12, 1992).

[113]. *Id.*

[114]. The controversial provisions of the Treaty are as follows:

Article 16(3) provides that each nation signing the treaty:

> shall take . . . measures . . . with the aim that Contracting Parties, in particular those that are developing countries, which provide genetic resources are provided access to and transfer of technology which makes use of those resources, on mutually agreed terms, including technology protected by patents . . . .

Article 16(4) states that:

> Each contracting party shall take . . . measures . . . with the aim that the private sector facilitates access to joint development and transfer of

The compulsory license provisions[115] would allow the genetically rich, but economically poor, developing nation to insist that technology arising out of its resources be available domestically. If the biotechnology firm elects to make the technology available only outside the country where it discovered the resource, that nation may obtain a compulsory license.[116] These compulsory licenses would enable domestic companies to exploit the resource, at least within the borders of that country. The effect of this provision is that the biotechnology company will either "work" the patent in the host nation, thus creating jobs and making the innovation available, or it will not work the patent, thus leaving domestic industry with the opportunity to produce and market the product. In either instance, there is an economic benefit to the nation in which the resources are located. This economic incentive will encourage the inhabitants of genetically rich countries to preserve their natural wealth.

In the United States, industry associations argued that because the American biotechnology companies would have reduced patent rights, the United States would lose their international lead in biotechnology innovation. President Bush agreed with this proposition, and refused to sign the convention.[117] In addition to

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> technology . . . for the benefit of both governmental institutions and the private sector of developing countries . . . .

Article 19(2) provides that the signatories:

> shall take all practicable measures to promote and advance priority access on a fair and equitable basis . . . to the results and benefits arising from biotechnologies based upon genetic resources provided by those Contracting Parties . . . .

Treaty, supra note 29. These provisions are identified and reprinted in *Industry Trade Groups Laud President Bush for Decision Not to Sign Biodiversity Treaty*, 16 Chem. Reg. Rep. (BNA) 571 (June 12, 1992).

115. The Treaty does not explicitly mention compulsory licensing, nevertheless trade experts believe that Article 16, Paragraph 4 authorizes such arrangements. *Biodiversity Treaty Risks Interfering With Patent Protections, Official Says*, 9 Int'l Trade Rep. (BNA) 1072, June 17, 1992.

116. *Treaty*, *supra* note 29, art. 16, para. 4.

117. President Bush seemed to think that compulsory license provisions would reduce the incentive to biotechnology firms. President Bush felt that this reduced incentive would lead to reduced innovation, less technological advances, and less jobs in the United States. While he did not offer alternatives, President Bush stated during the 1992 presidential debates that the way to protect biodiversity was not to "enter into a treaty that fails to protect America's property rights, fails to protect those to whom the world is looking for scientific

their concerns about the intellectual property impacts of the Treaty, biotechnology industry attorneys did not like the Treaty's "overall sentiment . . . that its signatories should not rely on the free market to work out technology arrangements."[118]

With regard to compulsory licensing, industry officials explained how they feared the Treaty would work:

> [I]f a U.S. firm made a product using genes derived from organisms that are indigenous to a particular country, the company would either have to share its profits with the country or grant a license to businesses in that nation to make the product.[119]

Such a requirement, industry argued, would reduce the incentive to U.S. companies to invest in the high-risk biotechnology field, thus eroding their competitive edge in the international arena. The opponents of the Treaty also argued that the agreement would allow developing countries to "pirate" the innovations of U.S. companies.[120]

In reality, the Treaty would do little that the genetically rich nation could not accomplish anyway. It is always possible for the nation in which the resources are located to enter into private agreements with the biotechnology firms. As an example of such a private agreement, both those for and those against the Treaty point to the 1991 agreement between Merck Pharmaceuticals and Costa Rica.[121] Under that agreement, Merck paid the Costa Rican government for the right to prospect for genetic resources. If Merck develops a commercially viable product through this research, half of the royalties will go to the Costa Rican government's National Park

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advancement and technological advancement." 28 Weekly Comp. Pres. Doc. 2201 *available in* LEXIS.

118. *Biodiversity Treaty Risks Interfering With Patent Protections, Official Says*, [1992] 9 Int'l Trade Rep. (BNA) 1072 (June 17, 1992).

119. *Treaty Wording Too Vague, Poses Risk to Biotech Firms, U.S. Industry Official Says*, [1992] 15 Int'l Envtl. Rep. (BNA) 822 (December 16, 1992).

120. *Id.* The industry representative further noted that many developing countries have a history of appropriating U.S. technology. *Id.*

121. *Deal Between Drug Firm, Costa Rica Called Example of What Treaty Would Do*, 15 Int'l Envtl. Rep. (BNA) 398 (June 17, 1992).

Fund for the conservation of rain forests.[122] This agreement clearly gives the host nation a substantial incentive to preserve its genetic resources. It is precisely this type of accommodation which will hopefully be encouraged by the Treaty. But where such agreements cannot be made, the Treaty provides an incentive by authorizing compulsory licenses.

Many supporters of the Treaty have criticized the initial position of the biotechnology industry,[123] and the Bush Administration's refusal to sign the agreement.[124] There are two fundamental bases for such disagreement. First, groups such as the Environmental and Energy Study Institute maintain that the Treaty will not jeopardize intellectual property rights any more than is currently considered acceptable in other international accords.[125] The Institute believes that the United States won a major concession at the final round of negotiations when "countries agreed to include a sentence that calls for 'adequate and effective protection.'"[126] The

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[122]. The agreement provided for a $1 million (U.S.) payment by Merck to Costa Rica, and thereafter an equal sharing of royalties derived from commercially viable products. *Id. See also Protections Provided in International Pacts Seen As Best Framework for Bioprospecting*, 16 Int'l Envtl. Rep. (BNA) 453 (June 16, 1993). However, Hope Shand, the director of Canadian-based Rural Advancement Foundation International, believes that the agreement is "very dangerous . . . . [INBio, the Costa Rican government agency created to preserve biological diversity] traded that material for a pittance." Shand is concerned that agreements such as this might undermine efforts to address the issue on a global scale. Jonathan W. King, *Breeding Uniformity: Will Global Biotechnology Threaten Global Biodiversity?*, THE AMICUS JOURNAL, Spring, 1993, at 30.

[123]. The United States biotechnology industry associations have recently reversed their position, and now support the Treaty. They realize that it is as much in their interest as anyone else's to preserve biological diversity. Furthermore, American biotechnology firms want to be sure that they are present at international negotiations on biodiversity. These negotiations will likely only involve those nations which are signatories to the Treaty. Furthermore, even if the U.S. or the biotechnology firms are able to attend as non-signatories, their influence at negotiations would be lessened by that status. *Industry Wants U.S. to Sign Treaty by Deadline Even if Statement Unfinished,* 16 Int'l Envtl. Rep. (BNA) 416 (June 2, 1993).

[124]. *See, e.g.,* Dianne Dumanoski and John Mashek, *US is Isolated in Opposing Biodiversity Treaty*, BOSTON GLOBE, June 6, 1992, at 4.

[125]. *See, e.g., U.S. Objections to Biodiversity Treaty Based on Misreading of Text, Study Says*, [1992] 15 Int'l Envtl. Rep. (BNA) 704 (November 4, 1992)(discussing a study on the Treaty conducted by the Environmental and Energy Study Institute).

[126]. *Id.*

Institute explains that ". . . this phrase is a term of art in international trade law. It specifies a minimum standard for protection of intellectual property rights that the United States demands of its trading partners . . . ."[127] Furthermore, the Environmental and Energy Study Institute maintains that the Treaty will not prevent parties from negotiating stronger intellectual property rights under the General Agreement on Tariffs and Trade.[128]

Second, supporters of the Treaty also argue that even if the agreement does detrimentally impact domestic patent protection, this is not necessarily an evil result. These supporters argue that the developing nations deserve some benefit from their genetic resources. There are two bases for this argument: (1) "fair's fair": the nation in which the resources lie is entitled to a share in the financial reward; and (2) aside from the equities, if the local people derive a benefit to preserving the rain forest, they will be less likely to resort to destructive practices in order to reap short term rewards.

In support of the first basis, Mostafa Tolba, the former Executive Director[129] of the United Nations Environment Programme pointed out that the relationship is a "two way street."[130] Tolba noted that "[u]nder the terms of the Treaty, developed countries will have a degree of access to biological resources of developing countries, and developing countries will have new access to the technological resources of industrialized countries."[131] In a similar vein, a member of the European Parliament noted the huge proportion of genetic resources which come from developing countries. Given such a situation, he stated, "for the biotechnology industry to demand monopoly property rights over . . . [the genetic resources] is utterly unjustifiable."[132]

The Biological Diversity Treaty is a step toward encouraging developing countries to preserve their natural resources. Before

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127. *Id.*

128. *Id.*

129. Tolba retired as executive director at the end of 1992. *UNEP Must Shift Focus, Move to Era of Action, Executive Director Says*, 16 Int'l Envtl. Rep (BNA) 195, (March 24, 1993).

130. Dumanoski & Mashek, *supra* note 124, at 4.

131. *Id.*

132. *Vote on Proposal to Protect Biotech Patents Delayed to Ensure No Conflict With Treaty*, [1992] 15 Int'l Envtl. Rep. (BNA) 398 (June 17, 1992).

biotechnology, the only resources with value were extractive, or at least damaging: logging, mining, and ranching. Until recently, conservation was a luxury practiced only by those fortunate enough to live in developed nations. But now that industry places a value on genetic diversity, developing nations will be able to act in environmentally responsible ways and reap economic benefits.

IV. PROBLEMS, CONCERNS, SUGGESTIONS

In an analysis of how compulsory licensing can positively impact the environment, it is useful to distinguish activities that are environmentally beneficial from those that are harmful.[133] This section discusses intellectual property rights as they fit into these two models, and focuses on the potential for protecting the environment.

A. Encouraging Innovation That is Environmentally Beneficial

The Clean Air Act's mandatory licensing provision is an example of how the intellectual property regime may be modified in order to accommodate overriding considerations such as environmental protection. Because of the importance of assuring optimum air quality, it is necessary to contravene traditional patent principles. It is essential to provide for a way in which patent rights are prevented from becoming a barrier to environmental progress.

For example, when it evaluates the state of the art pollution control technologies, the government should not be forced to consider whether the technology is subject to a patent monopoly. Indeed, the government should not be permitted to do so. It is not altogether clear whether the EPA considers patent protection as a factor in setting BACT and LAER, but it clearly does consider this element in setting other technology standards.[134] Due to the mandatory license provision, however, it is not appropriate for the EPA to consider whether the technology is covered by a patent, thereby increasing the cost of implementation to the polluter. Because of the mandatory license provision, the Agency can apply to the Attorney General for a license which would allow facilities in the regulated industry to use the technology.[135] The Agency should freely use this tool as a means

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133. *See* Gollin, *supra* note 6, at 194.

134. *See* discussion of perchloroethylene standard, *supra* notes 51-54.

135. 42 U.S.C. § 7608 (1988).

to improve the standard of pollution control technology used by industry.

As discussed above, there are also instances in which an inventor may prefer to withhold from other facilities a patented product or process which reduces pollution.[136] In such circumstances, there is a statutory means to ensure that the invention is available should a polluter require it to reduce its emissions.

For both of these reasons, the mandatory licensing provision of the Clean Air Act is an extremely important element. It gives the EPA the authority to prevent a patent holder from retarding environmental progress, and it allows the Agency to set environmental standards based on the newest technology without considering the patented nature of that technology.

B. Discouraging Activities That are Environmentally Detrimental

The Bush Administration feared the negative impact of compulsory licensing on the domestic biotechnology industry.[137] Given the language of the Treaty,[138] and its consistency with other international agreements, this fear was unjustified. Moreover, the United States could have lost even more by not participating in a treaty signed by over one hundred and fifty nations. While the domestic biotechnology industry is not impacted by the Treaty through domestic law, it would clearly have been impacted as it sought to exploit resources abroad.[139] A striking example of such an impact involves Venezuela's response to the United States' refusal to sign the Treaty. Venezuela stopped signing new agreements for scientific collaboration with United States companies that wished to study genetic resources.[140] At the time of the conference in Rio de Janeiro, international environmental organizations had predicted such

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136. *See supra* notes 60-64 and accompanying text.

137. *Industry Trade Groups Laud President Bush for Decision Not to Sign Biodiversity Treaty*, [1992] 16 Chem. Reg. Rep. (BNA) 571 (June 12, 1992).

138. *Treaty, supra* note 29.

139. *U.N. Biodiversity Treaty Seen Likely to Affect U.S. Biotech Firms*, [1992] 15 Int'l Envtl. Rep. (BNA) 636 (October 7, 1992). The article notes that even those who support the United States position at the Rio de Janeiro conference believe that U.S. companies will have to conform to the Treaty.

140. *U.S. Objections to Biodiversity Treaty Based on Misreading of the Text, Study Says*, [1992] 15 Int'l Envt. Rep. (BNA) 704 (November 4, 1992).

action. Noting that countries that would not sign the Treaty would lose jobs, one expert pointed out that:

> Non-governmental organizations, governments, universities, and private corporations will lose out when countries [restrict] access to their genetic material to only those who signed the convention.[141]

If profit sharing arrangements become the norm due to other nations participation in the Treaty, the United States will have few options but to follow the lead of companies which have privately arranged for such sharing. This would occur irrespective of the Treaty. In an attempt to draw a firm line, representatives of biotechnology trade groups in the United States have warned that any dilution of intellectual property rights would be a disincentive to member companies to participate in the economies of developing nations.[142] This threat rings hollow, however, as the United States biotechnology companies need access to the resources at least as much as the host nations wish to allow the access. Perhaps realizing the necessity of signing the Treaty so as not to be excluded from opportunities, some industry figures have recently changed their position and supported the U.S. decision to sign the agreement.[143]

Furthermore, even if there is a lessened incentive in the biotechnology field, surely the non-economic reward from the conservation of biological diversity is worth some sacrifice in the area of domestic technological progress. If that is not reason enough, even if the Treaty does result in economic loss of ground today in the United States, there will be a much greater economic loss globally,

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[141]. *Leak of Reilly Cable on Biodiversity Said to Eliminate Possibility of U.S. Signature*, [1992] 23 Envtl. Rep. (BNA) 646 (June 12, 1992) (quoting a statement of Russell Mittermeier, President of Conservation International).

[142]. *Biodiversity Treaty Risks Interfering With Patent Protections, Official Says*, [1992] 9 Int'l Trade Rep. (BNA) 1072 (June 17, 1992).

[143]. *See, e.g., Industry Wants U.S. to Sign Treaty by Deadline Even if Statement Unfinished,* 16 Int'l Envtl. Rep. (BNA) 416 (June 2, 1993). *See also Dow Chemical Chief Says Clinton Should Sign Biodiversity Treaty*, [1993] 16 Chem. Reg. Rep. (BNA) 2386 (March 12, 1993). Even at the time Bush refused to sign the treaty, some industry leaders disagreed with the refusal. For example, many members of the Genentech staff, including scientists and management, sent a letter to Bush noting that they, and others in the industry, supported the treaty. *Biodiversity Treaty Triggers More Controversy*, BIOTECHNOLOGY BUSINESS NEWS (July 17, 1992).

and within the U.S., should we accidentally eliminate genetic resources yet to be fully understood.[144]

The intellectual property provisions of the United Nations Framework Convention on Biodiversity provide an excellent model of how patent law can be used as an incentive to protect natural resources. In the genetic diversity of their plant and animal life, developing nations possess natural resources for which demand is increasing, and from which they may be able to realize substantial financial rewards. If the governments and private sectors in such nations receive such an incentive, they will assuredly increase their endeavors to protect their newfound assets. The motivation behind this protection might not be the most altruistic, but it is protection nevertheless. Altruism is easy for countries with substantial wealth and employment, but survival is the guiding principle in much of the developing world. Hopefully the Treaty will make it easier to survive in harmony with the invaluable resources of this biologically diverse planet.

V. CONCLUSION

Compulsory licenses, in their various forms, provide an excellent safety net in the context of environmental protection. They ensure that environmentally beneficial technology is used to its fullest extent, and provide incentives to encourage the protection of natural resources.

Compulsory licenses are clearly at odds with the position of patent monopoly advocates who insist that intellectual property rights are necessary to encourage innovation. However, in order to act as an incentive to innovation, it is not necessary to allow unlimited monopolies for seventeen years at the cost of environmental progress. Rather, it is preferable to allow inventors the opportunity to reap rewards for their work. When that reward hinges on an exclusive, monopolistic authorization which is unacceptable to the public interest, that incentive should be modified. An ideal manner in which to modify is through the use of compulsory licenses. This mechanism allows inventors to receive a reasonable royalty, but simultaneously discourages them from preventing use of the invention. Such a

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144. Scientists believe that "[d]iversity is a potential source for immense untapped material wealth in the form of food, medicine and amenities." WILSON, *supra* note 81, at 311.

system is fair to all parties interested in the patented product or process.

In the context of providing an incentive to preserve natural resources, the compulsory license is also an ideal mechanism. If the company holding a patent is unwilling to share the benefits of that patent with the nation from which the raw materials originated, then that nation may itself process the genetic resource. Again, the system is fair to all concerned.

As priorities are evaluated at the close of this millennium, it is imperative to consider how much reliance should be placed on the artificially created monopoly of the patent scheme as a tool for technological advancement. This is particularly true when the public interest in a healthy environment is concerned.

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