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TO : Senate Committee on Environment and Public Works
Attention: Mike Weiss

FROM : American Law Division

SUBJECT : Possible Patent Law and Takeover Problems Concerning Infrastructure Research and Development

The enclosed memorandum is submitted in response to your request of June 25, 1987.

Introduction

An invention can be patented only if it fits within one of the classes of subject matter for which federal statutes allow patentability.[1] Only those inventions which consist of "any new and useful process, machine, manufacture," or any new and useful improvement to one of the foregoing may receive a patent.[2] Further, in order for an invention to receive a patent, it must satisfy the federal statutory requirements of novelty and utility.[3] These requirements and the way in which they have been interpreted by the courts have arguably caused some problems for obtaining patents for infrastructure improvements resulting from research and development efforts. Other occurrences, such as the cutback in funds for research and development available to corporations because of the recent increase in hostile corporate takeovers, have also created difficulties for businesses which wish to obtain patents for infrastructure improvements. This report will briefly discuss

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[1] Chisum, Patents, sec. 1.01.

[2] 35 U.S.C. sec. 101.

[3] 35 U.S.C. secs. 102 and 103.

these possible problems caused by the federal patent statutes and by other occurrences in the business world. Reference to possible problems caused by federal patent statutes should not necessarily be construed as criticisms of these statutes; there may be countervailing considerations that argue in favor of the statutes as they stand.

Federal Patent Statutes

An invention is entitled to receive a patent only if it fits within one of the statutory classes of subject matter.[4] The purpose of having statutory classes of subject matter is to limit patent protection to certain specified fields concerning applied technology, areas which the United States Constitution refers to as the "useful arts."[5] This requirement rules out the patenting of theoretical and abstract discoveries as well as discoveries in the nontechnological arts such as the liberal arts, social sciences, and business management. Thus, a patent may be granted only for a "new means of achieving a useful end or result."[6]

Because of this requirement, discoveries involving improvements to the infrastructure may be difficult to qualify for patents. Many discoveries which

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[4] 35 U.S.C. section 101 states:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

See also, Kewanee Oil v. Bicron Corp., 416 U.S. 470, 483 (1974), in which the Court states that "no patent is available for a discovery, however useful, novel, and nonobvious, unless it falls within one of the express categories of patentable subject matter of 35 U.S.C. [sec.] 101."

[5] Article I, section 8, clause 8 of the Constitution states:

> The Congress shall have Power... 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.

[6] Chisum, Patents, sec. 101.

would improve bridges, roads, sewer systems, and other infrastructure facilities cannot be considered completed processes or discoveries. Instead, technologies or materials may consist of steps which lead only eventually to a completed process or discovery, although they may presently be useful as a measure for improving the infrastructure. For example, it is likely that an entirely new process for road resurfacing would qualify for the issuance of a patent, but a change in one aspect of a currently used process involved in road resurfacing may not be patentable because it does not fit within one of the patentable classes of subject matter; i.e., it is not a "new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof."

Three of the four classes of statutory subject matter, machines, manufactures, and compositions, may be grouped as products. The courts have had for the most part only limited conceptual problems in determining whether certain inventions fit within these statutory definitions. Early Supreme Court cases defined "machine,"[7] but it should be noted that a patent cannot be obtained on the function of a machine.[8] The definition of a composition of matter has been stated as follows:

> A composition of matter is an instrument formed by the intermixture of two or more ingredients, and possessing properties which belong to none of these ingredients in their separate state.... The intermixture of ingredients in a composition of matter may be produced by mechanical or chemical operations, and its result may be a compound substance resolvable into its constituent elements by

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[7] See, e.g., Coup v. Weatherhead, 16 F. 673 (D.R.I. 1983, rev'd on other grounds 147 U.S. 322 (1893), and Corning v. Burden, 56 U.S. (15 How.) 252 (1853).

[8] See Chisum, Patents, sec. 1.03[7].

> mechanical processes, or a new substance which can be destroyed only by chemical analysis.[9]

"Manufacture" has been defined as a "comprehensive class of inventions" that includes "every article devised by man except machinery upon the one side, and composition of matter and designs upon the other."[10]

Research and development investment with respect to improvements in the infrastructure may be made in all three of these statutory areas-- machines, compositions of matter, and manufactures. Yet, practically speaking, it would appear that the environment within which infrastructure research and development occurs may not be conducive to patenting the new technologies and materials which result. For example, such technologies and materials must have a high degree of safety. Governments and corporations are typically extremely reluctant to use technologies or materials for infrastructure facilities affecting large numbers of people unless they have been proven safe over a long period of time. The time which it takes to patent a machine, composition of matter, or manufacture and the necessity for assuring that it is a completed technology or material and not a step in developing another end-product may deter research and development investment in the infrastructure area. The advantage which a company receives from developing an improved construction technology may last only a short time until it is known to other companies. This, too, would seem to make investment in infrastructure research and development less attractive than investment in some of the more patentable areas. As stated by the Office of Technology Assessment:

> In terms of basic research, the gaps in infrastructure R&D are substantial. There is almost no research on, or

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[9] Chisum, Patents, sec. 1.02[2].

[10] Chisum, Patents, sec. 1.02[3].

> expectation of profit from, research toward developing totally new methods of delivering transportation, water supply, and wastewater disposal services. There even is little basic research on new materials, such as a totally new material for building roads. Moreover, few agencies or organizations are researching the public works applications of advanced technologies and materials (e.g., ceramics and composites) that were not developed specifically for infrastructure.[11]

Process claims, as contrasted with product claims (products consisting of the other three classes of statutory subject matter; i.e., machines, manufactures, and compositions), have been especially troublesome in claiming patent protection.[12] A process is typically considered not a structural entity but rather an operation or series of steps which leads to a useful result. One of the earliest discussions by the Supreme Court of process patents is the case Corning v. Burden,[13] in which the Court distinguished between processes and machines:

> The term machine includes every mechanical device... to perform some function and produce a certain effect or result. But where the result or effect is produced by chemical action, by the operation or application of some element or power of nature, or of one substance to another, such modes, methods, or operations, are called processes.... The arts of tanning, dyeing, making water-proof cloth, vulcanizing India rubber, smelting ores, and numerous others are usually carried on by processes, as distinguished from machines.[14]

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[11] Office of Technology Assessment, Construction and Materials Research and Development for the Nation's Public Works (staff paper June 1987), at 1-20.

[12] It should be noted that several congressional bills have language amending the patent process. S. 568 is typical. It prohibits the importation into the United States of goods made overseas by use of a United States patented process without the payment of royalties to the inventor.

[13] 56 U.S. (15 How.) 252 (1853).

[14] 56 U.S. (15 How.) at 267-268.

Perhaps the most frequently-quoted definition of a process is from the Supreme Court case Cochrane v. Deener:[15]

> That a process may be patentable, irrespective of the particular form of the instrumentalities used, cannot be disputed. If one of the steps of a process be that a certain substance is to be reduced to a powder, it may not be at all material what instrument of machinery is used to effect that object, whether a hammer, a pestle and mortar or a mill. Either may be pointed out; but if the patent is not confined to that particular tool or machine, the use of the others would be an infringement, the general process being the same. A process is a mode of treatment of certain materials to produce a given result. It is an act, or a series of acts, performend upon the subject-matter to be transformed and reduced to a different state or thing. If new and useful, it is just as patentable as is a piece of machinery.[16]

Despite these early Supreme Court cases defining a process, courts have continued to face the issue of defining process on a case by case basis.[17] One frequently stated rule is that a patent may not be obtained for the discovery of a principle or an abstract idea.[18] However, a patent may be obtained for a new product or process which uses a newly-discovered principle for the purpose of achieving a useful end.[19] A certain irony has been noted in the fact that the patent law does not grant patents to the discoverers of general scientific principles:

> Epoch-making "discoveries" or "mere" general scientific "laws," without more, cannot be patented.... So

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[15] 94 U.S. 780 (1877).

[16] 94 U.S. at 787-788.

[17] See e.g., Diamond v. Diehr, 450 U.S. 175 (1981); Parker v. Flook, 437 U.S. 584 (1978); and Gottschalk v. Benson, 409 U.S. 63 (1972).

[18] See Howes v. Great Lakes Press Corp., 679 F.2d 1023 (2d Cir. 1982), and General Battery Corp. v. Gould, Inc., 545 F. Supp. 731 (D. Del. 1982).

[19] See Diamond v. Diehr, 450 U.S. 175 (1981), and MacKay Radio & Tel. Co. v. Radio Corp. of America, 306 U.S. 86 (1939).

> the great "discoveries" of Newton or Faraday could not have been rewarded with such a grant of monopoly. Interestingly enough, apparently many scientists like Faraday care little for monetary rewards; generally the motives of such outstanding geniuses are not pecuniary.... Perhaps (although no one really knows) the same cannot be said of those lesser geniuses who put such discoveries to practical uses.[20]

It appears that many improvements in the infrastructure could be brought about by new processes. Because of the difficulty which seemingly still exists under patent law in determining exactly when there exists an identifiable new process as opposed to a step in developing a process, and for reasons discussed above such as the necessity for testing a new material or technology for complete safety before using it in a structure with which many people come into contact, it is possible to argue that current United States patent laws deter investment in research and development concerning infrastructure improvements. If, for example, steps in developing processes were permitted to be patented, it might be possible to test these steps sufficiently for safety without the worry that, once they are used without being patented, they will be known and therefore useable by others in the construction industry. Such a change in the patent laws might lead to the infusion of more investment money into research and development in the infrastructure area.

There is also the limitation relating to the eligible subject matter requirement that new uses for a known material or method already known are not patentable. As stated in Chisum:

> Discussions of the "new use" doctrine often fail to relate it clearly to a statutory source. Potentially, a claim for a new use can be viewed as nonpatentable (1) because it is not within the classes of eligible subject matter under Section 101, (2) because it lacks novelty under Section 102(a), or (3) because it is obvious in the

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[20] Katz v. Horni Signal Mfg. Co., 145 F.2d 961 (2d Cir. 1944).

> of the prior art under Section 103. In fact, the new use doctrine contains elements of all three statutory sources.[21]

This requirement would also appear to discourage investment in research and development concerning infrastructure improvements in that known infrastructure materials might be discovered to have new and particular uses. However, without the permission to patent these new uses, a discoverer of such a new use likely would find that his new use for an existing material has quickly spread throughout the construction industry. It should be noted that this rule of new uses is tempered by the doctrine of slight changes, which permits patentability if an existing product or process is altered slightly to fit the new use discovered by the inventor.[22]

In addition to the federal statutory requirement that subject matter be eligible for the issuing of a patent, there is also the requirement that an invention possess novelty; i.e., an invention must be new at the time of discovery in order to be patented.[23] The federal statutes set forth three conditions for the meaning of new: (1) No patent may be granted for an invention which is known or used by others in this country or patented or described in a printed publication in this country or in a foreign country;[24] (2) A patent will not be issued if the invention is described in a patent

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[21] Chisum, Patents, sec.1.03[8].

[22] See series of opinions by Judge Hand: Triatel Marble Co. v. U. T. Hungerford Brass & Copper Co., 18 F.2d 66 (2d Cir. 1927), and H.C. White v. Morton E. Converse & Son Co., 20 F.2d 311 (2d Cir. 1927).

[23] 35 U.S.C. sec. 101 requires that a patent may be issued to "[w]hoever invents or discovers any new [emphasis added] ... process, machine, manufacture, or composition of matter, or any new [emphasis added] ... improvement thereof.

[24] 35 U.S.C. sec. 102(a).

granted on an application filed previously;[25] (3) A person is not entitled to a patent if before the applicant's invention the invention was made in this country by another who did not abandon, suppress, or conceal it.[26]

A strict interpretation of the novelty requirement might be a deterrent to investment in infrastructure research and development. Many research and development projects concerning the infrastructure appear to be related to improvements in existing designs and processes. Such research is not developmental and does not consist of new technologies. Instead, these projects "aim at knowledge or techniques that manipulate existing and available construction technologies to obtain more appropriate, more efficient, more cost-effective, or better quality infrastructure results."[27] However, it is likely under the present federal patent statutes that such improvements may in many cases not be patentable, thus cutting further into incentives to invest in infrastructure research and development.

Utility is another statutory requirement which must be met in granting a patent.[28] The purpose of the utility requirement is to make certain that society obtains a quid pro quo by obtaining a "substantial utility" and "specific benefit in currently available form" before granting a monopoly in the form of a patent to an inventor.[29] According to Chisum:

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[25] 35 U.S.C. sec.102(e).

[26] 35 U.S.C. sec. 102(g).

[27] OTA staff paper, at 2-7.

[28] 35 U.S.C. section 101 states in pertinent part:
> Whoever invents or discovers any ...useful [emphasis added] process, machine, manufacture, or composition of matter, or any ...useful [emphasis added] improvement thereof, may obtain a patent....

[29] Brenner v. Manson, 383 U.S. 519, 534-535 (1966).

> To comply with the utility requirement, an invention need not be superior to existing products or processes. However, it must meet three tests. First, it must be operable and capable of use. It must operate to perform the functions and secure the result intended. Second, it must operate to achieve some minimum human purpose. Third, it must achieve a human purpose that is not illegal, immoral or contrary to public policy.[30]

Again, a strict interpretation of this statutory prerequisite for the granting of a patent might operate to deter investment in infrastructure research and development. It might be argued that the utility of infrastructure research results might not be immediately known. A construction process or a building material might be discovered which needs a relatively long period of evaluation before it can meet the utility requirement. Yet, under a strict interpretation of the statutory requirement, the process or material may be used by others with impunity because of the inability of the inventor to obtain a patent.

Impact Of Takeovers On Research And Development[31]

Until the late 1960's there was no federal legislation and very little state legislation that regulated takeovers; instead, most corporate acquisitions were made by proxy fights, which were strictly regulated by federal statutes.[32] Some experts speculate that takeovers and takeover attempts increased in the 1960's because corporate bidders wished to speed up the entire merger process and did not want to have to comply with what they believed to be unnecessarily onerous proxy rule disclosures.[33] In this

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[30] Chisum, Patents, sec. 4.01.

[31] For a more detailed treatment of takeovers, see Seitzinger, "Securities Law: Background and Recent Developments in Tender Officers and Insider Trading," CRS Report 87-590A (April 24, 1987).

[32] 15 U.S.C. sec. 78n(a).

[33] See Aranow & Einhorn, Proxy Contests for Corporate Control (2d ed. 1968).

unregulated atmosphere takeovers could be completed in a very short time, and management would often not have time to structure defense tactics. Hostile takeovers became more common, and some charged that shareholders were being deceived by both bidders and management. Until 1968 there was little recourse available to those injured by this deception. In response to calls for reform by both the business and investment communities and to assure a more "level playing field," Congress enacted the Williams Act.[34]

The Williams Act consists principally of sections 13(d) and (e)[35] and 14(d), (e), and (f)[36] of the Securities Exchange Act of 1934.[37] Under subsections (d) and (e) of section 13, any person who acquires ownership of more than 5% of the securities of a corporation registered with the Securities and Exchange Commission must file public disclosures with the Commission within ten days after reaching this threshold. Subsections (d), (e), and (f) of section 14 deal specifically with tender offers, although the term "tender offer" or "takeover" is not defined anywhere in the Williams Act. Section 14(d) requires that all tender offer material concerning securities of a corporation registered with the SEC must be filed with the SEC and accompanied by the required disclosures before a tender offer is allowed to occur. Section 14(e) prohibits material misstatements, omissions, and fraudulent practices concerning tender offers, whether or not the company must report to the SEC

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[34] P.L. 90-439, 82 Stat. 454, codified at 15 U.S.C. secs. 78m(d), (e) and n(d), (e), and (f).

[35] 15 U.S.C. sec. 78m(d), (e).

[36] 15 U.S.C. sec. 78n(d), (e), and (f).

[37] 15 U.S.C. secs. 78a et seq.

under the '34 Act's reporting requirements. Section 14(f) provides for disclosure requirements concerning new directors.

In the past several years corporate takeovers and takeover attempts have again increased dramatically. Both bidders and target managements have become increasingly aggressive in attempting takeovers and in defending the targets, respectively, and such actions cost the target company a great deal of money, whether the takeover is successful or fails. After a takeover or a takeover attempt, a corporation often finds itself in a position of having to maximize short-term profits and of servicing a large debt. This situation forces corporations to cut back expenses, and one of the first kinds of cutbacks frequently is a reduction in research and development. Although this is not directly related to possible patent law problems concerning infrastructure research and development, many people claim that without research and development United States corporations will not be able to obtain patents for new products and technology in order to compete in the marketplaces at home and abroad. Therefore, this might be another situation making more difficult the obtaining of patents in the infrastructure area. Several bills have been introduced in this Congress to amend the Williams Act to correct this perceived problem.[38]

Conclusion

It cannot be stated with certainty that present federal patent laws deter investment in research and development concerning infrastructure technologies and processes. Such a conclusion could be made only after studies and hearings. However, it may be argued that such requirements as having eligible subject matter, novelty, and utility deter this investment. Further, it may

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[38] See, e.g., S. 1323 and H.R. 2172.

also be argued that present takeover laws have caused a cutback in money available for research and development in infrastructure and other areas.

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