

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D. C. 20554

In the Matter of)
)
Implementation of the Local Competition)
Provisions in the Telecommunications Act) CC Docket No. 96-98
of 1996)

Joint Affidavit of Debra J. Aron and Robert G. Harris
on Behalf of Ameritech
May 26, 1999

A. Qualifications

My name is Debra J. Aron. I am the Director of the Evanston offices of LECG, Inc., a position I have held since July 1995. LECG, Inc. is an economics and finance consulting firm, providing economic expertise for litigation, regulatory proceedings, and business strategy. I received a Ph.D. in economics from the University of Chicago in 1985, where my honors included a Milton Friedman Fund fellowship, a Pew Foundation teaching fellowship, and a Center for the Study of the Economy and the State dissertation fellowship. I was an Assistant Professor of Managerial Economics and Decision Sciences from 1985 to 1992 at the J. L. Kellogg Graduate School of Management, Northwestern University, and a Visiting Assistant Professor of Managerial Economics and Decision Sciences at the Kellogg School from 1993-1995. I was named a National Fellow of the Hoover Institution, a think tank at Stanford University, for the academic year 1992-1993, where I studied innovation and product proliferation in multiproduct firms. Concurrent with my position at Northwestern University, I also held the position of Faculty Research Fellow with the National Bureau of Economic Research from 1987-1990.

At the Kellogg School, I have taught M.B.A. and Ph.D. courses in managerial economics, information economics, and the economics and strategy of pricing. I am a member of the American Economic Association and the Econometric Society, and an Associate member of the American Bar Association. My research focuses on multiproduct firms, innovation, incentives, and pricing, and I have published articles on these subjects in several leading academic journals, including the *American Economic*

Review, the RAND Journal of Economics, and the Journal of Law, Economics, and Organization.

I have consulted on numerous occasions to the telecommunications industry on strategic and efficient pricing. I have testified in several states regarding the proper interpretation of Long Run Incremental Cost and its role in pricing; the economic interpretation of pricing and costing standards in the Telecommunications Act of 1996; limitations of liability in telecommunications; Universal Service; and proper pricing for mutual compensation for call termination. I have also submitted affidavits to the Federal Communications Commission in support of Ameritech's petition for Section 10 forbearance from dominant carrier status in the Chicago LATA; analyzing the merits of Ameritech Michigan's application for authorization under Section 271 of the Telecommunications Act to serve the in-region interLATA market, CC Docket No. 97-137; and explaining proper economic principles for recovering the costs of permanent local number portability, CC Docket Nos. 95-116 and 99-35. I have conducted analyses of mergers in other industries, including several cable television mergers, under the U.S. Merger Guidelines. In addition, I have consulted in other industries regarding potential anticompetitive effects of bundled pricing and monopoly leveraging, market definition, and entry conditions, among other antitrust issues, as well as matters related to employee compensation and contracts, and demand estimation. In 1979 and 1980, I worked as a Staff Economist at the Civil Aeronautics Board studying price deregulation of the airline industry.

My name is Robert G. Harris. I am a Director at LECG, Inc. and Professor Emeritus of Business and Public Policy in the Haas School of Business, University of California, Berkeley. My business address is 2000 Powell Street, Suite 600, Emeryville, CA 94608.

I earned Bachelor of Arts and Master of Arts degrees in Social Science from Michigan State University and Master of Arts and Doctor of Philosophy degrees in Economics from the University of California, Berkeley. My academic research has analyzed the effects of economic regulation and antitrust policy on industry performance and the implication of changing economics and technology for public policies in transportation and telecommunications. Early in my career, I published extensively on competition, vertical relations and regulatory policies in the rail freight industry. I have published research on the reform of Japanese telecommunications policy; the strategic character of telecommunications services and its implications for public policies; the effects of regulation and the AT&T divestiture on technological innovation in telecommunications; the deployment and adoption of Integrated Services Digital Network; the development of competition in local access and exchange services; and the development of interconnection policies.

In addition, I have testified on telephone rate design, costing and pricing principles, competition policy and alternative regulation before the Federal Communications Commission and before the state commissions of 25 states plus the District of Columbia. I have testified before the United States Senate, the United States

House of Representatives and the Joint Economic Committee of Congress on transportation, antitrust and telecommunications policy issues.

The complete curriculum vitae of Drs. Aron and Harris are attached to this affidavit as Attachment I.

B. Introduction

In this affidavit, we respond to the recent notice by the Federal Communications Commission ("the Commission" or "FCC") requesting comments on the unbundling of network elements.¹ In particular, the Commission seeks comments on (1) how, in light of the Supreme Court's ruling,² the Commission should interpret the standards set forth in Section 251(d)(2) of the Telecommunications Act of 1996 ("the Act");³ and (2) which specific network elements the Commission should require incumbent LECs to unbundle under Section 251(c)(3). Our analysis in this affidavit is based upon a careful consideration of the language and goals of the Act, the recent decision of the U.S. Supreme Court vacating the FCC's unbundling rule, standard applied economic analysis, and a preliminary investigation of the availability of network elements outside the incumbent's network.

As we indicated earlier, the fundamental goal of the Telecommunications Act of 1996 is to make society better off. To this end, the Act seeks to encourage innovation,

¹ Second Further Notice of Proposed Rulemaking, In Matter of Implementation of the Local Competition Provisions in the Telecommunications Act of 1996, FCC 99-70, CC Docket No. 96-98, Rel. April 16, 1999, hereinafter *Second NPRM*.

² AT&T Corp. et. al. v. Iowa Utilities Bd. et. al., January 25, 1999.

promote efficient production, and accelerate the deployment of advanced telecommunications services to all Americans. The Act strongly advocates competition over regulation as the best way to achieve these objectives. Congress expressly intended the Act “to promote competition and reduce regulation in order to secure lower prices and higher quality services for American telecommunications consumers.”⁴ However, as discussed further below, competition is a *means* to further the Act’s objectives, not an end in itself. Competition must be fostered in a manner that espouses sound economic principles if we are to avoid uneconomic and undesirable outcomes.

In order to facilitate competition in local exchange markets, the Act imposes certain requirements upon incumbent local exchange carriers, including the duty to provide retail services for resale at discounted wholesale rates, the duty to interconnect with competitors’ networks, and the obligation to provide certain network elements, to be determined by the FCC, to competitors on an unbundled basis. The Act provides in Section 251(d)(2) that the FCC must determine which network elements will be made available to competitive local exchange carriers (CLECs) by considering, at a minimum, whether:

- A. access to such network elements as are proprietary in nature is *necessary*; and
- B. the failure to provide access to such network elements would *impair* the ability of the telecommunications carrier seeking access to provide the services that it seeks to offer. (emphasis added)

These criteria are referred to as the “necessary and impair” standards.

³ 110 STAT. 56 PUBLIC LAW 104–104, Feb. 8, 1996.

The FCC promulgated rules implementing Section 251(d)(2) of the Act in its First Report and Order.⁵ In Rule 319, the primary unbundling rule, the FCC required the incumbent LECs (“ILECs”) to provide blanket access to their networks.⁶ That is, Rule 319 compels ILECs to grant CLECs access to the local loop, the network interface device, various switching and call routing functionalities, transport facilities, and even operator support systems.

On January 25, 1999, the Supreme Court vacated Rule 319.⁷ The Court held that the FCC founded its interpretation of the necessary and impair standards on an erroneous premise. This premise was that the Act obliged incumbents to unbundle their entire networks, and that 251(d)(2) merely gave the Commission the authority to limit that requirement. The Court found that this premise is emphatically incorrect.⁸ On the contrary, there is no underlying duty to unbundle. Rather, the FCC must *affirmatively determine* which elements meet the necessary and impair tests. The Court’s decision was based on the following reasoning.

First, the Court ruled that the FCC did not interpret the Act in a way that gives substance to the necessary and impair standards. According to the Court, the Act

⁴ S. 652 cited in the Act, 110 STAT. 56 PUBLIC LAW 104–104.

⁵ First Report & Order In re Implementation of the Local Competition Provisions in the Telecommunications Act of 1996, 11 FCC Rcd 15499 (1996), hereinafter *First Report & Order*.

⁶ 47 C.F.R. 51.319 (Part 51 – Interconnection, Subpart D - Additional Obligations of Incumbent Local Exchange Carriers, Sec. 51.319 Specific unbundling requirements).

⁷ AT&T Corp. et. al. v. Iowa Utilities Bd. et. al., January 25, 1999, see slip op. at 25.

⁸ Slip op. at 24.

“requires the FCC to apply some *limiting standard*, rationally related to the goals of the Act, which it has simply failed to do.”⁹ The Court points out that the FCC reduced the standards to a tautology: the FCC assumed that a carrier would only request an unbundled element if using such an element would improve its expected cost or quality relative to any other alternative source of the element.¹⁰ But, the Court points out, if every requested element tautologically satisfies the impairment standard, then Congress need not have included the necessary and impair standards at all. Hence, the Commission’s overly broad interpretation was inconsistent with Congressional intent.

Moreover, the Court ruled that in establishing so weak an interpretation of “necessary and impair,” the FCC’s interpretation was not consistent with the “ordinary and fair meaning of those terms.”¹¹ The Court held that it cannot be considered an “impairment” if, for example, the lack of access to an element reduces a competitor’s profits from 100% to 99%, although the FCC’s interpretation would have it so. In response to an analogy drawn by Justice Souter in a dissenting opinion, the Court said:

“The proper analogy here ...[is] the presence of a ladder tall enough to enable one to [change a lightbulb], but not without stretching one’s arm to its full extension. A ladder one-half inch taller is not, ‘within an ordinary and fair meaning of the word’ [ref omitted] ‘necessary’ nor does its absence ‘impair’ one’s ability to do the job.”¹²

⁹ Slip op. at 21.

¹⁰ The Commission therefore also failed to account for cases where a carrier may request an element to raise the incumbents’ costs.

¹¹ Slip op. at 22.

In addition, the Court objected to the FCC's interpretation of the necessary and impair standards because the Commission considered *only* whether alternatives to a particular requested element would be available *from the incumbent* itself. The Court found that failing to consider whether there are *alternative* sources of the requested elements outside the incumbent's network, including self-provision,¹³ is unacceptable.¹⁴ The FCC *must* evaluate whether an element is available from an alternative source when determining whether that element satisfies the necessary and impair standards.

In a separate opinion concurring in part and dissenting in part (concurring with respect to Rule 319), Justice Breyer further elaborates on the Court's decision to vacate Rule 319. Justice Breyer points out that any unbundling requirement imposes real costs on society. Regulators should therefore avoid imposing unbundling mandates whose societal costs exceed their societal benefits:

“[r]egulatory rules that go too far, expanding the definition of what must be shared beyond that which is essential to that which merely proves advantageous to a single competitor, risk costs that, in terms of the Act's objectives, may make the game not worth the candle.”¹⁵

¹² Slip op. at 22, note 11.

¹³ Slip op. at 21-22: “which means that comparison with self-provision, or with purchasing from another provider, is excluded. ... But that judgment allows entrants, rather than the Commission, to determine whether access to proprietary elements is necessary, and whether the failure to obtain access to nonproprietary elements would impair the ability to provide services.”

¹⁴ Slip op. at 22: “The Commission cannot, consistent with the statute, blind itself to the availability of elements outside the incumbent's network. That failing alone would require the Commission's rule to be set aside.”

¹⁵ AT&T v. Iowa Utils. Bd., 119 S. Ct, Opinion of Breyer J., January 25, 1999, p. 20.

Justice Breyer correctly points out that “increased sharing by itself does not automatically mean increased competition.”¹⁶ Hence, the purpose of the Act itself compels a restrictive interpretation of the necessary and impair standards. Excessive unbundling creates costs without generating competitive benefits. To bring about the goals of the Act, the Commission must distinguish between merely increasing the number of competitors without regard to its actions’ effect on competition, and truly nurturing efficient, beneficial competition. In particular, Justice Breyer identifies three reasons why Rule 319’s excessive unbundling requirements are harmful.

First, Justice Breyer accurately recognizes that any unbundling imposes “administrative and social costs” to effect and oversee the unbundling.¹⁷

Second, he recognizes that unbundling may significantly undermine the incumbent’s incentives to invest in the resources that must be shared. This can take the form of decreased maintenance of existing facilities, fewer upgrades of facilities, or reduced investment in research and development. This may reduce the pace and degree of technological innovation and thereby impose costs on society that may well outweigh any perceived enhancement to competition, thwarting the Act’s goals of promoting innovation and competition.

Third, Justice Breyer observes that true competition occurs among the *unshared* elements, not the shared ones.¹⁸ If it were the view of Congress that access to the

¹⁶ *Id.*, p. 19.

¹⁷ *Id.*, p. 18.

incumbent's entire network were necessary for competition to develop, then it is unclear why Congress would think that competition is a viable goal at all. As Justice Breyer put it, "a totally unbundled world ... is a world in which competitors would have little, if anything, to compete about."¹⁹ Indeed, if its goal were simply to lower prices, then Congress could have achieved this objective much more directly by mandating a nationwide roll-back in telecommunications rates.

Hence, the Supreme Court has been abundantly clear that the FCC must abandon its previous approach and adopt new rules implementing the "necessary and impair" standards that:

- are limiting, as opposed to all-encompassing;
- lend substance to the language of the Act;
- are consistent with, and advance the goals of, the Act; and
- explicitly recognize the availability of elements from sources other than the incumbent, including self-supply.

Further, as Justice Breyer points out, a well-formulated policy must meaningfully acknowledge both:

- the real social and administrative costs of unbundling; and
- the real dynamic costs of unbundling in terms of decreased incentives to maintain resources and invest in innovation.

¹⁸ *Id.*, pp. 19-20: "Rules that force firms to share every resource or element of a business would create, not competition, but pervasive regulation, for the regulators, not the marketplace, would set the relevant terms."

¹⁹ *Id.*, p. 20

The Court therefore clearly expects that a proper implementation of the necessary and impair standards will limit the availability of unbundled elements, as evidenced by its comments regarding the other FCC rules which it upheld.²⁰

The purpose of this affidavit is to provide an economic framework for a proper interpretation of Section 251(d)(2) that is consistent with the mandate and logic of the Supreme Court, that adheres to sound economic principles, and that can be implemented using reasonably available data. Our analysis will be informed but not driven by the essential facilities doctrine in antitrust. We provide a framework for analyzing the evidence for each element in the context of each relevant geographic and product market.

It scarcely can be denied that a discussion of the necessary and impair standards needs to begin with an appropriate economic definition. The Court recognized that, although a reasonable reading of the statute precludes defining any element as “necessary” that would generate only a small improvement to a competitor’s profitability, it could not draw a bright line distinguishing “necessary” from non-necessary, or those elements whose absence would impair from those whose absence would not impair, on a strictly linguistic basis. These distinctions cannot be drawn using legal interpretations alone, but rather require the application of economic analysis.

²⁰ In particular, the Court pointed out that while it does not find language in the Act to prohibit CLECs from buying unbundled elements and recombining them to provide end-to-end service, or language that elements must be provided on a physically separated basis, the Court points out that its remand of Rule 319 may render these concerns “academic.” See slip op. at 25.

Unfortunately, however, while economic analysis is conceptually up to the task, there are no off-the-shelf economic definitions that suffice to fill in the blanks supplied by the Act and that are recognized by the Court. Nevertheless, there is a significant body of case law, as well as some legal writing and economic literature, on the related and relevant concept of the “essential facilities doctrine.” The essential facilities doctrine is applied in cases where a plaintiff seeks access to some facility or property of its competitor without which, it claims, it cannot compete. The issues that arise in these cases – the circumstances under which denial of access impedes competition, the effect on incentives to develop alternative facilities or replicate the allegedly essential facilities themselves, the role of prices in determining whether an input is “essential” – are the same inescapable issues that arise in interpreting the “necessary” and “impair” standards in the Act. Hence, it would be irresponsible to ignore the literature and other discussion that the essential facilities doctrine has produced. We will provide definitions of necessary and impair that are simple and intuitive, yet which are rigorously consistent with economic logic and theory and that keep with the literature and case law precedents established by previous appellate court decisions pertaining to “essential facilities” cases.

Similarly, no off-the-shelf templates exist that can be used to apply these principles to the facts about the actual availability and feasibility of self-supply of alternative facilities. To comply with the Court’s remand, the Commission must initiate a thorough fact-finding process, and avoid prejudging the issue in the absence of facts by compelling certain elements to be unbundled nationwide. For this affidavit, we develop a framework based on sound economic analysis for application to individual cases.

Our analysis results in the following principles:

- Whether an element satisfies the necessary and impair standards depends on the economic fundamentals in the relevant product and geographic market, and therefore can vary from one geographic market to another, from the analysis of one element to that for another, and from one time period to another.
- The Commission should not and cannot make a determination that an element whose supply characteristics are local does or does not satisfy the necessary and impair standards on a nationwide basis unless it determines that such element should be unbundled in every relevant geographic (i.e., local) market. The Commission should, therefore, define a general analytic framework that can be applied to each element in any specific geographic area across the country and yield a clear “yes or no” answer.
- Whether an element satisfies 251(d)(2) depends on whether there is a reasonable and practical alternative source, by use of which entrants could make a profitable business case without the requested network element.
- The impair standard, which applies to all elements, can only be satisfied for a given non-proprietary element in a given area if (a) there is no current provider of the element, (b) no entrant could profitably self-supply the element, and (c) an entrant could profitably enter if it had access to the element at TELRIC-based prices.
- The necessary standard applies only to those aspects of elements that are proprietary in nature. It can only be met (i.e., the proprietary component can only be required to be unbundled) if the element is shown to impair, and access to the proprietary feature is “necessary” to the use of the element.
- The Commission’s analysis of the element must be fact-based. If a competitive provider is self-supplying the element in question in a particular market, that element *prima facie* does not satisfy 251(d)(2) in that area and should not be subject to mandatory unbundling.
- The Commission’s framework should incorporate standard principles of antitrust analysis. This includes the proper definition of the relevant output markets to which the element is pertinent and the relevant input markets for determining the availability of the element or adequate substitutes for it. The framework should explicitly define both the relevant geographic market and the time-frame of the analysis.²¹

²¹ In this affidavit, we generally follow the antitrust principles articulated by the Federal Trade Commission and the Department of Justice in their Horizontal Merger Guidelines. The Guidelines establish criteria for defining the relevant geographic and product markets, and prescribe a

- The Commission must include the costs of unbundling in completing its cost/benefit analysis of the desirability of unbundling.
- Entrants who claim “necessity” or “impairment” should be required to present evidence supporting their claim.

In Section C we discuss the objectives of the Act and how unbundling can preserve or impede them. In Section D we provide economic definitions of the “necessary” and “impair” standards, and explain why our definitions properly and effectively implement the requirements of the Act and the Supreme Court. In Section E we discuss the economics of the essential facilities doctrine. In Section F we discuss our proposals for implementing the standards, including our bright-line test for unbundled local switching. In Section II, we apply our standards to actual network elements and consider their implications.

C. Objectives of the Act

1. Promotion of Competition

As I indicated earlier, the fundamental goal of the Act is to enhance the well-being of society. The Act intends to bring consumers the benefits of more and better services, more choices, more rational pricing plans, and more product and service differentiation to satisfy consumers’ diverse and ever-changing preferences. It also seeks to provide businesses with more opportunities to attempt to meet consumers’ needs by creating, developing, and applying their own expertise. In the fast-paced and rapidly

methodology for determining which firms participate in these markets. Both *actual* and *potential* participants are considered in assessing market power. Potential entrants are considered to be “in the

changing world of telecommunications, this means the promotion of both static and dynamic efficiency. Achievement of static efficiency leads to the desirable outcome of an optimal allocation of society's resources, where resources go to produce the products that consumers want in the proportions they want them, given their willingness to pay for them. Dynamic efficiency fuels the innovative process that brings our citizens the creative new products that our economic system can produce. These types of efficiency drive society's ongoing economic progress.

Competition can play an instrumental role in achieving these objectives. Competition provides the incentives, in the form of both rewards and punishments, for satisfying society's desires. Indeed, it is a fundamental tenet of economics that, under the proper circumstances, competition is the *best* and perhaps the only way of achieving those goals. This said, it is crucial that the type of competition engendered be competition that will foster society's goals and not detract from them. Competition in name only can be detrimental to these goals if the incentive structure facing all competitors is not economically sound. To state the point once again, competition itself is not the underlying goal of the Telecommunications Act; it is a means that, when properly unleashed, is intended to achieve the Act's goals.

Assuring that competition furthers the Act's goals requires that the focus of Commission policies, here specifically its unbundling policies, be focused on balanced, healthy competition, not on the economic well-being of any given firm that wishes to

market" if it is possible to have a significant impact on the market within two years – a criterion we adopt.

compete in the market. The competitive process does not ensure the success or survival of any competitor. A focus on competition, not competitors, is crucial to accomplishing the Act's objectives. Throughout this paper's discussion, this fundamental notion underlies all of the analysis. It is critical that this important distinction always be kept in sight.

2. Effect of Unbundling on Competition

In some circumstances, unbundling can bring societal benefits. If access to an ILEC's unbundled element is truly required to enable local competition, that is, if no competitors providing the same product or reasonable substitutes exist or could viably enter the market without access to the element, then providing access to the element can enhance consumer welfare. However, the primary benefit of the unbundling would derive from the opportunity thereby created for entrants to engage in competition via the *other*, non-shared inputs and elements. Consumer welfare is enhanced if competitors can produce the same products as the incumbent more efficiently, if the entrant can differentiate its product from that of the incumbent in ways that appeal to consumers, or if entrants can innovate to produce new and different services. The more the entrant relies on the incumbent's network, the less these benefits are possible.

3. Potential costs of unbundling

The potential benefits of unbundling notwithstanding, unbundling has very significant and real costs, which were largely ignored by the Commission in its First

Report & Order, as noted by Justice Breyer.²² The costs of unbundling can be divided into two broad categories:

- The indirect costs of the reduction, and in some cases the destruction, of pro-competitive incentives for both the incumbent and entrants; and
- The direct cost to the incumbent (and society) to implement and maintain compulsory sharing, including the administrative and enforcement costs.

a) Indirect Costs of Unbundling

Quantitatively, the indirect costs of distorting the players' incentives are likely to be by far the most significant and long-term of the two categories of costs imposed by unbundling. There are three sources of indirect cost in unbundling. First, the incentives of the *entrants* to make sunk investments are severely reduced, an effect that is well-recognized in the economics literature.²³ Put simply, the entrant has to decide whether to invest now, later, or never in sunk equipment. In the telecommunications field, which is marked by rapid innovation and competing technologies, investment is risky, as it may commit the entrant to a particular technology that later reveals itself to be inferior to other technologies or, even if not technically inferior, less favored by customers. Leasing unbundled network elements (UNEs) from the incumbent is a crutch that can allow entrants to delay their own investments and efforts at innovation and idly wait to

²² AT&T Corp. v. Iowa Utilities Bd. (97-826), U.S. Jan. 25, 1999, BREYER J., concurring in part, dissenting in part, at 18.

²³ Aron, D., K. Dunmore, and F. Pampush, "The Impact of Unbundled Network Elements and the Internet on Telecommunications Access Infrastructure," presented at the Harvard Information Infrastructure Project, Impact of the Internet on Communications Policy, December 3, 1997, available at <http://ksgwww.harvard.edu/iip/iicompol/Papers/Pampush.html>. For the fundamentals of decision making under uncertainty, see Dixit, A., and R.S. Pindyck, 1994, Investment Under

see which technologies pan out. The problem with this scenario is that unless competitors make those risky investments in research and development, there will be only lethargic technological growth. There will be less incentive for the kinds of aggressive investment that lead to improved technologies and new products. The process of economic growth is fueled by risk-taking, which entails success for some and failure for others. It is wrong-headed and destructive public policy to provide artificial protection from risk. The purpose of unbundling is to permit entry if it otherwise would be infeasible; it is *not* to limit entrants' risk, particularly in a market where risk is the seed of innovation and where innovation lies at the heart of the benefits that should arise from competition.

Second, the unbundling requirement reduces the *incumbent's* incentive to invest in innovation or development of new product ideas, particularly those that are not patentable.²⁴ The rewards of successful innovation are diminished (as entrants will demand unbundled access to successful innovations at rates that do not reflect the innovation risks), while the incumbent alone bears the risk of failure.²⁵ It is a fundamental tenet of U.S. public policy that protection of an innovator's exclusive rights

Uncertainty, Princeton University Press, and "The Options Approach to Capital Investment," Harvard Business Review, May-June, 1995, pp. 105-115.

²⁴ AT&T Corp. v. Iowa Utilities Bd. (97-826), U.S. Jan. 25, 1999, BREYER J., concurring in part, dissenting in part, at 19 (concurring): "Nor can one guarantee that firms will undertake the investment necessary to produce complex technological innovations knowing that any competitive advantage deriving from those innovations will be dissipated by the sharing requirement."

²⁵ While we recognize that decreasing the incumbent's incentive to innovate does not automatically reduce total social investment (as this depends on the overall set of incentives for entrants and other providers), it nevertheless is highly likely that in practice unbundling will have just this effect. See the Affidavit of Jerry A. Hausman and J. Gregory Sidak, Second Further Notice of Proposed Rulemaking: In the Matter of Implementation of the Local Competition Provisions in the

to the fruits of its labor is in the public interest. Failure to protect those rights would so severely undermine the incentives to innovate that the social harm would outweigh the static costs of the monopoly. This is the well-known premise behind patents and other intellectual property rights. By the same logic, requiring unbundling at cost-based rates will dampen the incumbent's incentive to innovate, at significant social cost.

These concerns are amplified for the newest, most innovative services. One example is a new proprietary service developed by Ameritech called "Privacy Manager." Privacy Manager is a service that uses switching intelligence and other features of the network to screen telemarketing calls for consumers. There is no public policy reason to require that such a service be "unbundled." Privacy Manager is a proprietary service that derives from the service creation environment ("SCE"). Access to Privacy Manager is not necessary in order to utilize the SCE. Hence, Privacy Manager cannot satisfy the necessary test. Moreover, while some customers will, presumably, value this new service, it is beyond credulity to assert that a provider could not viably serve the market without it. Hence, it cannot satisfy the "impair" standard either. The chilling effect on innovating new products like Privacy Manager would outweigh any potential benefits from requiring that this service be unbundled at TELRIC rates.

Third, with unbundling there is an incentive for the entrant to waste the incumbent's resources, because no commitment by the entrant is necessary for the entrant to demand access to UNEs and impose unbundling costs on the incumbent. For example,

an entrant can declare that it wants to purchase unbundled local switching, and that it therefore must be made available. Once the incumbent has made the investment to make unbundled local switching available, however, the entrant is not required to purchase that service at all, let alone in sizeable quantities. If the entrant does purchase it, it can stop purchasing it at any time, with no regard for the unbundling costs that were incurred but not recovered. The cost of the unbundling is borne by the incumbent's shareholders and ratepayers.

b) Direct Cost of Unbundling

Mandatory unbundling also results in administrative costs. For example, unbundling already has resulted in increased regulation. Moreover, like many regulatory conditions, competitors that avail themselves of UNEs may come to view these transitory measures as an entitlement, and may demand that UNEs continue to be available long after their initial purpose has disappeared. This is a classic flaw associated with what is known as the "infant industry" rationale.

Often implemented in the form of tariffs to protect a fledgling domestic industry from foreign competition, the infant industry rationale induces policy makers to bestow temporary preferential treatment on a certain industry or class of competitors in order to boost their ability to compete until the industry or competitors mature. In addition to distorting incentives to enter the market, the problem with infant industry protectionism is that it is very difficult to eliminate the preferential treatment once the infant industry is on its feet. As noted by economist Alfred Kahn, "so long as companies are insulated

from competition, they are, to that extent and for that reason, less likely ever to "grow up" - that is to say, attain the ability to compete without such special protections."²⁶

Second, while probably smaller in magnitude than the costs caused by incentive distortions, the implementation costs on the part of the incumbent are also substantial. These costs include the engineering necessary to allow sharing (such as the creation of additional line class codes for unbundled local switching), the costs of management time to monitor the process, and the investment in additional equipment to accommodate shared use. There are real costs that divert social resources away from other productive uses. To these implementation costs, one must add the regulatory costs of designing and administering the process, monitoring the provision of the elements, and resolving the inevitable disputes, all of which are also real social costs.

While it may be socially efficient to incur these costs if doing so promotes genuine competition in the long run, the Commission must consider that the costs of overaggressive unbundling may outweigh any gains. Because this aspect of unbundling is so important, our analysis, as described below, ends with a consideration of the costs versus the benefits of unbundling. As stated previously, the goal of the Act is to increase the well-being of society. If unbundling cannot pass this final part of the test to unbundle an element, then it surely should not be unbundled. When the Act states that the necessary and impair standards must be met "at a minimum," it logically contemplates this type of final screen.

²⁶ Rebuttal Testimony of Alfred E. Kahn, Before the Pennsylvania Public Utility Commission, Docket No. R-00973954, Statement No. 18-R.

D. Definitions of Necessary and Impair

1. Interpretation of the Statutory Language

Throughout our analysis we adopt the interpretation of Section 251(d)(2) that was endorsed by the Eighth Circuit and the Supreme Court.²⁷ Namely, it is our understanding that the “necessary” test applies to elements or aspects of elements that are proprietary in nature, while the “impair” test applies to all elements. Hence, any application of 251(d)(2) requires the ability to identify which elements do and which do not have one or more proprietary aspects to them.

In our view, the term “proprietary” is related to the existence of intellectual property,²⁸ which amply justifies the reason for Congress enacting a strong test for proprietary elements. Therefore, it is not only reasonable but desirable public policy to consider a network element “proprietary” if intellectual property protection has been granted or is pending (patent, trademark, service mark), or would have been proprietary absent or prior to an unbundling mandate, or is otherwise an element that embodies the intellectual property of its owner. Similarly, if an element does not meet the proprietary definition, it necessarily must fall into the complement set of non-proprietary elements.

2. The Correct Definition of “Proprietary” Network Elements

In deciding whether the necessary test must be applied, the Commission must determine whether one or more aspect of an element is “proprietary.” Unfortunately, the

²⁷ Slip op. at 7.

²⁸ The Merriam-Webster Dictionary defines “proprietary” as “1 : of, relating to, or characteristic of a proprietor 2 : used, made, or marketed by one having the exclusive legal right 3 : privately owned and managed and run as a profit-making organization.”

Act neither defines nor elaborates upon what constitutes “proprietary.” Although we are not lawyers, we believe as economists that the proper definition of “proprietary” should flow from the standard conceptions of the term as used in antitrust economics. In particular, we believe the Commission should adopt a definition consistent with that used by the U.S. Department of Justice and the Federal Trade Commission’s Intellectual Property Guidelines.²⁹

Broadly stated, these Guidelines deal with the treatment and licensing of intellectual property “protected by patent, copyright, and trade secret law,³⁰ and of know-how.”³¹ Laws protecting intellectual property “provide incentives for innovation and its dissemination and commercialization by establishing enforceable property rights for the creators of new and useful products, more efficient processes, and original works of expression.”³² The Guidelines’ interpretation is consistent with widely accepted principles in the economic field of Industrial Organization. For example, Carlton and Perloff (1990) note:

“Most economists and policy makers believe that without patents or other government incentives, there would be too little research.... A rational investor engages in costly research up to the point where the expected marginal return from more research equals its marginal cost. If the investor’s return is less than society’s, the inventor tends to underinvest in research. Patents may permit investors to capture a large share of the benefits

²⁹ U.S. Department of Justice and Federal Trade Commission, *Antitrust Guidelines for the Licensing of Intellectual Property*, April 6, 1995, hereinafter *Intellectual Property Guidelines*.

³⁰ Trade secrets, the protections of which derive primarily from state laws, “apply to information whose economic value depends on its not being generally known.” *Intellectual Property Guidelines*, § 1.0.

³¹ *Intellectual Property Guidelines*, § 1.0.

³² *Intellectual Property Guidelines*, § 1.0.

(internalize the externality) associated with the production of knowledge by insulating them from competition. By granting these exclusive rights through patents, society encourages more innovations in some industries.... By providing patent protection to inventors, society obtains two valuable results: greater incentives for additional research and development and an acceleration of innovation through disclosure of inventions.”³³

The economic logic underlying intellectual property law is well-established, and is even articulated in the U.S. Constitution.³⁴

In Section C, we described how a requirement to “share” physical facilities creates a disincentive for further investment in such facilities. The same logic holds true in the context of intellectual property: allowing competitors to freely use Qualcomm’s CDMA digital wireless protocol, giving Pepsi access to the “secret recipe” for Coca-Cola, or permitting free duplication of Lauryn Hill’s latest album (examples of a patent, trade secret, and copyright, respectively) would discourage future innovations by these firms or artists.³⁵ This is not to say that no invention would take place or that all spending on research and development would cease, but these efforts would be sharply curtailed. Although the Patent Office could enhance welfare in the short run by revoking

³³ Carlton and Perloff, *Modern Industrial Organization* (Scott, Foresman/Little, Brown Higher Education, Glenview, Illinois, 1990), pp. 656-661. Although the authors note that patents can lead to “distortions due to monopoly pricing,” they state that alternative incentives to innovate, such as prizes or government research contracts, may not be as efficient unless “the government has sufficient information to induce the optimal amount of research.” p. 670.

³⁴ *The Constitution of the United States*, Article I, Section 8, states that “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.”

³⁵ These inventors are still free to voluntarily license their inventions to others; Qualcomm recently reached a cross-licensing agreement with rival firm Ericsson to jump-start a new global wireless standard. Similarly, Lauryn Hill may allow another artist to “sample” her music in exchange for a royalty on each album sold by the other artist. Coca-Cola, on the other hand, is likely to keep its

these intellectual property protections (since the inventors' development costs are already sunk), the long-run chilling effect on innovation would far exceed any short-term benefits.

Intellectual property is as important to telecommunications as it is to wireless communications, soft drinks, or the music industry. If Ameritech develops an innovative service such as Privacy Manager, it should be allowed to reap the benefits of its research and marketing efforts. Similarly, Ameritech expends significant resources on the routing tables contained in its switches, representing an ongoing expense that is offset by improved efficiency in its network configuration. Permitting competitors to access these proprietary routing tables would be as inappropriate as mandating free access to the LEXIS/NEXIS database, which contains electronic versions of many periodicals, because of the dampening effect it would have on new innovation and risky investments. Our framework would require entrants to show that access to these tables is "necessary" in order to utilize the otherwise non-proprietary element before it would be compulsorily made part of any unbundled offering. If the manner in which the element would be made available makes it technically impossible for the CLEC to self-supply the proprietary feature, then that feature would have to be included in an assessment of whether the impair test is or is not passed.

3. An Economic Framework for Defining "Necessary" and "Impair"

secret recipe to itself, although its competitors are free to attempt to duplicate the flavor independently.

We here provide a formal economic definition of “necessary” and “impair.” In order to provide a workable interpretation of the necessary and impair concepts, we must recognize, first, that the Court held that the evaluation of the “necessary” and “impair” standards requires that the Commission examine both the availability of elements outside of the incumbent’s network and whether, for each element, it would meet the requirements for being a “necessity” or would “impair.”³⁶ As these considerations are likely to depend on actual and projected market conditions, it follows that the application of the “necessary” and “impair” standards must vary by geography, element, and time. Moreover, the terms “necessary” and “impair” must entail different concepts inasmuch as they apply to different aspects of elements (proprietary vs. non-proprietary), and therefore should differ by design.

As stated above, the necessary test must be met for proprietary elements or aspects of elements and the impair test should be applied to all network elements. It is appropriate from a public policy standpoint for proprietary elements to be coupled with a tougher unbundling standard because of the dampening effect unbundling must have on incentives to innovate. Clearly, if Congress had intended the standards to be one and the same, it would not have established different language in different subparts. Therefore, even if the non-proprietary aspects of a network element must be made available under the impair test, a further inquiry is needed to determine whether access to the proprietary

³⁶ Slip op. at 22: “The Commission cannot, consistent with the statute, blind itself to the availability of elements outside the incumbent’s network. That failing alone would require the Commission’s rule to be set aside. ... [T]he Commission’s assumption that any increase in cost (or decrease in quality) imposed by denial of a network element renders access to that element “necessary,” and causes the

aspect of that element must also be made available. Our fundamental premise is that the necessary and impair standards require that access to the element be required only if unbundled access would enable competitive entry where it otherwise would be economically infeasible. Our approach is to examine whether entry and, therefore, competition either currently exists without unbundling, could exist without unbundling, or whether unbundling of the element is required in order to make entry feasible.

The necessary and impair standards should not be interpreted in a manner that facilitates entry by inefficient potential providers. Such an interpretation would not only be undesirable from a societal standpoint, but it would result in a chronic dependence on the uneconomic provision of one or more unbundled elements. For unbundling to be considered, it must be demonstrated that entry is not feasible without access to a part of the incumbent's network. Feasible, for this purpose, can be defined as enabling the entrant to earn at least zero economic profit (in long-run, discounted present value), which includes a normal risk-adjusted return on its investment. Any such analysis naturally requires that the firm demonstrating whether or not the element makes entry feasible be reasonably efficient.

If it is demonstrated that entry is not feasible without access to the incumbent's element, the question arises whether entry would be feasible if the element were unbundled. For this purpose, logically one would also like to define the viability of entry in terms of a "reasonably" efficient competitor or a similar criterion. It is certainly true

failure to provide that element to "impair" the entrant's ability to furnish its desired services is simply not in accord with the ordinary and fair meaning of those terms."

that, if the unbundled element were offered at a zero price (to take an extreme case), a great deal of entry would be feasible that would be infeasible without such unbundling. Encouraging entry by providers who could only make a business case if they got the element for *free*, however, obviously would be unwise from a societal point of view because such providers are clearly inefficient. The point is that the *price* at which the element is assumed to be supplied is critical to, and sufficient for, a determination of which firms would be considered “reasonably efficient.” We here adopt the criterion that the price at which UNEs would be available is a TELRIC-based price. “Reasonably efficient” firms are, therefore, those that could make a viable business case with the purchase of the relevant UNEs at TELRIC-based rates.

As discussed above, every element must be subjected to the impair test. Only elements that have one or more proprietary aspects or features must additionally be subjected to the necessary test. With respect to the impair test, the fundamental question is whether the element either is or can be self-supplied by a competitor and, if that is not feasible, whether provision of the element by the incumbent would make entry viable. If an element must be provided as a result of the impair test, and such an element contains proprietary components, then it must be determined whether it is necessary also to provide access to the proprietary aspects of the element. Therefore, in instances where the element has proprietary aspects, some consideration must necessarily be given to the feasibility of use of the non-proprietary aspects: (a) without the proprietary feature at all, (b) with the proprietary feature self-supplied, and (c) assuming the feature is necessary and it is not feasible to self-supply it, whether inclusion of the proprietary feature by the

incumbent would then make entry viable. Again, every element must be subjected to the impair test; however, whether the test is applied to the element with or without the proprietary feature (if any) depends on the necessary test. The basic nature of the impair test is precisely the same in either case. The general impair test is:

Element *x* satisfies the impair standard if:

- A. there is not at least one supplier in the relevant product and geographic market that is self-supplying *x* (or a substitute) or purchasing it or a substitute from another source;
- B. there is no current supplier in the relevant product and geographic market and there is no potential supplier to the relevant product and geographic market that could enter within a two-year period and expect to earn non-negative discounted present value economic profits; and
- C. there is at least one firm that could profitably enter if it had access to *x* at TELRIC-based rates.

In advocating a TELRIC-based price as the price on which the analysis should be based, we recognize that the FCC has adopted TELRIC and the courts have supported its right to do so. However, we wish to emphasize that when we are referring to TELRIC, we are referring to a *realistic* forward-looking cost, not an idealized, hypothetical misinterpretation of the TELRIC concept.

The TELRIC to an incumbent of providing service should reflect the cost that the incumbent will incur to provide that service on a going-forward basis. This should reflect the technology the incumbent will adopt going forward, and the costs of inputs it will bear, because these reflect the incumbent's actual forward-looking costs: the incumbent will provide service using the best available technology that it finds

economical to adopt, and will employ inputs such as capital and labor at market rates, rather than historical rates. This understanding of forward-looking costs is supported explicitly by the Commission in its First Report and Order:

“This benchmark of forward-looking costs and existing network design most closely represents the incremental costs *that incumbents actually expect to incur* in making network elements available to new entrants. (emphasis added)”³⁷

Hence, forward-looking costs must be estimated on the basis of what the incumbent is likely to actually incur, not what could be incurred in an idealized world.

Other economists share this understanding of forward-looking costs. For example, according to the renowned economist Professor Alfred Kahn,

“The general economic principle...requires that the correct pricing ‘signals’ inform consumers of the costs that society will actually incur if they take somewhat (or a lot) more of each good or service- or that society will save if they take less. These can only be the actual incremental costs of the incumbent companies.

...In unregulated markets, prices tend to be set on the basis of the actual costs of incumbent firms. That gives challengers the proper target at which to shoot, the proper standard to meet or beat and the proper reward if they succeed. If they can achieve costs lower than that, they will enter and in the process (which the FCC’s pricing rules would short circuit) beat prices down to efficient levels. Ultimately, only the market, and not regulators, can determine the efficient result.”³⁸

³⁷ *First Report and Order*, at ¶ 685.

³⁸ Letter to Reed E. Hundt, January 14, 1997, pp. 1-2.

As noted by Dr. Kahn, basing prices on true forward-looking costs is the means by which more efficient firms have the opportunity to enter and make a profit. If prices were based on idealized costs, no firm, even if it were truly more efficient than the incumbent, could enter and profit from its enhanced efficiency. Prices based on idealized costs do not promote competition; on the contrary, they impede entry, and they impede competition.

Importantly, our impair analysis involves three discrete steps. If there is an actual competitor, the impair test is not satisfied and no unbundling is required. Second, if there is not an actual competitor, then the question of viability for at least one potential competitor self-supplying or purchasing its own element must be assessed. If this is possible, then the impair test is not satisfied and no unbundling is required. Third, if the first two steps are passed, an assessment must be made as to whether provision of the element by the incumbent at TELRIC-based prices would enable an entrant to be viable. If such provision would not make entry viable for at least one potential competitor, then the third step of the impair test would also not be satisfied and no unbundling is required.

The Necessary Test

When one or more proprietary features are associated with an element, the necessary test must be applied. The necessary test is a technical, rather than an economic, test, and addresses whether an element feasibly can be used by a CLEC without the incumbent's proprietary feature, i.e., whether the proprietary aspect of the element is "necessary." The necessary test intersects with the application of the impair

test when the element has proprietary features. Four possible scenarios exist. First, the entrant may be able to self-supply the entire element, including the proprietary feature. In this case, no access is required since the impair test is not met; it is unnecessary even to analyze whether the necessary test needs to be applied, as it clearly does not. Second, if the impair test is passed under the first scenario, that is, if it is technically possible but not economically feasible for an entrant to self-supply the *non-proprietary* aspect of the element, additional analysis is required to determine whether access to the proprietary aspect of the element is "necessary." If the proprietary function, feature or capability is not needed to make the element usable, then the proprietary aspect fails to meet the necessary standard. In that event, there should be no requirement to include that proprietary aspect in any possible provisioning of the non-proprietary aspect of the element by the incumbent. The third possibility exists where proprietary aspects associated with an element are critical or integral to the functionality of the element but technically could be self-supplied by the CLEC. If so, the issue is whether the proprietary aspect must be provided by the incumbent or whether the entrant economically could provide its own substitute for the proprietary aspect. If the proprietary aspect (or a form thereof) is critical to the functioning of the element, the necessary test would be passed for the proprietary feature, and the impair test would address whether the self-supply of that proprietary feature, while purchasing the non-proprietary element itself from the incumbent, would be feasible. For example, a routing table is essential to the functioning of a switch; the impair test would assess whether a competitor could self-supply its own routing table, thereby obviating the need to unbundle Ameritech's proprietary routing tables. If the firm could use the non-